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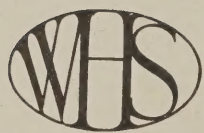
APPEALING TO THOSE ENGAGED IN

THE ART OF BUILDING.

*IT is our aim, our ambition, our aspiration even,
to build our Journal worthily and well, not
for the hour only, but for future years; for the
few men in the forefront of an enduring and
a laborious Art; for the disciplined ranks of a
distinguished Profession; for the young men—
Architects to be—and for all who love a clustered
column or a flying buttress, a traceried window
or a Greek frieze; for the man, too, who honestly
plumbs a jamb*

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Architects and the General Election.

WITHOUT entering the political arena we may opportunely make comment on the forthcoming General Election in so far as architects are concerned. It is regrettable that so few of the candidates are men possessing an enlightened sense of architectural and kindred matters. These matters have been flagrantly neglected by the Legislature. How often large Government buildings are spoiled for a few extra thousands which are wasted upon schemes that do not give any such return. Bills which come before the House of Commons framed by private commercial companies often interfere with existing monuments of architecture, and it is a great pity that there is no body of influence in the House that could be trusted to decide properly in regard to these matters. While nearly all the leading professions of the country, such as the legal, medical, naval and military, and clerical, are represented in Parliament, the architect and artist are practically unrepresented, while the civil engineering profession and building trades are very inadequately represented. The only candidate of the architectural profession we have noticed in the lists is Mr. T. B. Silcock, of the firm of Silcock & Reay, of Bath, who is putting up for the Wells division of Somerset. It is characteristic of the architectural profession that its members are somewhat retiring and do not take sufficient part in municipal life: and this applies still more to parliamentary life. It is to be

regretted in more ways than one because the constructive professions lead men to a somewhat wider outlook which would be especially serviceable to a statesman needing such knowledge, whereas the legal fraternity, whose abilities are more destructive, or tend merely to archæology, have exploited Parliament rather too much. In the direction of building by-laws for sanitation and hygiene the architectural profession can give valuable aid in legislation, while by their influence in that larger aspect of beautiful surroundings which makes for the well-being of the person and the cultivation of his higher intellectual faculties the architect and the artist are paramount. We think it is the duty of leading members of the architectural profession to put aside their personal disinclination to enter into political life, and thus aid in promoting the interests of the public and the dignity of their profession.

The Contractor's New Position.

THERE is a feature in the American contractor's business which promises to make its way into English practice; in fact, it has been adopted already by one or two firms here. On previous occasions we have referred in these columns to the anomalies of the present contracting system and to the evils of the ruinous competition which goes on—a competition which tends to dishonesty and what is practically betting on chance. The American contractor has, however, realized that there is a possibility of his making a legitimate profit by the use of new methods of contracting, and saving of labour and time in every direction. In such a system the contractor occupies the position of a true business organization, and has on his staff several commercial engineers (if they might be so called) whose function it is to keep abreast of all modern methods of construction and inventions. When a contractor is tendering for a job these engineers are called in to overhaul the architect's drawings and to see how they can in the design of the steelwork and the provision of mechanical plant convenience and expedite the erection of a building and save in the amount of material, while at the same time in no way interfering with the architect's design. In the building of heavy walls, for instance, they would propose to substitute stanchions at intervals and fill in between with thin partitions. Thus the compartments would be exactly the same and yet the ground area would be economized and all the heavy labour of erecting a substantial brick wall done away with. In this manner the engineers go over the whole of the design and see where it is possible to substitute any form of construction which is just as efficient but somewhat more economical. Of course it may be thought that this is taking away something from the architect which is within his

special province—and so in a sense it is—but we are inclined to think that after all there is no real loss to the profession. Such a method only applies to large buildings. There is a great deal of routine work to be done by the staff of an architect, and it only means placing a portion of this staff under the control of the contractor where they can gain that experience which is necessary to enable them to appreciate all the little points that make for economy. The architect in modern times has been more and more divorced from practical work and the control of the workman. The consequence is that he very often designs from theoretical knowledge, and his construction, though doubtless sound, is not progressive; whereas the contractor has continually to deal with those practical problems with which the architects of former times had to deal. This divorcing of the architect from practical work has always been decried by the leading men of the profession as naturally stagnating architectural progress and being most disastrous to artistic design. The architect now seems to be more and more relegated to the position of planner and chief organizer, and the fact that under this new method of contracting he retains his control over the contractor's staff means that his responsibility is in nowise decreased. These engineers that revise his plans and prepare their own constructional diagrams are only craftsmen in their particular part of the work, and the architect is still the organizing master of all the crafts. When very large works are undertaken in America they are usually in the hands of architects, who have such big staffs that they can do without the assistance of the engineers in the employ of contracting firms. Naturally this would always be best in such circumstances, but it would be impossible for an architect to retain very highly-skilled engineers unless he had a large quantity of work, whereas the contractor with his large turnover and capital can keep such skilled men in employ and when an architect with a smaller practice has need of their assistance he obtains it without risking anything. Of course, there is not so much competition, but what competition exists is sufficient to keep the price at a reasonable figure, and in any case the building is executed at a cheaper price than it would be under the ordinary system. This newer method, therefore, is in our opinion a warrantable innovation in this country. A contractor who obtains work in this way knows that he will be met by the architect with every desire to assist him to profitably execute the work, and he of course gives a guarantee, so that there is every reason for him to do his work honestly and well and not look upon the architect as a policeman for the client whom he is endeavouring to fleece because competition ever presses him towards it.

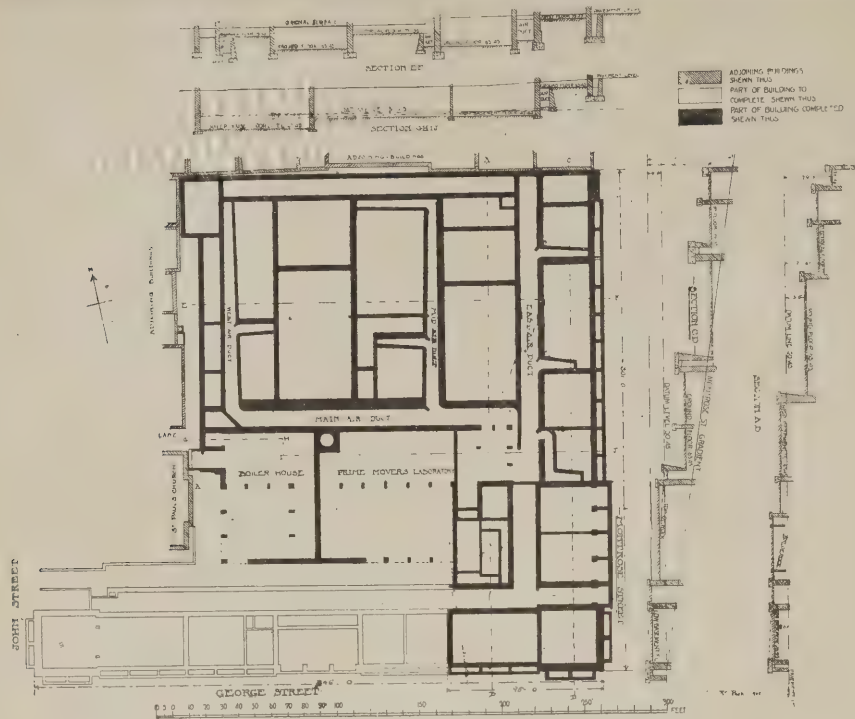


FIG. 1.—G. ASGOW TECHNICAL COLLEGE: PLAN OF MAIN WALLS AT FOUNDATION LEVEL.

UNDERPINNING.*

By R. PARK.

IN preparing this paper it has been my intention not to deal with underpinning as carried out generally, but rather to attempt to describe the method of underpinning and shoring carried out successfully for the buildings on the north, south and west sides of the new technical college at Glasgow.

Before dealing with the underpinning it will be well to describe briefly the site of the buildings, so as to give an idea of the slope of the ground. On plan (see Fig. 1) the portion of the building now occupied is of the shape of a rectangle, 850ft. by 301ft., having a small rectangle, 155ft. by 68ft., cut out at the south-west angle, but when the original plan is completed it will then be a rectangle 346ft. by 301ft., with a small part wanting at the north-west angle. The south frontage, or what is better known as the George Street front, will then be 346ft. long. Meantime the present section extends only 95ft. of this length, the basement floor being about 8ft. below the street level, which latter has a slight fall westwards. The east frontage, or Montrose Street front, is about 300ft. long. Here the slope or rise of the street is 1 in 7, there being a difference in level of 43ft. between the south-east and north-east angles of the new buildings, the low basement floor being 8ft. below the pavement level at the south-east corner, while what is known as the high first floor is about 14ft. below the pavement level at the north-east corner. This can be better understood by the section c d on Fig. 1, which is a section through the Montrose Street wing, showing what may be termed four different ground-floor levels. Fig. 1 shows four sections of the site with the ground-floor levels, and also the original surface level, from which a better idea of the site can be gained than from any written description. This plan also shows the adjacent buildings on the north and west sides, nearly all of which had to be underpinned.

At the outset I may state that when reference is made to the ground floor it is to be taken as the floor immediately overlying the

excavated surface, as there are five different levels which can be taken as relating to the ground floor, there being a difference of 37ft. between the highest and the lowest.

I will treat first the underpinning on the north side, as all the adjacent buildings on this side had to be underpinned; and here I may state that the difference between the ground-floor level (or what is known as the electrical-floor level at this part) of the new buildings, as compared with the ground-floor level of the adjacent buildings, is at some parts as much as 20ft., and in some cases the pits sunk for the concrete were 23ft. deep, measured from the underside of the foundations of the adjacent buildings.

The north boundary is about 250ft. long, and the whole of this had to be underpinned from end to end. The method adopted was as follows:—All the soil above the level of the foundations of the adjoining buildings was first removed; then a pit 6ft. by 4ft.

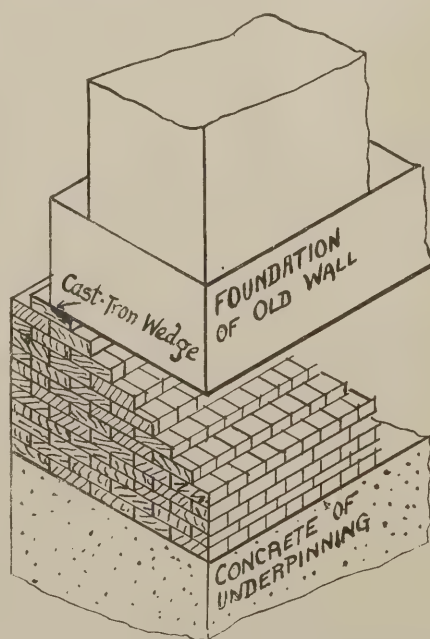


FIG. 3.—STEPPING OF BRICKWORK ON TOP OF CONCRETE.

was excavated hard against the wall of these buildings to a depth of at least 4ft. below the underside of the foundation of the adjoining building; so forming what is termed "an access opening," this opening giving the workmen access to the pit, 4ft. by 4ft., that had to be excavated directly underneath the foundation of the walls of the adjoining buildings.

The material which was excavated from these pits was of a loamy nature, overlying a soft clay; therefore a system of close timber sheeting had to be adopted to keep the adjoining earth in a firm state; underneath this soft clay was firm boulder clay. The pits were excavated until the firm boulder clay was reached, and to a depth at least 3ft. below the ground-floor level of the new buildings, so as to allow for the depth of the foundations of the new buildings being below floor level; but the boulder clay was generally more than 3ft. below the ground floor of the new buildings. A glance at the elevation of the underpinning for this wall (Fig. 2) shows the boulder clay to be from 5ft. to 8ft. below the ground-floor level.

After the firm boulder clay had been reached the pit was immediately filled up with concrete (composed of 5 parts of broken brick, 2 parts of sand and 1 of cement) to a height of about 3ft. from the underside of the old foundation, the concrete being allowed to stand from ten to fourteen days so as to give it time to set. The remaining 3ft. was then built up of brickwork and cement in the following manner:—The bricks were stepped upwards from front to back, so that when the inner top row of brickwork reached to the underside of the old foundation, it was directly keyed up with cast-iron wedges, and then another course was commenced on top of the last course at the front, stepping inwards and keying up similarly on reaching the old foundation with the top course, and so on until the last course at the front was reached, thereby ensuring that the wall was keyed up throughout its entire thickness. (See Fig. 3.)

The pits which received the concrete were made about 20ft. apart, so that the concrete and brickwork which was put in the first pit was sufficiently set to carry the weight of the wall before the pit adjoining it was excavated, there being generally three or four of these pits in progress at one time, but all in different stages of advancement.

The only part where shoring was used is shown on the elevation from A to B (Fig. 2), this being the part where the deepest of the underpinning was done. The adjoining building is used as a stable, and, as already noted, the difference of ground-floor levels is 20ft. As it was found that the underside of the foundation of this building was 10ft. above the original surface level, the earth or clay underlying this foundation being apparently held in position by an old wall (which is shown in section of pit No. 33, Fig. 4), this old wall had to be removed; its removal, however, presented no difficulty, owing to the old and crumbling condition of the wall.

The shoring used here consisted of seven steel beams of a heavy section let through the wall at the positions indicated on the elevation, and immediately above the level of the ground floor of the stable, one end of the beams resting on sole-pieces lying on the granolithic floor of the stable, the sole-pieces lying parallel to and at a distance of about 20ft. from this wall, so as to keep the pressure exerted by the weight of the wall on the ground under the granolithic floor well back from the old wall where the excavating for the pits was being carried out, the other end of the beam being supported on an upright timber resting on a platform composed of old railway sleepers.

The stable building is of recent construction, and the architect appears to have had

*A paper read before the Glasgow and West of Scotland Technical College Architectural Craftsmen's Society.

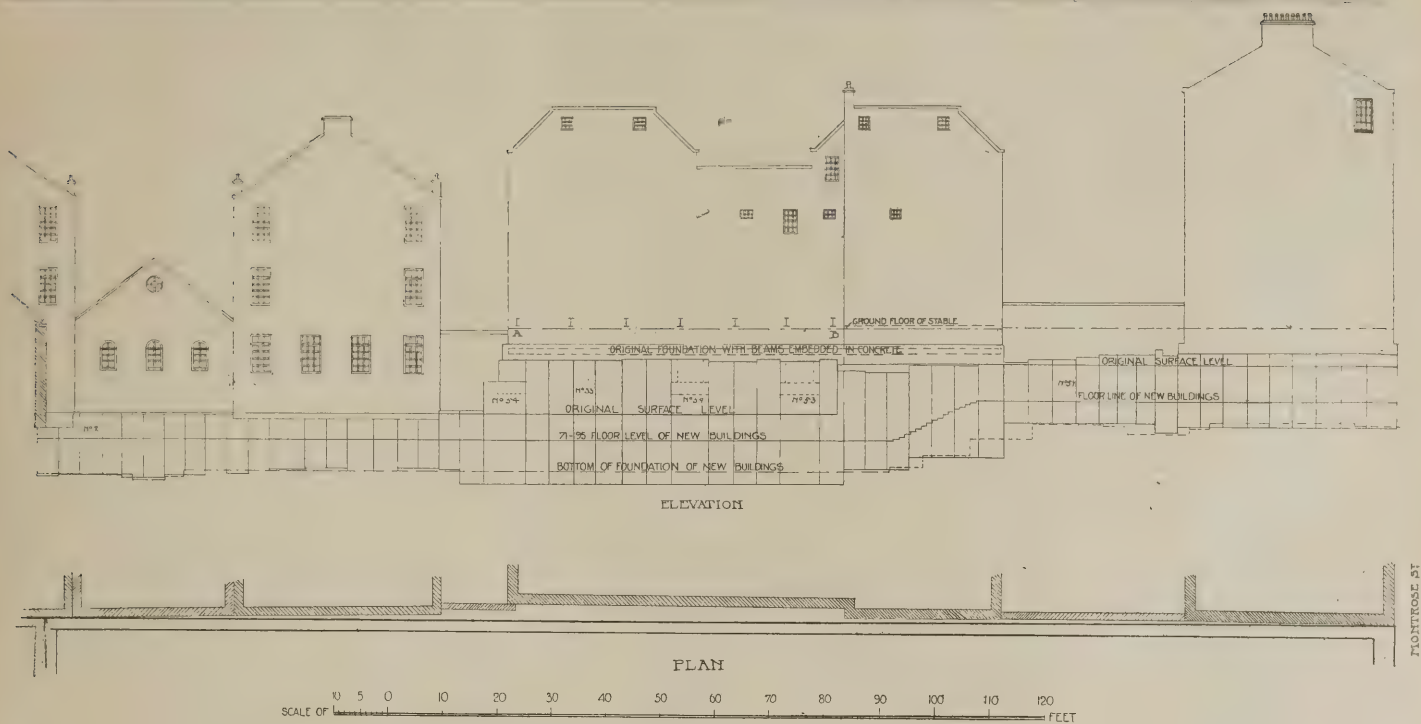


FIG. 2.—UNDERPINNING OF BUILDINGS ADJOINING NORTH WALL.

some doubt about the stability of his foundation; he relieved his conscience by placing in the concrete longitudinally sets of two 6in. by 4in. joists of various lengths, and to support these joists he had excavated three pits about 5ft. by 3ft. 6ins. by 6ft. 6ins. deep, into which some rough concrete was thrown to a depth of about 2ft. 6ins.; on top of this concrete brick piers were built hard up to the underside of the old concrete foundations containing these joists.

The nature of the soil underlying the foundations of these piers was not sufficiently stable, and even assuming that the soil had

been of a firm and compact nature it would have been necessary to remove the soil and underpin these piers, as the underside of the concrete blocks was from 8ft. to 9ft. above the ground-floor level of the new building at this part.

These piers are shown by dotted lines at pits Nos. 53, 54 and 59 (Figs 2 and 4). As may be seen from Fig. 2, they are longer than any of the others, owing to the fact that in excavating the pits underneath them it was advisable to excavate their full length at one operation, but they were among the last to be done, the brick piers with their

foundations being removed, and the underpinning carried right up to the underside of the foundations containing the iron or steel joists.

The method of timbering adopted to keep the adjoining earth in position during the excavation of the pits consisted of 9ins. by 3ins. timbers placed horizontally as soon as a depth of from 9ins. to 12ins. was excavated. These timbers were inserted by placing in position two timbers parallel to each other, and at a distance apart equal to the thickness of the concrete of the underpinning, these two being held in position by driving

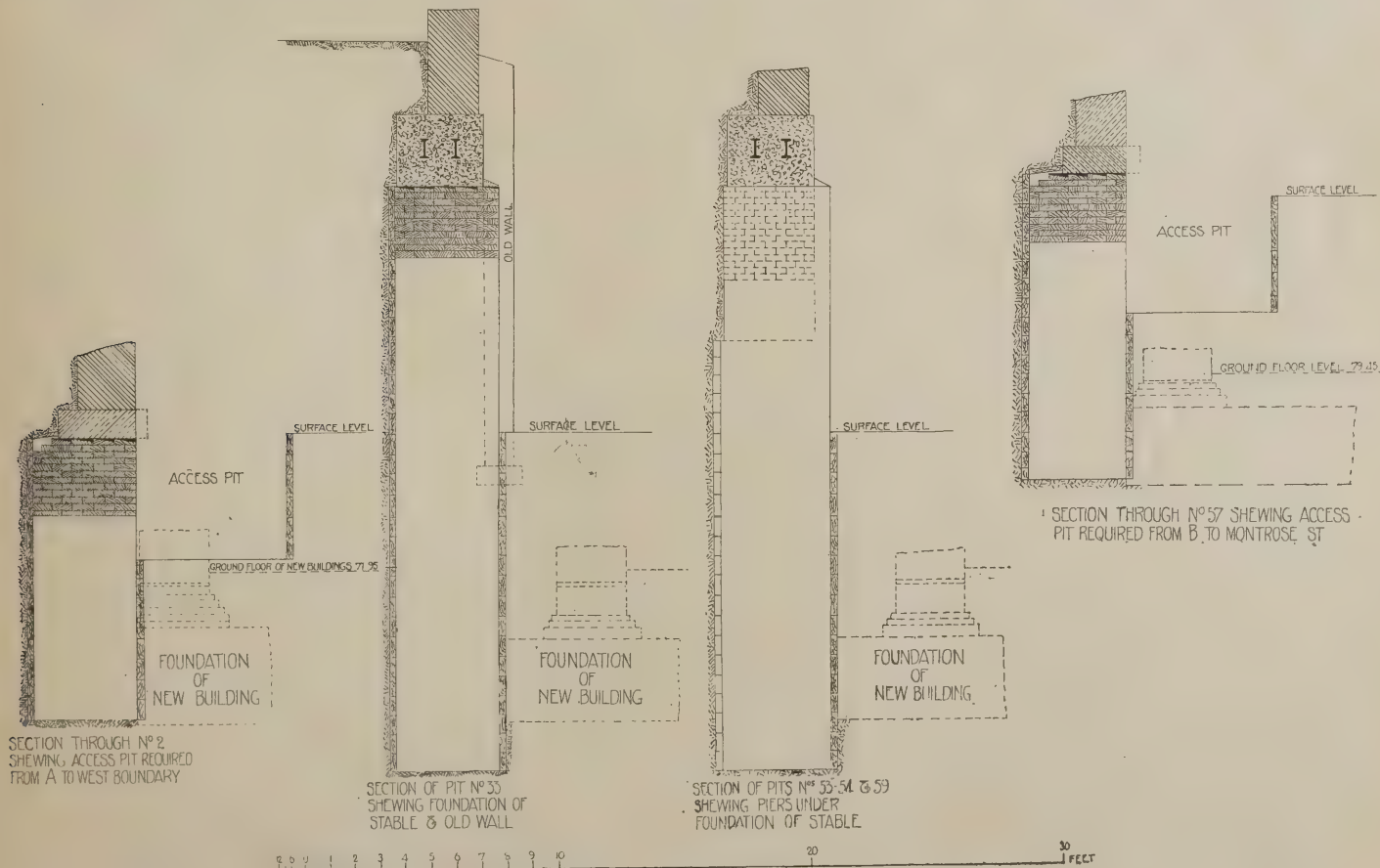


FIG. 4.—SECTION OF UNDERPINNING AT NORTH BOUNDARY.

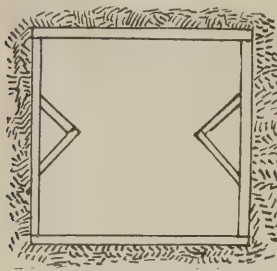


FIG. 5.—TIMBERING IN POSITION.

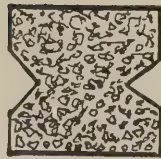
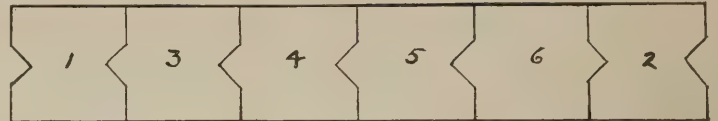
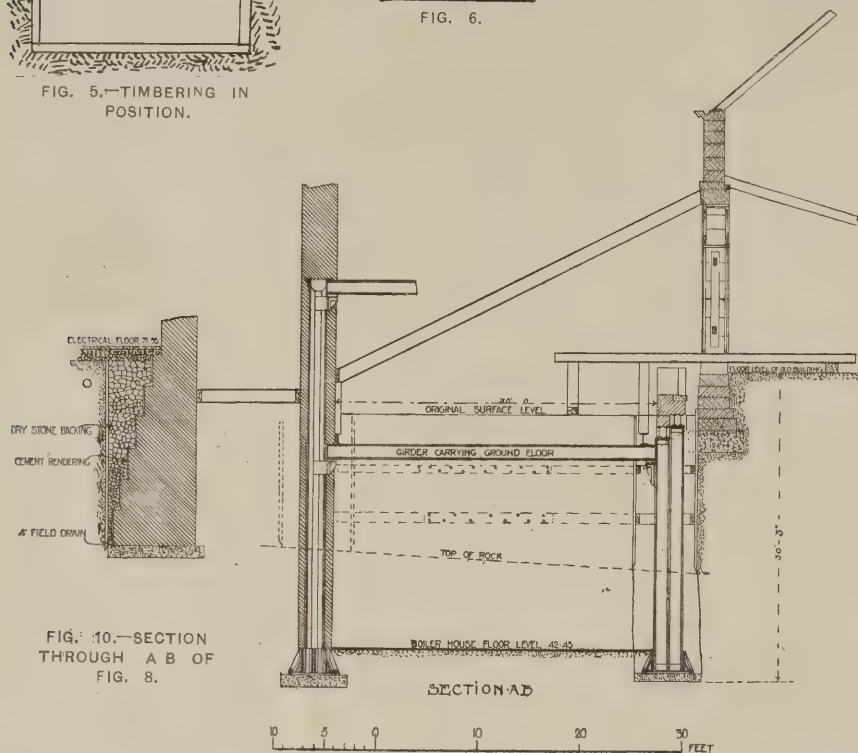


FIG. 6.

FIG. 7.—SHOWING BONDING OF CONCRETE.
(The numbers refer to the method of filling in.)FIG. 10.—SECTION
THROUGH A B OF
FIG. 8.

other two timbers in between them and at right angles to them and then excavating for another foot or so and again inserting another set of timbers, and so on until excavated to the required depth.

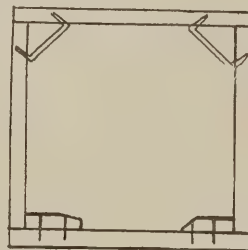
Before the concrete was put into the pit, two boards about 9 ins. wide were nailed at right angles to each other. They were then placed vertically against the sides of the pit, and at an angle of 45 degs. to them, these forming a concrete block which on plan was of the shape shown in Figs. 5 and 6, the reason for which will be explained later.

On coming to excavate the pit adjoining this last, one set of the gin. by 3 in. timbers was relieved from the side of the pit which had already been filled with concrete, and was again used for one of the sides of the pit which was being excavated, but the timber on the side next the concrete already in had to be removed as the concrete was put in, otherwise this timber could not have been got out, and besides would have prevented the concrete in one pit bonding with that of the next.

The vertical pieces which were fixed to the sides of the pit could also be removed on excavating the adjoining pit, and fixed in a new position. In this way the timbering was used repeatedly, and the only timbering that could not be got out was that at the back of the pits, as on excavating for the foundations of the new buildings the timbering in front was got out and again used in other positions.

The pieces already referred to as being fixed vertically up the sides of the pit served the purpose of forming a joggle in the concrete, thus keying the concrete of the pits into each other, and thereby tending to bond them all together (Fig. 7).

The underpinning of the west boundary was carried out in a similar manner to that of the north boundary. On this side it was only considered necessary to underpin two of the adjoining buildings, as there is a space of

FIG. 9.—SHOWING METHOD OF HOLDING
WALES IN POSITION.

about 10 ft. between the walls of the adjoining buildings and those of the new college, with the exception of 57 ft. at the north end, where the new college buildings project out and so form what is known as the north-west stair, and the wall of this projecting part is close up to the wall of the adjoining building.

The underside of the foundation of this building was found to be only 6 ins. below the ground-floor level (or what is termed the electrical-floor level) of the new college, and underneath this foundation there was soft clayey soil. It had therefore to be underpinned. The underpinning of this length of 57 ft. is on an average 10 ft. deep. At this depth a bed of clay was reached, which, although not a boulder clay, was considered to be of sufficient solidity to carry the adjoining buildings, which were only one storey in height. To avoid additional digging and underpinning the foundations for that part of the new buildings which formed the north-west staircase, the whole area of the staircase was covered with a layer of concrete 3 ft. thick, in which several 16 in. by 6 in. steel beams were placed. This part of the underpinning was completed without shoring of any kind.

The necessity for the underpinning of the other building on this boundary, although there is a space of 10 ft. between them, was partly owing to the height of the old buildings and partly to the difference of level between the bottom of the foundations of the old and new buildings, this difference being 14 ft.; and also owing to the nature of the soil that was encountered at this part of the excavations, consisting of very soft clay or slurry overlying the solid rock. This rock has a dip towards the south-east, and as its surface was practically coincident with the floor-level required for the air ducts at this point, there was no hesitation in removing the soft clay or slurry overlying the solid rock, and so ensuring a good foundation here. The length of this part of underpinning required for the adjoining building was 50 ft. 6 ins. It was carried down 8 ft. below the underside of the original foundation.

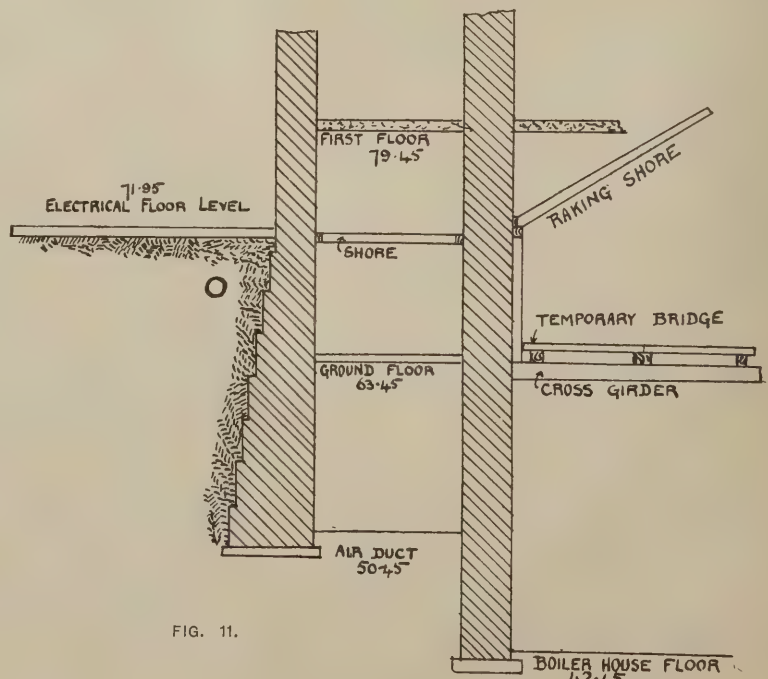


FIG. 11.

To give an idea of the softness and tenacity of the clay or slurry at this part, I may say that the excavators when working in the trenches were provided with deep sea boots to keep themselves dry, and if they did not use a plank to stand on (so as to distribute their weight over a larger area), or keep moving from one position to another, they gradually sank into the clay, and it was no easy matter to get them extricated from it if once they went beyond a certain depth. On one occasion two of the excavators were needed to remove the slurry from around the sea boots of a third who had taken too long to get his cutty in good going order; and at other times some of them, in trying to extricate themselves, managed to wriggle free, but left their boots remaining in the slurry.

At the south end of the west boundary of this section of the new college buildings stands St. Paul's Church. At one time it was thought that the east wall of this church might require to be underpinned also, but on sinking a pit alongside this wall it was found that the foundation of the church was resting on the solid rock, and as this pit had been sunk opposite the south wall of the back wing of the new college (A, Fig. 1) it was taken for granted that the remainder of the foundations of this wall northwards would also be resting on the rock, and on excavating later for the wall of the coal chute to the boiler-house this supposition was found to be correct.

Another place where it was considered advisable to underpin for a length of 34ft. was at the east gable of the old Andersonian Buildings, owing to the foundation at the north end of this gable not having been carried down to the rock. The underside of the foundation of this length of 34ft. was 15ft. above the ground-floor level (or what is known as low basement floor level), but it was not necessary that this full depth should be underpinned, as the surface of the rock was 6ft. above the ground-floor level, so that the underside of the foundation of the Andersonian College was about 9ft. above the surface of the rock. This foundation was gradually stepped downwards as it approached George Street, and at a distance of 34ft. from the north wall of the Andersonian College it was found to be resting on the rock.

The shoring required here consisted of two raking shores placed on the north-east angle of the Andersonian College. These shores are shown in position on the drawing of the elevation of the back wall of the Andersonian College on this page. The necessity for them is quite apparent, owing to the thrust of the arch acting on this angle of the building, the two arches at the east end of the building being supported on centres. These will be referred to when describing the shoring necessary for the construction of the south wall of the back wing of the new college.

It might be asked, Why underpin the Andersonian College, when it is going to be removed shortly?—but I must ask you to remember that the underpinning that I am dealing with was done towards the end of 1902 and the beginning of 1903. We now know that the old Andersonian College had still to be used for two years, but the thickness of concrete used here was only 3ft., as against 4ft. at the other buildings which were underpinned.

The concrete was prepared in the following manner:—The cement was first mixed as mortar, then mixed with brick in the proportions of 5 of broken brick, 2 of sand, 1 of cement and 1 of water by measure, the brick being broken to pass through a 3in. ring. Although the outside of the blocks was dry, it was seen after the tests that the inside was quite damp. A piece of the concrete was secured in a large block and removed to the contractors' yard, and there cut up into cube blocks, which blocks were to be tested to

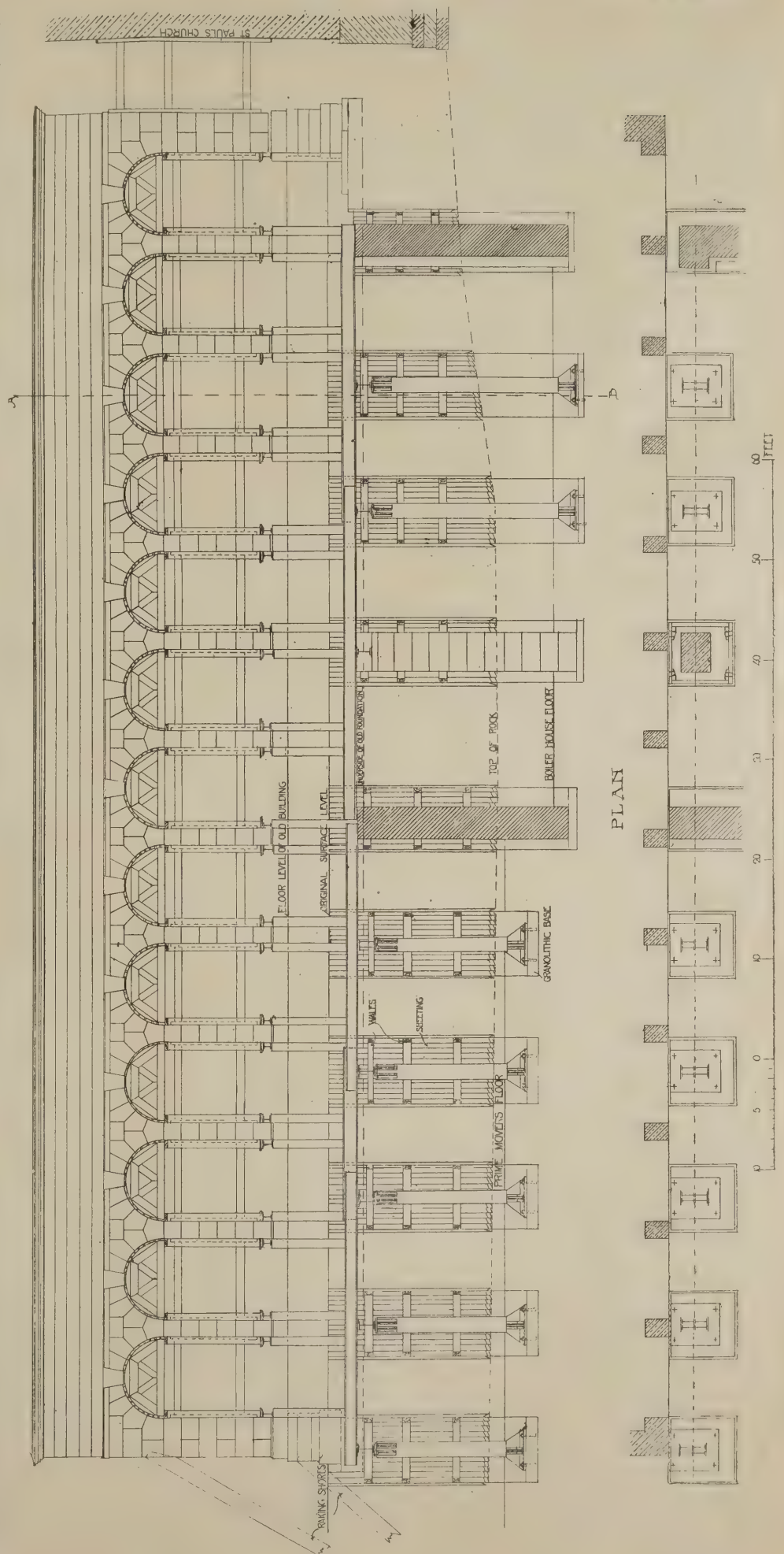


FIG. 8.—BACK ELEVATION OF OLD ANDERSONIAN BUILDINGS, GLASGOW, SHOWING STEEL STANDARDS CARRYING SOUTH WALL OF BACK WING OF NEW COLLEGE BUILDING.

show the weight or load required to fracture or crack them.

As these results have not yet been obtained, I am unable to state them here, but I can give you the results of this same concrete six weeks after making, namely:—

Cracking load	-	-	4½ tons per sq. ft.
Maximum load	-	-	58 " "

Load applied by hydraulic pressure to 2ft. cubes at the rate of about 10 tons additional per minute.

A commencement was made with the excavation of the first pit on October 16th, 1902, and the last one was keyed up on March 17th, 1903, the whole underpinning occupying five months. There were ninety-one pits, containing about 740 cub. yds. of concrete and brickwork.

The Andersonian College.

We now come to the treatment adopted for the north or back wall of the Andersonian College, which was 134ft. long, carried by thirteen arches resting on stone piers and the two abutments at the ends (see elevation of this wall, Fig. 8). Here there was only a space of about 15ins. between the external faces of the walls of the old and new buildings—just sufficient to allow the building of the new wall without interfering with the projecting cornices of the Andersonian College. The differences between the ground-floor levels of the old and new buildings at this point were 22ft. and 27ft. at the east and west parts respectively. This difference of 5ft. is due to the boiler-house floor being 5ft. deeper than the floor of the prime-movers' laboratory. It was found that the distance from the underside of the foundation of the Andersonian College to the boiler house floor was 19ft., yet here it was determined to do without underpinning this old wall of the Andersonian College, owing to the fact that the wall to be erected was carried on one stone pier, three brick piers, and a series of built steel standards composed of four 16in. by 6in. joists and two 18in. by ½in. plates, these standards being placed at a distance of 12ft. 8ins. from centre to centre and extended 2ft. above the next floor. Advantage was taken of this wall being carried by these piers and steel standards, as by the adoption of the following method no underpinning was required:—

Avoiding Underpinning.

The first thing to be done was to support all the remaining arches of this old wall, two of them at the east end having already been supported previous to the underpinning of the gable at this end. The centres supporting these arches were constructed of 9in. by 3in. timbers, carried on 9in. by 3in. uprights, the uprights resting on steel beams with the usual slack blocks between, the steel beams being from 24ft. to 30ft. long so as to allow them to project beyond the line of the walls and at the same time to be clear of the pits that were excavated to receive the steel standards. One end of these steel beams rested on horizontal timbers lying on the concrete floor of the old building, while the other end was supported on an upright timber resting on a sole-plate lying on the solid ground. As the east abutment was already supported by two raking shores, this end was considered secure, and the west abutment was secured by inserting three horizontal shores between the abutment and the wall of St. Paul's Church. The slack blocks under the uprights carrying the arches were then driven tight, so that the centres should take the weight of the arches and the walling above, and thereby relieve the weight on the stone piers in the event of any settlement.

Upright timbers were then placed against the sides of the stone piers and held in position by driving two horizontal pieces in each space, this being adopted to keep the piers perpendicular.

The position of the centres of the new piers and steel standards was then set out, and pits 6ft. 6ins. square excavated to the necessary depth to receive the steel standards, this depth being 21ft. at the prime-movers' laboratory and 26ft. at the boiler-house below the original surface level. The earth or soil encountered in the excavation of these pits was of the same nature as that last described—soft clay overlying the rock, so that timber sheeting had to be used until the surface of the rock was reached, the top of the rock varying from 13ft. to 16ft. below the original surface.

Timber Sheeting in Pits.

The timber sheeting used in these pits was 6½in. by 2½in. battens; the wales were half timbers 12ins. by 6ins.; but the sheeting was not inserted horizontally, as in the pits for the underpinning, but placed upright, the lower ends being bevelled obliquely from one face only, so that after the first batten was driven into the ground the next one was placed against it, with its longest edge to the edge of the one already driven; thus in driving the sheeting this oblique point kept the edges hard against each other, and thereby prevented the soft slurry from penetrating between the joints of the sheeting.

In driving the sheeting the pit was first excavated as deep as possible, without the timber sheeting, which was then inserted and driven down by using a heavy wood mallet, the workmen sometimes requiring to erect a scaffold to drive the timbers owing to the top ends of the sheeting being so far above surface level. Two wales were then inserted, one on each side parallel to each other and kept in position temporarily with iron dogs. Other two wales were then driven hard in between the first two, these last two being held in position by driving iron dogs across the angle formed by the wales, or by cleats secured with spikes, as shown in Fig. 9.

A space of about 1in. was kept between the sheeting and the wales to allow for the insertion of hardwood wedges, as the timber sheeting could be driven in the exact direction by slackening or tightening these wedges.

Rock Foundation.

After the top row of wales was fixed in position more of the soft clay or slurry was removed until the bottom of the timber sheeting was reached; then the sheeting driven further down, the hardwood wedges being tightened or slackened as required. Another row of wales was inserted in the same manner as the first row, and then more of the soft clay removed, and so on until the surface of the rock was reached. The rock was then removed to the required depth, blasting being necessary to slacken the rock in most of these pits. A wooden template which held the rag bolts to secure the steel standards was then placed at the desired level, and a foundation or levelling block was put in (consisting of granolithic and cement, 2 of the former to 1 of the latter), which was brought up to a level of within ½in. of the underside of the sole-plate. After this granolithic block was set the template was removed by unscrewing the nuts off the rag bolts. The standard was then lowered and set in position by inserting cast-iron wedges between the block and the sole-plate. By using these wedges the steel standard could be set exactly vertically and at the required level. A fillet of clay about 1½ins. high was then formed on the surface of the granolithic block, right round the edges of the sole-plate and at a distance of 3ins. from the edge. The space between the granolithic block and the sole-plate was then filled up by pouring cement-grout through a hole provided in the plate for this purpose until it came out at the edges of the sole-plate and rose to the top surface of the plate, the fillet of clay keeping the cement-grout in the required position and preventing

it running over the whole surface of the block. It was then allowed to stand for a few days until the grout was set. The nuts of the rag bolts were then tightened up, and the earth was then removed to allow the cross-girder (which rests on the brackets of the steel standards) to be placed in position and secured with bolts. These girders carry the 5in. by 4½in. steel joists which are placed at about 24in. centres and encased with concrete (composed of ashes and cement), which form the fire-resisting floors of the building.

After all the standards and piers with their cross-girders had been put in position, the earth was excavated from between the pits down to the bottom of the cross-girder and the four beams resting on the top of the standards were secured in position, after which they were encased in concrete and allowed to set, being then ready to build the brickwork of the wall.

Boiler-house Work.

We now come to deal with the excavating of the boiler-house. As I have already mentioned, the basement floor of this wing of the new buildings is taken up by the boiler-house and part of the prime-movers' laboratory (about one-third of this laboratory being in the basement floor of this wing, and not accessible until the Andersonian buildings were demolished). It was therefore unnecessary to excavate it, but a glance at the section (Fig. 10) will show that it was necessary to excavate about 5ft. deep all over this area so as to allow the concrete of the floor over the prime-movers' laboratory to be put in. A glance at the section shows that this excavation of 5ft. could not be done until another method was adopted to support the north end of the steel beams upon which rest the uprights supporting the centering carrying the wall. To get over this, steel joists were placed on the top of the cross-girders, close to the south wall and running parallel to it, and by inserting half timbers from the top of these to the underside of the steel beams upon which the centering rested a secure support was formed for the centering, and the remainder of the earth could then be removed without further trouble.

The boiler-house had to be treated differently, as the boilers were to be in position and ready for use at the beginning of the present session. Therefore none of the excavations could be held over, as was done with part of prime-movers' laboratory.

The First Step

was to put in steel joists on top of cross-girders to support the centres carrying the arches and wall above. This was done similarly to that part for the prime-movers' laboratory already described.

You will notice from the plan (Fig. 1) that the boiler-house is immediately beside the lane that leads off John Street, but 25ft. below the level of the lane; and as nearly all the material required for the construction of the building was brought in by this way a temporary bridge had to be formed to allow all necessary material to be delivered. This temporary bridge consisted of three 18in. by 18in. timbers resting on the top of the cross-girders, and immediately resting on the top of the 18in. by 18in. timbers railway sleepers were placed.

In excavating this part it was necessary to drive timber sheeting from the one pit to the other so as to prevent the soil escaping from under the foundations of the Andersonian College. By excavating the soil or earth directly on the north side of the pits we removed the embankment which was taking the thrust exerted through the wales, due to the soft earth under the foundations of the old college, and therefore long wales, stretching from one standard to another, were put in, and held in position by driving short struts between the wales and the standards, with a

long horizontal shore between each standard, running right back to the north wall of the boiler-house, and having a half timber inserted between its end and the wall, to distribute the pressure on the wall. These shores are shown on Fig. 10. The top wales being fixed in position, the remainder of the sheeting between the pits was driven down as far as possible, and then the earth removed from over the area down to the bottom of the sheeting. Another row of wales was put in and secured as described above, and so on until the top of the rock was reached.

The raking shores shown on Fig. 10 were inserted to prevent the wall from overturning, owing to the vibration caused by the blasting of the rock, and the scarcement of the old foundation being cut off. These raking shores were 16in. by 16in. pitch-pine logs about 40ft. long, and were placed directly above the piers and underneath the string-course of the old wall, while the other end abutted against the north wall of this wing and kept to the necessary height (so as to allow the carts coming over the bridge to pass under them) by resting on a half timber which was supported by two uprights resting directly on the cross-girders.

Another horizontal shore was placed on

the other side of this north wall of the new building, so as to direct the thrust exerted by the raking shore against the embankment of earth which is held in position by the retaining wall at o. (Fig. 11.)

NOTES ON COMPETITIONS.

Carnegie Libraries.

At this season of the year, when hearts and purses have been opened wide and there has been much giving and receiving, it is not unnatural in the period of calm which succeeds the time of revelry that the mind should turn to an inward contemplation of philanthropy and its various effects. The gift personal affects mainly the recipient. The gift public affects not only the recipient but all those who are instrumental in assisting its progress through the devious paths which lead to the desired end. Philanthropy, as such, should affect beneficially all agents engaged in its dissemination, and when this desirable aim is not attained the bloom is brushed from the fruit and evil has been wrought in an attempt to do good. Such has been the case in connection with the

proposed Carnegie Free Library at Shaw, the ridiculous conditions of which were commented upon in these columns a fortnight ago; nor is this by any means the only instance where a competition for a library of this nature has been promoted under auspices so unfavourable. It cannot be that so great a philanthropist as Mr. Carnegie is indifferent to the wrong done from time to time to members of an arduous profession, unless, indeed, he be ignorant of the fact. Ignorant he certainly is not of the desire of members of the profession that his libraries should not be the subjects of unfair dealings, for to that end he was approached by the Royal Institute of British Architects.

Mr. Carnegie gives his money and his formal approval of the selected design, if the latter conforms with his opinion, no matter under what conditions it has been obtained. With the desire to know what manner of building his generosity is to be productive of, no one would cavil, but with the frame of mind which causes him to view with indifference the maltreatment of the competitor no architect could sympathize. It is nearly two years since the R.I.B.A. did all in its power to safeguard the interests of competitors; is it not time that competitors took the matter into their own hands?

Carnegie Branch Library, Greenwich.

It is a relief to be able to note that this is one of the Carnegie libraries with satisfactory conditions, and it is to be hoped that nothing will occur to mar proceedings which have commenced well. Within a few days of going to press several of the competitors have had their deposits returned, and have sought the envelopes in vain for an announcement of the assessor's award. The return of a deposit unaccompanied by an announcement is somewhat unprecedented, and the recipients of lonely cheques are, under the circumstances, in a state of perturbation.

North Wales University College.

At the last meeting of the council of the University College of North Wales it was decided to hold a limited competition for the new college buildings proposed to be erected. Architects are invited to submit their names to the Plans Committee.

Milan Exhibition: Designs for Workmen's Dwellings.

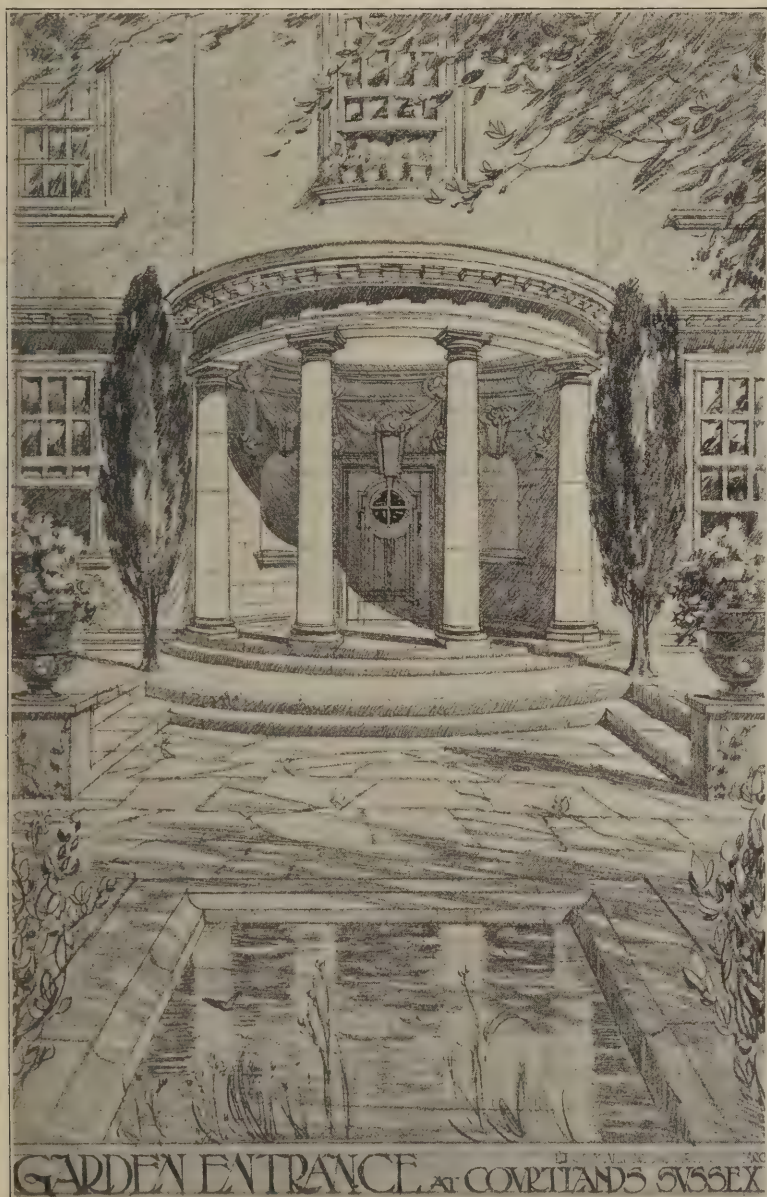
This is an international competition for workmen's dwellings suitable to the conditions of Northern Italy. Competitors must make themselves acquainted with the rules laid down in the Italian Artizans' Housing Bill of April 24th, 1904. Estimates of cost on the basis of the prices contained in the standard schedule of prices for the buildings in the commune of Milan and other data are required. The competition comprises three categories, and two prizes are offered in each category, the first amounting to £240 and the second to £80. An international jury will make the awards. The Hon. British Commissioner for the Milan Exhibition is Mr. Arthur Serena, 1 and 2, Oxford Court, Cannon Street, London, E.C.

Kingston School Competition.

Mr. F. W. Roper, of Adam Street, Adelphi, is the successful architect (among three others, selected) for the proposed new schools in Richmond Road, Kingston-on-Thames.

King Edward VII. School, Fairhaven.

Of the fourteen sets of designs submitted in this competition the governors of the Lytham Charities have awarded the first premium of £250 to those by Messrs. Briggs & Wolstenholme, of Liverpool; the second (£100) to Messrs. Broderick, Lowther & Walker, of Hull; the third (£50) to Messrs. Potts, Son & Hennings, of Manchester; and the fourth (£25) to Mr. G. H. Willoughby, of Manchester. Prof. Beresford Pite was the assessor.



This entrance forms part of a scheme for alterations and additions to an old house in Sussex which in itself is of no particular interest. The porch is built in Bath stone and is circular on plan. It connects the centre line of the hall with that of the formal garden on the west side of the house, the principal feature of which is the lily pond shown in the foreground of the drawing. The carving to the porch was carried out by Messrs. Martyn, of Cheltenham, and the interior woodwork by Mr. John P. White, of Bedford, the architects being Messrs. C. E. Mallows and Grocock, of 28, Conduit Street, London, W.

CHIMNEY CONSTRUCTION.

An Interesting Scottish Arbitration Case.

MR. W. FORREST SALMON, I.A., F.R.I.B.A., of Glasgow, has sent us a copy of his finding as arbitrator between Messrs. Edmundson's Electricity Corporation, Ltd., of London, and Messrs. John Purdie & Co., contractors, of Hamilton, in regard to the erection of certain parts of the superstructure of the burgh electricity station at Almada Hill, Hamilton—in particular the boiler-house chimney shaft. The architect was Mr. John Armitage, of London, and the clerk of works was the resident engineer for the contractors at Hamilton. The foundations for the chimney had been put in by another contractor. The basement was to be built of stonework to a height of about 20ft. and the superstructure was to be of brick. After the contractors had completed the basement of the chimney and the brick superstructure had proceeded till the total had reached a considerable height, a set occurred and cracks appeared at the basement near the south-west corner adjoining the flue port. The architect was of opinion that the only satisfactory way of getting over the difficulty of the settlement was to take the chimney down and rebuild it, but delayed finally pronouncing on the matter until he made further enquiries. The contractors demurred to the chimney being taken down on the ground that it was a sufficient chimney, conforming to the contract, and that the architect had passed it. They proposed arbitration, but this was declined. Eventually, however, the employers (Edmundson's Corporation) thought it advisable to check the opinion of the architect by taking the opinion of some outside party. As a result, Mr. Bruce, Dean of Guild of Edinburgh, gave a report which condemned the chimney.

Attempts to adjust the matter at the time were futile, and on April 11th, 1904, the architect ordered the chimney to be removed. The contractors declined to obey this order; nevertheless the architect had the same carried out in June, 1904. The contractors then took proceedings in the Sheriff Court at Hamilton, craving the balance of the contract price and for interdict. They were not successful in obtaining interdict before the chimney was taken down, and the action was sisted in view of the provisions for arbitration contained in clause 33 of the general conditions attached to the agreement between the parties.

The parties failed to arrange arbitration by joint application under the above-named clause, and eventually the employers themselves moved under the provisions of the clause, with the result that Mr. Salmon was appointed arbiter.

Mr. Salmon found neither party entitled to damages or to expenses, and both parties jointly liable for costs. In his finding Mr. Salmon says: "The plans and specification of the basement of the chimney were in my opinion faulty, inasmuch as according to them part of the basement was to be built entirely of common rubble and bedded and jointed with common mortar, whereas the other parts had to be faced with square-dressed Corsehills stones bedded and jointed with Portland cement. This difference was aggravated by the fact that on one side of the flue port were the hard Corsehills stones with cement joints and on the other side of the flue port the rubble stones from a local quarry and the common mortar joints. Before the basement was commenced a proposal was made, for which the contractors claim the credit, to build the basement entirely of Corsehills stone. The contractors offered to do this at an extra price, but the architect declined to authorize it, and apparently it was left to the contractors to build the basement of the chimney with or without remedying the defect referred to. As

the basement of the chimney could not have been built as designed without liability to set unequally, and to fracture as a result therefrom, in my opinion when the question arose the architect should have insisted on the basement being built entirely of Corsehills stone, or at least faced all round with Corsehills stone. The question as to who should pay for the extra facing might have been settled in a simple way without interfering with the progress of the work. On the other hand, the contractors under the agreement were held to have concurred as practical tradesmen in the method and style of construction to be adopted, and the sufficiency of materials proposed to be used, and they undertook to execute anything omitted from drawings, specification, &c., which was fitting to be done for the completion of the work (clause 6). In addition they also undertook responsibility for any injury the work might sustain from any cause, and undertook at completion to deliver the whole in a 'perfect, clean, complete and uninjured state' (clause 13). If, as they admit, they considered there was a defect to be remedied, then they were bound to correct it themselves if it was necessary for the satisfactory completion of their contract (*McElroy & Son v. Tharsis Sulphur Co.*, 1877, 5 R. 161). The contractors say the architect ordered them to proceed without correcting the error, but this is not proved, and in my opinion, even had it been proved, it would not have been relevant, seeing that the architect had no power to authorize a defective chimney to be built. The contractors' explanation of the damage by the subsidence of foundations, overflow of water from tanks, weather, &c., are not in my view proved, and I cannot concur in their contention that the examination from time to time of the chimney which was made by the architect during the course of its construction amounted to an approval within the meaning of the contract. Further, if the work was not to conform to contract, there could be no approval by the architect in a question between the contractors and the employers, at least until the work was certified by the architect as approved. The employers were not bound to accept a doubtful chimney, and the contractors have not discharged the onus on them to prove the sufficiency of the chimney. In saying this I have left aside the whole question of the architect's right to order the chimney to be taken down, but if he was not barred by his own actions in exercising that right I think it clear that, in view of the conflict of evidence, his non-approval cannot be said to have been unreasonable or capricious.

"I do not base any part of my findings on the analyses of mortar, or the photographs which have been produced. Proper steps were not taken to ear-mark or verify the samples of mortar taken, and the analyses are of little use without an analysis of admittedly sound mortar for comparison. The photographs also were taken after the work had been defaced by unskilled persons; and though this defacing may have been done in good faith to show more plainly certain alleged defects, I think it was most regrettable. . . .

"Dealing with the question of damages, the contractors cannot recover anything seeing that their claim depended on the question of the sufficiency of the chimney. Neither can the employers, as their claim could not have arisen had their architect supervised the work as carefully as its nature demanded and had he exercised proper care in the choice of materials and insisted on the basement being built of the same consistency on all sides. It was unfortunate too that the clerk of works who was the resident engineer of the employers should have been in the contract appointed clerk of works and deputy of the architect for the purpose of seeing the contract carried out. As he himself stated in evidence, and is supported by the evidence

of the architect, he, though a skilled electrical engineer, was not skilled in building construction. Apart from these considerations, however, the employers have not instructed damages by sufficient competent proof. . . ."

IRISH OPINION ON REGISTRATION.

AT the recent annual meeting of the Ulster Society of Architects held at Belfast—Mr. W. J. Gilliland presiding—the annual report of the council was presented and adopted. This stated that in October the Society had passed a resolution unanimously supporting the R.I.B.A. Bill for the Enrolment of Architects, and urging its adoption at as early a date as possible. "It is to be hoped that the Royal Institute of British Architects will not fail to use their utmost endeavours to obtain Parliamentary sanction for this measure."

A conference had been arranged between a sub-committee of the Society and the quantity surveyors practising in Belfast, with the result that the surveyors had formed themselves into the Belfast Quantity Surveyors' Society.

Deputations had waited on the Tramway Committee and Belfast Corporation with reference to the appointment of an architect to design the additions to the electricity generating station, the original portion of which was most creditably designed and carried out under the superintendence of a member of the Society, but the Corporation refused to appoint an architect, and entrusted the work to the staff of the city surveyor.

A Chair of Architecture at Queen's College, Belfast.

The important question of architectural education had not been overlooked, and a deputation from the council had waited on the president of Queen's College to advocate the establishment of a chair of architecture, or at least a lectureship, in connection with the present scheme for the extension of that college.

The Anomaly of the County Surveyor.

The attention of the Society having been called to a custom prevailing in some districts of allowing county surveyors, assistant county surveyors and surveyors to urban councils to engage in private practice, it was resolved that the attention of the various county and urban district authorities in Ulster be called to the desirability in every case of terminating the practice. It was an anomaly that surveyors to urban district councils should have the power to approve plans prepared by themselves and to approve or disapprove plans prepared by architects who were in private competition with them for private practice. On the one hand, the public interests suffered, while on the other it was grossly unfair to architects practising in the district. The difficulty of obtaining the services of a competent surveyor and adequately remunerating him for his entire time might be got over by grouping urban districts under one surveyor, or other suitable means.

The scrutineers handed in the result of the ballot for officers and members of council for 1906, to take up office on January 1st:—President, J. J. McDonnell, J.P.; vice-president, F. H. Tulloch; hon. secretary, W. Hartley Patterson.

Slate Quarrymen's Strike.—750 quarrymen employed at the Talsarn and Cilgwyn slate quarries marched on Saturday from Pen-y-groes, nine miles away, into Camarvon, where they held an open-air demonstration as a protest against the proposed reduction in wages at the quarries. It is stated that on account of the great depression in the Welsh slate trade the management have determined to reduce the wages 10 per cent. The men are willing to consent to the reduction so far as it applies to the poundage, but object to any reduction of the fixed wage.

LIBRARY
OF THE
UNIVERSITY OF ILLINOIS



EAST FRONT.

CHRIST CHURCH, MOSS SIDE, MANCHESTER.



INTERIOR, LOOKING EAST.

W. CECIL HARDISTY, F.R.I.B.A., ARCHITECT.

LIBRARY
OF THE
UNIVERSITY OF ILLINOIS

Notes and News.

A new Police Station at Walker. New-castle-on-Tyne, is to be erected at an estimated cost of £7,000.

A Queen Victoria Memorial School at Dunblane is to be erected from designs by Mr. John A. Campbell, of Glasgow, at a cost of £50,000.

A new Free Library at Walkley, Sheffield, was opened recently. Mr. H. L. Paterson, A.R.I.B.A., of St. James's Street, Sheffield, was the architect, the general contractors being Messrs. D. O'Neill & Sons.

The West Front of Winchester Cathedral is in a very bad state of repair, and for the safety of the public the Dean and Chapter have closed the three western doors, leaving only the south door as a means of public entrance to the cathedral.

Mr. W. Noble Twelvetrees, M.I.M.E., A.M.I.E.E., has been elected a member of the executive of the British Fire Prevention Committee, vice Mr. Lionel J. Langridge, A.M.I.E.E. He has also been nominated to serve on the General Testing Arrangements (Standing) Sub-committee.

A National School of Architecture is to be founded in New York by the Society of Beaux-Arts Architects, on the lines of the Ecole des Beaux-Arts in Paris. Messrs. Walter Cook, D. Despradelles, B. P. Trowbridge, John M. Carrere and Lloyd Warren have been appointed as a committee of five to consider the scheme in detail.

Indications of Trade Revival.—At the recent annual dinner of the Edinburgh, Leith and District Employers' and Allied Trades' Association, and the Edinburgh Building Trades' Exchange, Mr. David Metie said they had passed through a very dull season, but he believed they had come through the worst, and were now entering upon a new cycle of prosperity.

North Lincolnshire Brick Trade.—In the North Lincolnshire brick trade the year just closed has shown some improvement on 1904. Between 350 and 400 men are employed in the season, and the output is estimated at from twenty to twenty-five millions per year. The year 1903 saw the tile trade flourishing remarkably well, but during 1904 and 1905 there has been a decided falling away.

Electric Lifts on Ocean Liners.—Messrs. R. Waygood & Co., Ltd., of Falmouth Road, S.E., have been commissioned to construct electric passenger and service lifts to be fitted in the new S.S. "Kaiserine Augusta" being built for the Hamburg-American line by the Vulcan Engineering Co. of Stettin. This order is the direct result of the satisfaction which has been given by a similar installation, fitted by the same firm, in the S.S. "Amerika," built by Messrs. Harland & Wolff, of Belfast, which consisted of an electric passenger elevator and three service lifts. This latter we understand the first case in which an electric passenger lift has been fitted in an ocean liner, and on the first voyage of the new steamer this lift carried 4,500 passengers in about 2,000 trips, giving the greatest satisfaction, and working well under all conditions of the voyage. In view of the great attention devoted by German firms to electrical engineering, and the long start which they had of British manufacturers in this direction, it is very encouraging to find that English makers should be selected to supply an installation of this kind in a German shipyard. It is stated that the Cunard S.S. Co. are also arranging to fit electric passenger lifts in their new liners, which are being built at Clydebank and at Newcastle, so that these luxuries will no doubt soon form a regular portion of the equipment of these ocean hotels.

A new Church at Ben Rhydding, Yorkshire, has been erected from designs by Messrs. Chorley & Connon, of Leeds.

Hever Castle is at present being restored for Mr. W. W. Astor by Messrs. John Thompson & Sons, who are employing no fewer than 350 men.

A new Glasgow Board School—Hayfield Public School, South York Street—has been erected. It is built of red sandstone, in Renaissance style. The architect was Mr. John Hamilton, of Glasgow.

The Shropshire Arts, Crafts and Industrial Exhibition will be held in the Music Hall, Shrewsbury, from May 1st to 5th. The hon. secretary is Mrs. Mather, Coneybury, Cleobury Mortimer, Shropshire.

New London Buildings.—The London County Council have voted £111,610 for the erection of a new training college for teachers and a central school of arts and crafts in Southampton Row, £80,050 for the erection of artisan dwellings, and £30,430 for the erection of cottages on the White Hart Lane estate at Tottenham.

Heavy Sentence for Stealing Lead Piping, &c.—At the Clerkenwell Sessions recently Nathaniel Thomas, a builder, for eight years member of the Westminster City Council, was sentenced to fifteen months' imprisonment in the second division for being concerned together with Frederick Woodhouse and George Bevis (who received sentences of twelve months and four months respectively) in stealing and receiving coils of lead piping, quantities of solder, and sanitary appliances and fittings from John Boulting & Son, in whose employ Woodhouse and Bevis had been—the one for thirty-seven years and the other for thirty-three years.

The largest Contract for Spiral Staircases ever placed.—The St. Pancras Ironwork Co., Ltd., have received an order from the Underground Electric Railways Co. of London, Ltd., for spiral staircases to be fixed at all the stations on the following tube railways:—Baker Street and Waterloo; Great Northern, Piccadilly and Brompton; Charing Cross, Euston and Hampstead. There are upwards of forty stations. The staircases are about 18ft. diameter and vary from 50ft. to 200ft. in height, according to the position of the stations. Treads and landings are covered with a new and improved non-slipping material. The staircases are built entirely of steel, and were specially designed by the St. Pancras Ironwork Co. for the railway company. The design involves an entirely new principle in staircase construction, combining great strength with lightness and economy of material, while being of very neat appearance. Some of the staircases are already finished.

Lancashire Cottage Exhibition.—The particulars have now been issued of the cottage exhibition which is to be held at Cleveleys (between Blackpool and Fleetwood) from July to September next. Prizes are offered in each of the five classes, as follows:—Class 1, detached cottage, 1st prize £100, 2nd £50, 3rd £25; class 2, pair of cottages, 1st £100, 2nd £50, 3rd £25; class 3, for the best design and specification for a detached cottage to cost not more than £180, 1st £10, 2nd £5; class 4, for the best design and specification for a pair of cottages to cost not more than £350, 1st £10, 2nd £5; class 5, for the best laid-out garden, 1st £10, 2nd £5. Applications for plots must be made to the Estate Office, Fleetwood, before March 1st next, and all buildings must be completed by June 14th next. All plans and sections must be approved by the Thornton Urban District Council before any of the buildings are commenced. Diplomas will be awarded for the best exhibits in the various trades connected with the building and furnishing of cottages in classes 1 and 2.

At the new Aldwych Theatre—at the corner of Aldwych and Kingsway—Mr. Albert Toft's statue of "The Spirit of Contemplation" is set up in the foyer.

Mr. George Waymouth, F.R.I.B.A., has moved from 23, Moorgate Street, E.C., to Raymond House, Theobald's Road, Gray's Inn, W.C. Telephone No. 4867 as before.

New Highway Offices for the Leeds Corporation have been erected in Kirkstall Road by Messrs. Charles Myers & Sons, of Woodhouse, from designs by Mr. W. Bruce, of Leeds.

The Charing Cross Station Roof Contract has been secured by Messrs. Handyside & Co., engineers, of Derby and London. The new roof will be of the ridge and furrow type, at a considerably lower level than the present roof. Gigantic travelling stages will be used to remove the existing roof. The station is expected to be re-opened in March next.

The Victoria Memorial Hall.—During his visit to Calcutta the Prince of Wales will lay the foundation-stone of the Victoria Memorial Hall, of which a model and large coloured perspective were shown at last year's Academy exhibition. Sir William Emerson is the architect. The building is to be built of white marble with a delicate blue vein, and its dome, rising 160ft. above the plain, will form a beacon to all approaching Calcutta. The cost of the building will necessarily be great, but the generosity of India is equal to the demand for funds. Already nearly £400,000 has been subscribed.

The Manchester Building Trades' Exhibition is to be held in St. James's Hall, Manchester, from April 25th to May 5th next. It will be conducted on the lines inaugurated at other trade exhibitions four years ago at Manchester, namely, that every likely buyer will receive an invitation with free ticket direct from the management, and the exhibitors will form the Exhibition Committee. No gold medals or diplomas will be given. Entries are now being booked. All enquiries should be addressed to the manager, Mr. W. Cawood, at St. James's Hall, Manchester (London representative: Mr. W. A. Carson, 173, Fleet Street, E.C.).

A new Town Hall for Lancaster.—The Lancaster Corporation have selected Mr. E. W. Mountford, of London, to be the architect of the new town hall which Lord Ashton has promised to build as a gift to the community. The new town hall will be in Renaissance style, with a pillared portico, and will stand in Dalton Square. All the corporation departments will be housed in it, and in addition there will be a police court, a banqueting hall, and a public hall for meetings, to seat 2,000 persons. Opposite the building a space has been cleared for a statue of the late Queen Victoria, to cost over £10,000, given by Lord Ashton, while in the park (which was given to the town by his father) Lord Ashton is erecting an ornamental structure at a cost of £30,000.

"Unfading" Green Slates.—Mr. Louis Ambler, F.R.I.B.A., at a recent meeting of the Architectural Association Discussion Section, said "Eureka" slates were thin compared with Westmoreland green slates, and were said to lose their colour. The Association Journal reported him to say "they lose their colour and are very thin." Messrs. Roberts, Adlard & Co., the sole agents for the Eureka slates, wrote to him pointing out that the slates were not as thin as ordinary Welsh slates, and could be supplied as thick as Westmoreland if specially ordered, and that the reputation which they had of losing their colour was not justified and that they could in circumstances give a reasonable guarantee. Mr. Ambler now states that he has since at their request inspected some roofs where the "Eureka" slates were used several years ago, and has found that they



This design by Mr. T. Gibbon was submitted in one of last year's competitions for public libraries at Glasgow. The elevation was intended to be carried out in Portland stone and brick. The drawing reproduced above was exhibited at last year's Academy.

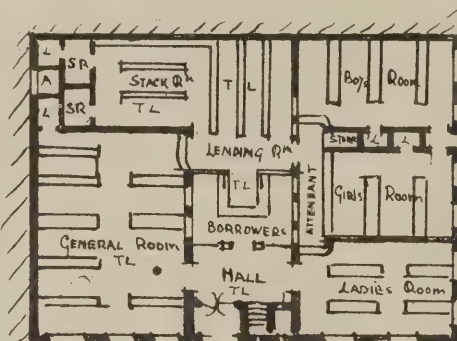
have retained their colour to a reasonable extent. As architects occasionally require to substitute a cheaper and lighter green slate for the Westmoreland specified, this correction by Mr. Ambler of the erroneous impression prevailing in some quarters is useful.

An Article on Garden Villages, Cities and Suburbs, by Mr. Hugh B. Philpott, appears in "Cassell's Magazine" for this month, illustrated by a number of sketches of Bournville, Letchworth and Port Sunlight.

New Public Library, Northfield, Birmingham.—The joint architects for this new library, the tenders for which were given on p. xxxvi of our issue for last week, are Messrs. Bateman & Bateman and Alfred Hale, whose design was selected in competition.

Work in the Colonies.—The January circular of the Emigrants' Information Office, 31, Broadway, Westminster, has just been issued. From this it appears that New Zealand is the only colony which at the present time offers secure employment for competent building-trade workmen. The supply to the other colonies is already full, though the labour market and the demand for men has improved in Cape Colony.

Floor Vibration.—Mr. James Thomson, the Dundee city architect, has been investigating the cause of vibration in the floors of the Dundee Sculpture Gallery and small adjoining room. He has discovered that this is occasioned by the earth underneath, on which the sleeper walls supporting the joists were founded, being partly undermined by recent underpinning operations, so that it has shrunk, leaving the joists suspended. The floor will now be supported by steel columns and beams. From an architectural point of view the Free Library and Sculpture Gallery are curios in respect that they have not been provided with storage accommodation. Neither Sir Gilbert Scott, R.A., who erected the first portion, nor Mr. Mackenzie, who designed the Gallery, provided for storage. This is now to be arranged for by Mr. Thomson.



Correspondence.

The "Tom Tower" at Christchurch College, Oxford.

To the Editor of THE BUILDERS' JOURNAL.

SIR,—Mr. C. T. Armstrong's pleasant drawing of this tower in your issue for November 29th, recalls to mind that "Great Tom," described as being hung in the upper stage of the tower but brought formerly from Osney Abbey, is the largest old bell in England. Is this so? The heaviest ringing peal in Great Britain (although I regret to say comparatively very seldom heard) is in the south tower—Norman—of Exeter Cathedral. There are eleven bells, and their united weight is 258 cwt. 1 qr. 17 lbs. The great bell, known locally as "Peter," hangs by itself in majestic isolation in the north tower. Both these massive towers were built by the blind Bishop William Warelwast, a nephew of the Conqueror (A.D. 1107-36), and this particular bell claims to be the second largest old one in this country. It was formerly at Llandaff Cathedral, but Bishop Courtenay, who (A.D. 1478-85) raised both towers, adding battlements and pinnacles to them, exchanged some smaller bells for it, brought his prize to Exeter, and hung it where it now is. Upon it the curfew has tolled the knell of parting day every night at eight from that period until now. Common report has long had it that its weight is 12,000 lbs., i.e., more than 107 cwt., but Messrs. John Taylor

& Co., of Loughborough, who overhauled the bells in the southern tower recently, tell me they do not estimate it at more than 80 cwt.—a very considerable difference. Yours truly,
HARRY HEMS.
EXETER.

Trade and Craft.

Pencils for Architects and Builders.

We have received from Messrs. L. & C. Hardtmuth, of 15, Ludgate Hill, E.C., some samples of their well-known "Koh-i-Noor" pencils. These are the best pencils with which we are acquainted. They are obtainable in seventeen different degrees, ranging from very soft to very hard leads. We have always found the leads of these pencils to be of perfectly regular quality from end to end, and enclosed in wood which does not break away. Though they are, comparatively speaking, somewhat expensive pencils, we think that the excellence with which they last, warrants the additional cost. Besides being obtainable in the usual hexagonal and round forms, Messrs. Hardtmuth now supply them in screw-holders for the pocket. Like the pencils themselves, these holders are finished in the best possible manner and will be found of the greatest service.

Air-Purifying Apparatus.

Mr. G. Dubuis, of 26, Hugh Street, Eccleston Square, S.W., has invented and placed on the market an apparatus for purifying, disinfecting, aromatizing, cooling and warming air, which should be of service to many architects. It is adaptable for all kinds of buildings, especially for hotels, hospitals and similar buildings, and has been proved by analysts of the Charing Cross School of Medicine to be very effective in ridding air of carbonic acid, having in this particular test been found to reduce to 49 air charged with 26.6 of carbonic acid. It has also been awarded a gold medal at the Tuberculosis Exhibition held at Paris. Full particulars can be obtained from Mr. Dubuis at the address given above.

INDIAN ARCHITECTURE.

IN an article in the "Manchester Guardian" under this heading, "F. M. S." (? Professor Simpson) says:—

In Indian architecture the buildings of some races are all lintelled, whilst others are arched and domed. "An arch never sleeps," says the Hindu proverb, and the Hindu, therefore, doubts its stability and leaves it severely alone.

How the Hindu Builds.

He spans his openings by beams — by a single one if the space be narrow, by many if it be of considerable width. In the latter case the beams are placed one on top of another, and each in turn projects in front of the next below, like a bracket. He does not object to the shape of the arch, or at all events he did not in the past. On the contrary, he used the form frequently when building in stone. But his arch is not a true arch. He laid his stones, as he laid his beams, horizontally. In the north of India there are many Hindu domes, and one would have thought that these would have been built as the Byzantines built them and as we build them now. But no: the same principle of beam on top of beam—in this case they cross one another, generally diagonally—is followed, until the opening at the top is sufficiently small to be closed by a single piece of stone.

How the Mahometan Builds.

The Mahometans built quite differently. A mosque was not a mosque, a tomb not a tomb, unless it had an arch in it. For some time they were dependent on Hindu labour, and their arches, although of Saracenic form, are built in Hindu fashion. But about the middle of the fifteenth century they learnt to build more correctly, and many of their subsequent arched openings are amongst the largest and finest in existence. Moreover, they built domes which can hold their own with any in Europe. The dome over the tomb of Mahmūd at Bijapur is 135ft. in diameter, practically the same width as the dome of Florence Cathedral. But the Florentine dome and the wall below it are the same in plan, octagonal, whereas the Indian dome is a circular one placed above a square. The difficulties of construction were thus increased enormously, and the manner in which they were overcome is both beautiful and ingenious.

Indian Pyramids and Rock Halls.

Amongst the oldest and largest of the very early buildings of the country are the domical pyramids or topes and the caves or halls excavated in the rock. The former may not rival the pyramids of Memphis in size, nor the latter the rock-cut tombs of Thebes in extent, but they are nevertheless of great interest. The finest of the caves is at Karli, between Bombay and Poonah. In plan it resembles an early Christian church, as, besides being divided into nave and aisles by columns, it finishes at one end with an apse and ambulatory, whilst at the entrance the side columns are returned across to form an inner narthex, as in S. Agnese, Rome. The date when it was excavated is said to be B.C. 78.

The Mystery about Greek Forms.

How Greek ornamentation—the acanthus leaf and other Greek forms—found its way into India probably never be known for a certainty. Perhaps from small carvings, in the same way as Byzantine ivories influenced the sculpture in the South of France, especially in and around Toulouse. Other foreign influences entered as well. At Allahabad is the Assyrian "honeysuckle," carved round one of the tall, slender, circular obelisks, or lāts. But the most curious examples of all are a number of pseudo-Corinthian capitals, some of which are now in the Museum at Lahore. They are not exactly like any known series of Greek, Roman or Byzantine capitals, and yet they

must have been inspired by European work. They remind one somewhat of the capitals at Philæ, carved in Ptolemaic times, after Egypt had been conquered by Greece.

THE OPPORTUNITY IN THE STRAND.

THE announcement that three syndicates are negotiating for the middle building site between Aldwych and the Strand, and that the Improvements Committee of the London County Council are about to make a recommendation thereon, gives the Further Strand Improvement Committee occasion to make another effort to secure the setting-back of the present building line.

Between the two churches, the north side of the Strand, instead of being planned so as to give the roadway its natural course direct to the Courts of Justice, deviates about 60ft. towards the south, thus forming a barrier between the portions of the Strand east and west thereof. Thus, when buildings are erected on the site they will obliterate from the west the view of the Courts of Justice and the church of St. Clement Danes, and from the east that of the church of St. Mary-le-Strand, and being at an angle encroaching upon the latter church, the buildings will mar the beautiful aspect of St. Mary's from where-soever viewed.

The Committee fully appreciate the wish of the Council to save public money, but at the same time they urge that there are overwhelming reasons why so great an advantage as this further improvement should be secured whilst the opportunity offers. In this they have the support of the Royal Institute of British Architects and many eminent architects, painters and sculptors.

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Correspondents are particularly requested to be as brief as possible.

The querist's name and address must always be given, not necessarily for publication.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

Cesspool in Running Sand.

ORMSKIRK.—T. R. writes: "How can I deal with a cesspool built in running sand? Water finds its way in at one or two points, despite a coating of best cement. Would a coating of boiling pitch be likely to stop up the places? The outside of the tank has 6ft. of puddled clay around it."

You will find it practically impossible to prevent the water getting into the cesspool as it exists at present. Boiling pitch would not be likely to adhere to the damp brickwork, and so would prove useless. The most effective method of dealing with running sand is drainage; but this would probably end in letting down the tank. Our only suggestion is to improve the puddle backing, which should surround the entire tank. Increase the thickness of it, and use only good stuff, worked before using to the consistency of putty, and put it in in thin courses well trodden down.

St. Albans Abbey.

EXETER.—MR. HARRY HEMS writes: "Referring to the reply to an enquiry about the above on p. 328 of your issue for December 6th, your correspondent 'H. Y. M.' is perfectly correct in his remark that an excellently illustrated little book by the Rev. Thomas Perkins, M.A., entitled 'The Cathedral Church of St. Albans,' has been published by Messrs. George Bell

& Sons. Unfortunately, however, it is weak on the very subject your enquirer 'H.' writes upon, *i.e.*, the high altar screen. The illustration of the latter, therein entitled 'The Wallingford Screen,' only shows the latter during the process of renovation, and minus the great central figure; hence it does not represent it as it now is. The completed work was renovated, however, upon All Saints' Day (November 1st), 1899, the late Sir Arthur Blomfield having been the architect for the restoration. The statues (there are eighty-five, all told) are of yellow magnesium limestone (Mansfield), excepting the thirteen statuettes immediately over the altar, which are in pure white alabaster. The great central figure of the Crucified Christ measures 8ft. gins., and is not only the largest representation of its kind in stone in this country, but was carved out of the biggest block ever raised in the celebrated Mansfield quarries. The whole of these statues were carried out in my studios. The only book in existence—so far as I am aware—that fully describes the screen and its statues is 'An Account of the High Altar Screen in the Cathedral Church of Saint Albans,' by Mr. Henry Hicks Gibbs (now Lord Aldenham). It was published by Gibbs & Bamford, Market Place, St. Albans."

Reinforced-concrete Lintels.

CATFORD.—H. L. B. writes: "Referring to Prof. Adams's reply to 'A. W. D.' on p. 341 of your issue for December 13th, the formula should read thus:—

$$\frac{nf_e}{b} \left[\sqrt{1 + \frac{2b(h-a)}{nf_e}} - 1 \right]$$

and not as shown, thus:—

$$\frac{nf_e}{b} \left[\sqrt{1 + \frac{2b(h-a)}{nf_e}} - 1 \right]."$$

Determining Section of Rolled Joist and Stanchion.

LEWES.—FELSPAR writes: "A rolled steel joist is to carry a distributed weight of 9 tons over a span of 18ft., and is to be supported at the ends by two steel stanchions of I-section 10ft. high. Please show how a suitable section for the joist and stanchion is calculated; also what regulates the thickness of metal in relation to the depth and width of the joist." This is an examination question which I have been unable to solve without the use of manufacturers' tables."

This being an examination question and no manufacturers' tables being allowed, it may be worked as follows:—The mean depth of joist in inches may be assumed as half the span in feet = $\frac{18}{2}$ = gins. Then the stress in

flange is given by the formula $\frac{wl}{8d}$, where w

= load in tons, distributed = 9, l = span 18ft., and d = mean depth, both being in the same

units. Then $\frac{wl}{8d} = \frac{9 \times 18}{8 \times \frac{9}{12}} = 27$ tons stress in

each flange. Allowing $6\frac{1}{2}$ tons per sq. in. for steel, the area required will be $\frac{27}{6\frac{1}{2}} = \text{say } 4\cdot25$

sq. ins., requiring a flange 6ins. $\times \frac{3}{4}$ in. Then the total depth of joist will be, say, 10ins. and the thickness of web, say, $\frac{1}{2}$ in. The weight in lbs. per ft. run is approximately $3\frac{1}{2} \times \text{area sq. in.}$, which in the present case = $3\frac{1}{2} \times 13\cdot25 = \text{say, } 45$ lbs. Then the joist will be 10ins. by 6ins. by 45 lbs. The total weight to be carried by stanchion = $\frac{1}{2}$ load

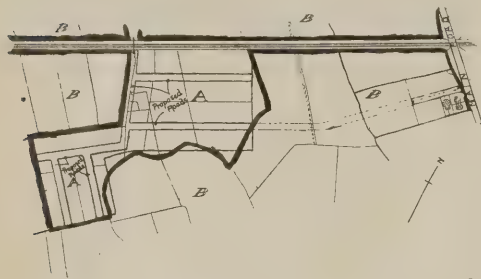
+ $\frac{1}{2}$ weight of girder = $\frac{9 + 36}{2} = 4\cdot68$ tons,

say 5 tons. Then the section of stanchion must first be assumed, say, 4ins. \times 3ins. r.s.j.; web thickness, say $\frac{3}{4}$ in.; and flange thickness say $\frac{1}{2}$ in.; giving the weight = $3\frac{1}{2} \times 4\cdot125 = \text{say } 14$ lbs. per ft. run. Now the safe load on mild steel stanchions 30-40 diameters long, as in the section assumed, is approximately $2\frac{1}{2}$ tons per sq. in. Then the area required =

$\frac{5}{2.5}$ = say 2 sq. ins., so that the section assumed, 4ins. by 3ins. by 14 lbs. r.s.j., will be more than enough, but a smaller section could hardly be used. The thickness of metal in the flanges is regulated by the amount of stress in the flange, and the thickness of web by the buckling and shearing stresses. Checking this by reference to catalogue, it is found that Dorman, Long & Co.'s *G 9, 10 x 6 x 45 lb. r.s.j. is the nearest section to carry the load, and for the stanchion, 10ft. high, Dorman, Long & Co.'s G 28, 4 x 3 x 12 lbs. is the section required. HENRY ADAMS.

Land Development.

WALLASEY.—T. T. writes: "A and B are separate owners. A wishes to develop his land with the aid of B, i.e., to convert it from agricultural into building land, the district being a suburban one. A has approached B.



He cannot develop without getting through B's land. B has an occupation lane across the railway for agricultural access, but cannot sewer that way. Is there any precedent for B to negotiate upon? B does not wish to purchase A's land. Directly A gets through he naturally becomes B's competitor in the building market."

B is of course master of the situation, and may if he so chose refuse to allow A to have any access through his property. If B desires to negotiate with A, I suggest that the latter should purchase from B a strip of land wide enough for access, say 36ft. wide, and should metal and sewer the new roadway, B of course reserving the right to use the road for all purposes and to connect with the sewer. It may answer B's purpose to give A easier terms than the above on condition that A gives him access to his other land, which appears to be beyond A's property; this, however, can only be settled by someone having actual knowledge of the land and its capabilities. F. S. I.

Tramway Stations and Works.

YOR writes: "I was much interested in your correspondent's description of the new mills at Manchester on p. 299 of your issue for November 22nd. Have illustrations, &c., been published of the tramway power station at Bristol and the Dolphin Works, Portslade, Brighton?"

We can find no trace of such illustrations having been published.

Dorchester House; Almshouses.

LONDON.—H. P. writes: "(1) Have any drawings or views of the interior of Dorchester House been published? (2) Where are the best modern and ancient private almshouses to be seen? Have any works or papers been published on this subject?"

(1) No detail drawings of Dorchester House appear to have ever been published. Good descriptions of this building are to be found in such works as Walford's "Old and New London" or Prickett's "History of Highbury." These works also contain woodcuts, which however are so lacking in detail as to be unworthy of publication. (2) There is no book devoted entirely to the subject of almshouses, but numerous illustrations of this class of building may be found in publications such as Dolman and Jobbin's "Analysis

of Domestic Architecture in Great Britain," "The Spring Gardens Sketch Book," and "The A.A. Sketch Book." A list of London almshouses will be found in Herbert Fry's "Royal Guide to the London Charities," published by Chatto & Windus, 111, St. Martin's Lane, 1906, price 1s. 6d., or a complete list of English almshouses will be found in the somewhat bulky volume, "The Charities Digest and Register," by C. S. Loch, published by Longmans, Green & Co., Paternoster Row. H. Y. M.

Mahometan Architecture; A.A. Sketches.

YOR writes: "(1) Have Mr. Phéne Spiers's lectures on Mahometan architecture been published? (2) Are the sketches made with the A.A. excursion first done roughly in pencil and afterwards inked in for publication?"

(1) Yes. With many other lectures these were published last year by Mr. B. T. Batsford, 94, High Holborn, in a book called "Architecture, East and West," with further illustrations forming part of a testimonial to the author. (2) The sketches made with the A.A. excursions are sometimes finished upon the spot and sometimes worked up carefully in ink, pencil or other material afterwards. This depends upon the skill, rapidity or taste of the individual artists. H. Y. M.

Drains to Four Houses.

STEVENAGE.—RAT writes: "I have bought four plots of land in a corner of an estate on which to build four cottages. The drains of these cottages I proposed to join into the main sewer, but the local authority stipulate a drain from each house into the main sewer, so that from the point A on accompanying sketch (not reproduced) I should have to take four 4in. drains to point c and make four connections into the sewer. Can the local authority enforce this? They have no by-law to this effect. Their point is that in the event of the drain going wrong it would be a public sewer, and that they would then be liable for its maintenance. Provided the drain is in accordance with the by-laws as regards size, can I be compelled to put in four drains? What should I do in the matter?"

The local authority has power to permit the drainage of several houses in one ownership by a combined drain such as you propose. They would, however, safeguard themselves by agreement or otherwise and bind the owner and his successors in title to regard such a drain as a private drain not repairable by the authority. An owner cannot, however, compel the authority to come to such an arrangement. But the authority may compel the owner to provide a separate drain for each house, though only semi-detached or forming part of a block constituting only one building. (Woodford U.D.C. v. Stark (1902), 18 T.L.R. 439.)

Tenants' Fixtures.

STOURBRIDGE.—ANXIOUS writes: "I have just let a shop at £45 yearly and a further rent of £10 for the use of certain fixtures in the shop. In the tenancy agreement is the following clause: 'And it is hereby further agreed that it shall be lawful for the tenant at any time before the 8th day of December, 1906, to purchase the said fixtures and fittings at or for the price or sum of £150, and upon payment of the said purchase money of £150 and of all rent hereby reserved up to the time of such payment the said fixtures and fittings shall belong to and be the property of the tenant.' (1) Can I, in addition to the usual 5 per cent. on the £45 and £10, charge a further sum equal to 5 per cent. on the £150 for which the fixtures were agreed to be sold? or (2) should I charge 5 per cent. for letting the house only, at £45, and 5 per cent. for fixtures? or (3) should I charge now only for letting the house and fixtures, and advise the owners that if the tenant purchases the

fixtures I shall have a further charge? (4) Does the wording of the clause given amount to a definite agreement to purchase, or does it only give the tenant the option to purchase? I have had all the negotiations in the matter, except that a list of fixtures was supplied by the owner, through me, to the tenant. I did not prepare the list."

(1) I am of opinion that you should not charge any commission upon the £150 for fixtures. (2) The correct charge would be at the rate of 5 per cent. upon the £45 house rent and also upon the £10 fixture rent. There may also be small fees due to you for drawing up the agreement, out-of-pocket expenses, &c. (3) I do not advise this course. (4) The clause, as quoted, merely gives the tenant the option of purchasing, if he so chose, at any date prior to December 8th, 1906. F. S. I.

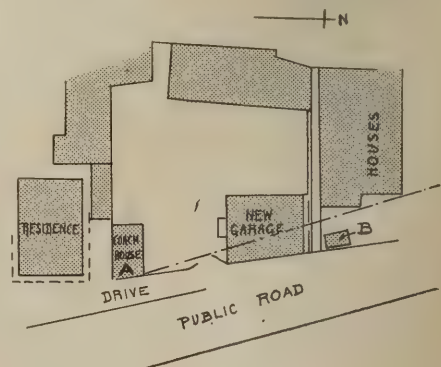
Porous Brickwork.

MIDLANDS writes: "Is there any remedy for porous bricks? These are covered externally with stucco. The building is five years old, and internal damp has only lately showed itself. It is important to use some preparation which will not materially change the colour, as this new part is an addition to a very old house."

We should like more detailed information, because it is doubtful if the dampness is not caused by a leaky roof, choked or damaged gutter and down pipes, and want of a proper damp-course. If, however, the trouble is really caused by porous bricks, the wall would be best vertically tiled or slated on battens; or Portland cement and sand plastering, trowelled, might be sufficient; while finally the outside might be tarred, although the appearance would not be good.

Building Line.

ARCH writes: "The urban district council will not pass the accompanying plan unless the building is set back as indicated by dotted lines. Considering that there is already a building on the site A in a line with proposed new building, and the wood and iron room on the north side (B) has been



in existence more than twenty years, can they compel my client to set back his building to the dotted line? The plans have the approval of the owner of the adjoining property."

Unless the erection B is of really so inconsequent a character as not to justify its description as "a building," the urban district council are wrongly interpreting section 3 of the Public Health (Buildings in Streets) Act, 1888. It may serve a useful purpose to draw the surveyor's attention to the fact that that section definitely states that the building line is to be drawn between "the front main wall of the house or building on either side thereof in the same street." The fact that the iron building could not be erected under the present by-laws has nothing to do with the question, nor has the period of time during which it has occupied the ground. The building is there and cannot be ignored. F. S. I.

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Electrical Notes.

The Uses of Electricity in Modern Buildings.

Despite the fact that this is pre-eminently the day of the specialist, and that in the erection of buildings the various trades are each taken up by their own special workers, to whom essential details are left, in the matter of electric installations in houses it is necessary for the architect to be at least cognizant of the main requirements, and to know what is and what is not good practice. In this connection it is interesting to note the lecture on "The Uses of Electricity in Modern Buildings" which Mr. S. E. Fedden, A.M.I.C.E., general manager of the Sheffield Corporation Electric Supply Department, delivered before the last meeting of the Sheffield Society of Architects and Surveyors.

In the course of this lecture Mr. Fedden dealt with electric lighting, cooking, heating and ventilating. Speaking of lighting by electricity, he remarked that it paid the consumer to purchase a good incandescent lamp, which had many advantages over a cheaper second-rate article. For effective illumination, lamps should be hung so as to be easily avoided by the eye. The amount of light required to produce a satisfactory illumination could not easily be stated by any particular rule. Although shades stopped some of the light emitted by the lamp, they tended to greatly heighten the illuminating effect by shielding the eye from the direct rays, and thus allowing the pupil to open to greater extent. In the arrangements of the lights and switches lay the greatest possibility of economy in the use of electricity, and it would pay every intending consumer to consult his architect on the matter. Mr. Fedden proceeded to show how the electrical installation should

be placed in the various rooms of an ordinary dwelling-house, detailing the varying positions for the lamps in the different rooms. He then went on to speak of electricity as used in heating and cooking. Apart from its many other great advantages, the cost of electrical cooking was extremely low. The cost of heating one pint of water to boiling point was approximately one-fifteenth of a penny. The time taken to cook food varied very much with the food, but a kettle giving 90 per cent. efficiency and taking half a unit per hour would raise $1\frac{1}{2}$ pints of water from 60° degs. Fahr. to boiling-point in twelve minutes.

The heating of rooms and buildings could be accomplished by either radiant or convected heat. With the former method heating was effected by the agency of glow lamps, and with the latter method by resistances working at comparatively low temperatures. The difference between the two methods of heating was a very wide one, the best method to employ depending entirely on the nature of the work for which the heaters were required. It was necessary in deciding which type of heater would give the most satisfactory result to know the purpose for which it was to be used and the conditions under which it would work. The glow lamp was suitable for use out of doors and in balconies, owing to the heat being unaffected by air currents. Heating by electricity was not costly, the estimated cost of burning a four-lamp heater being 1d. per hour. Electric stoves possessed great advantages over both coal and gas. They were very suitable for chimneys which had down-draughts and for places where it was impossible to have flues, whilst for bedrooms and sick rooms the electric stove was practically indispensable.

The question of electric ventilating had received much attention from architects. For this purpose electric fans were eminently

suited, owing to the ease with which they could be fixed to run in any position, and the little attention they required. They were now being largely used in all classes of workshops and factories. Electrically-worked elevators promised soon to displace every other form, being economical to work, and reliable. Mr. Fedden proceeded to quote figures showing the saving effected in the cost of running suitable machinery by electricity as against coal, and concluded by hoping that when his audience heard the oft-repeated statement that electricity was in its infancy but would be the power of the future, they would think of the many uses to which it was put at the present time.

The Paris Metropolitan.

In the north-west of Paris a new power station has been built for the needs of the Metropolitan Railway. The plant installed consists of three Brown-Boveri-Parsons turbo-alternator groups of 5,000 kilowatts; 25-cycle, 5,500 volts, three-phase; one ditto ditto, 3,000 kilowatts; two turbo-exciter groups; and one motor-generator group of 250 kilowatts. On the Metropolitan No. 1 line new double-truck cars with rounded ends have been placed. These have each a total capacity for seventy-five passengers, with seats for forty-six. The floor is of iron. Visitors to Paris who have not been about the city since the introduction of this underground railway will find it of the greatest convenience—even more so than the London "tube." They will also be struck with the large size of the tunnels and the very brief stops which are made at the stations, leaving one only the smallest interval for getting in or out; but the arrangement of sliding doors near the ends of the cars will be found to be nothing like so good as the gates on the London "tube" cars, which, too, are more comfortable to travel in.



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KETTERING.—F. A. H. writes: "Please give me a good standard specification for tar-paving to a schoolyard."

See the Municipal Engineers' Specification, price 2s. 6d. (3s. post free) from our offices.

Building in the Colonies.

J. C. writes: "Kindly name books or publications suitable for building or architecture in the Colonies. I believe I saw a series of articles some years ago on 'Woodwork for Colonists.' Where one is forced principally to the use of timber in construction it follows of necessity that our methods here, as well as designs, have to be modified. Works on water-storage, sewage-disposal, roads and streets for Colonial purposes would be helpful. I have 'Specification for Municipal Engineers,' and an excellent compilation it is."

"Specification No. 8" (price 2s. 6d. nett, or 3s. 3d. post free from our offices), Rivington's "Notes on Building Construction," 4 vols.; the "American House Carpenter," by R. G. Hatfield; "Farm Buildings," by A. Dudley-Clarke; and "Civil Engineering," by L. G. Vernon Harcourt. The prices can be obtained from our "Book Lists."

Honours, Building Construction Examination.

LYTHAM.—CONSTRUCTION writes: "Please give me a list of books necessary to study for Honours, Building Construction."

See our "Book Lists" for works on the various subjects required to be studied. As regards general instruction books, we recommend Rivington's "Notes on Building Construction," "Specification," Goodman's "Mechanics applied to Engineering."

THE BUILDING TRADE IN 1905.

THE following reports on the state of the building trades in various centres during the past year have come to hand:—

England.

Bradford.—Building operations are stated to have been never so depressed in modern times.

Halifax.—Here also the trade has been depressed, and many men are out of work. A considerable amount of tenement property is unlet, and not much speculative building of house is going on, but it is expected that there will be more activity this year.

Harrogate.—A fair amount of medium and cottage property has been built in this popular watering-place. About 1,000 houses have been built since 1901, and about 125 of these last year. There are brighter prospects for this year.

Huddersfield.—A good number of cottages and middle-class houses have been put up in this district. A few new mills and weaving sheds have also been erected, and extensions of mills have been carried out in Huddersfield and the Colne and Holme valleys. It is probable, however, that but for the extensive buildings that are being erected at the West Riding Asylum at Storthes Hall, short time would have to be resorted to.

Hull.—Many men are out of work, and the amount of unlet tenement property is a disquieting feature of the situation. Good progress is being made with the new law courts, and the second portion of the new city hall is well advanced.

Leeds.—In this centre the past year has been uneventful. A few large schools have been completed or commenced, but big schemes of any kind are very scarce; the most important being the new sewage scheme which the Corporation has just decided upon. The large number of empty houses does not encourage speculative building. This year is, however, anticipated to be an improvement.

Manchester.—Several housing schemes have had the attention of the Manchester city architect's department during the year. Buildings have been erected in Rochdale Road providing accommodation for sixty-four families in tenements of two and three rooms. The Parks and Cemeteries Committee has had a fairly busy year in the matter of builders' work, notably in Heaton Park, erecting a new tea-room, rustic shelters and other structures. The Markets Committee has carried out two large painting contracts. At the Foreign Animals Wharf a large extension is approaching completion which gives accommodation for 600 additional head of cattle. A new slaughter-house and an addition to the cooling-room have been included in the operations. At Whitworth Street West a gas-meter testing depot is now constructed. Victoria Baths have been brought near completion. The Moss Side baths are well in hand. At Monsall a new mortuary and disinfecting station have been added. Of the buildings now in progress for the Manchester Corporation the largest and most important is the new Central Fire Station, near London Road Station. The building has reached the roof, but the undertaking is so large that another year must elapse before the premises are sufficiently furnished and equipped to be devoted to their purpose. The building is the design of Messrs. Willoughby, Woodhouse & Langham, joint architects, and its erection is in the hands of Messrs. Gerrard, builders, Swinton.

Sheffield.—The year has been a bad one, but the outlook is not altogether gloomy. Building is still keeping in front of the demand by tenants. Opinions as to the condition of the cottage property market are conflicting. One has it that it has not been so bad in Sheffield for many years; another holds that there are not quite the number of empty houses that there were a year or even two years ago, because fewer cottages have been built. The City Buildings Inspector and his staff have been fairly busy, but they have not had so much to do as in 1904. There has been a marked decrease in the number of plans deposited. In 1904 there were 1,530, but last year up to December 20th there were only 1,288. Of these 974 have been approved, as compared with 1,093 in 1904. Sanctioned on these plans were 2,076 houses—451 fewer than twelve months ago. Plans have been approved for 661 buildings of a general description. Here, again, the decrease is considerable, since in 1904 777 general buildings were erected. A large number of dangerous structures have been dealt with, and a good deal of attention has been paid to the means of exit from various public buildings and workshops. There have been comparatively few large and important buildings completed during the year. First and foremost is the University.

Scotland.

The past year has not been prosperous for the Aberdeen building trade. The revival that is taking place in the general industry of the country has not yet begun to make itself felt in this particular trade. The number of plans passed by the town council during the year is the smallest that has been before them for about fifteen years, so that unless a very decided change for the better is experienced during this year it is probable that the builders of Aberdeen will have another twelve months of dull trade to look forward to. The most important mason-work contract that has been completed during the year is the Marischal College extension. A considerable amount of work has yet to be done before the premises are ready for use—practically all the inside work has yet to be accomplished—but the actual building is finished. It may very well be that the general granite industry of Aberdeen will

benefit considerably from the advertisement which it will receive in September next, when the University extension will be opened by His Majesty the King in the presence of a large company of distinguished men from all parts of the world. Another large job which has been completed during the year is Sunybank School, built by the Aberdeen School Board, and the new post-office comes into the category of buildings on which the work of the mason is finished. Substantial progress has been made during the year with the erection of the new theatre. The number of plans passed by the borough surveyor's department is as follows:—

	No. of plans.	Estimated value.
New dwelling-houses	178	£139,155
Alterations on dwelling-houses and business premises	70	18,720
New business premises, fish-curing sheds, workshops, stables, &c.	28	29,007
Public buildings and institutions, including alterations on same	11	31,255
Shop fronts, sheds, outhouses, and sanitary alterations sanctioned by the burgh surveyor	132	5,541
	419	223,681

It may be of interest to note that of all the buildings erected in Aberdeen during the year 33 per cent. were self-contained, 41 per cent. were buildings for two tenants, and 26 per cent. were tenement houses.

The building boom reached its height in 1898, when 747 plans were passed of an estimated value of £514,013. A decrease occurred in 1899, the plans passed numbering 616; in 1900 and 1901 they were about 500; in 1902 and 1903 the plans numbered 550 and 636 respectively, and in 1904 going back to 442.

As regards the granite industry, merchants are at present suffering from the effects of keen competition, not from abroad but among themselves. On every hand are heard complaints as to the cutting-down of prices by a large number of firms keenly anxious to secure work in order to keep their men and machinery working fairly steady. The result of this has been that during the past two or three years work has been taken in hand at abnormally low prices and profits have shrunk practically to the irreducible minimum.

OUR PLATES.

CHRIST CHURCH, Moss Side, Manchester, was completed last year from designs by Mr. W. Cecil Hardisty, F.R.I.B.A., of Manchester. It is carried out in brick and stone, and is a good example of modern Gothic, with a feeling of bigness in the interior. The photographs do not call for extended comment.

Views and Reviews.**A Painter's Pocket-Book.**

The class of book known as the "pocket-book" is now recognized as most handy and useful, although it more often than not exceeds the dimensions suitable for carrying in the pocket. The present book, however, serves both functions. Such a work has been needed in the paint trade, and we can only wish it the ready sale which it deserves, and that this will urge the publishers and author to further efforts to add to its usefulness in future issues. The information given is very practical. There are various tables that will save time in estimating, a list of prices for painters' work, notes on the little understood science of colour mixing, a list of defects in painting and how to remedy them, an illustrated dictionary of terms used in building, &c., hints on setting-out work, &c., &c.

"The Painters' Pocket-book," by Peter Matthews. Published by John Heywood, of Deansgate and Kedgefield, Manchester, and of 23 and 30, Shoe Lane, London, price 3s.

Complete List of Contracts Open.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:			
Jan. 4	Warminster—Playgrounds	Committee	W. H. Hardick, Architect, Warminster.
" 4	Elgin—Houses	Education Committee	Charles C. Doig, Architect, Elgin.
" 5	Little Bromley—School	Carmarthenshire Education Committee	F. Whitmore, County Architect, Duke Street, Chelmsford.
" 5	Llandilo—Additions and Alterations to Council School	Ditto	W. D. Jenkins, M.S.A., M.R.S.I., County Education Architect, Shire Hall, Carmarthen.
" 5	Bryndu—Additions and Alterations to Council School	Ditto	Ditto.
" 5	Brynamman—Heating Apparatus and Repairs at Council School	Ditto	Ditto.
" 5	Bettws—Repairs to Council School	Ditto	Ditto.
" 5	Hillfield—Ventilation and Folding Partitions at Council School	Ditto	Ditto.
" 5	Castle—Ventilation, Lighting and Repairs at Council School	Ditto	Ditto.
" 6	Manchester—School	Education Committee	Education Offices, Deansgate, Manchester.
" 8	Gayton—Additions, &c.	Guardians	L. T. Eagleton, Architect, King Street, King's Lynn.
" 8	Carlisle—Cottages	Corporation	James Mansergh & Sons, Engineers, 5 Victoria Street, S.W.
" 8	Merthyr Tydfil—Rebuilding	N. W. & O. Morgan	T. Edmund Rees, Architect, Merthyr Tydfil.
" 8	Bridlington—Pavilion, &c.	Corporation	Magnall & Littlewoods, Architects, 42 Spring Gardens, Manchester.
" 8	Bristol—Timber Sheds	Docks Committee	W. W. Squire, Engineer, Cumberland Road, Bristol.
" 8	Lemington-on-Tyne—Cottage	Urban District Council	T. Gregory, Surveyor, Council Offices, Newburn.
" 8	Plumpton—Additions, &c.	Education Committee	F. J. Wood, County Surveyor, County Hall, Lewes.
" 9	Cheshunt—Isolation Hospital	Urban District Council	A. C. Lee, Clerk, Manor House, Cheshunt.
" 9	Sunderland—Customs Offices, &c.	H.M. Office of Works	Mercantile Marine Office, Sunderland.
" 9	Clutton—Alterations, &c.	Guardians	W. F. Bird, Architect, Midsomer Norton.
" 9	Bungay—School	Education Committee	A. Pells, Architect, Beccles, Suffolk.
" 11	Wembley—Town Hall	Corporation	E. W. Mountford, Architect, 17 Buckingham Street, Strand, W.C.
" 11	Cookham—Schools	Great Central Railway Co.	Engineer's Office, Marylebone Station, London.
" 12	Bwlchgwyn—Alterations	Education Committee	Secretary, Education Committee, The Forbury, Reading.
" 13	Leeds—Hoarding, &c.	Guardians	W. R. Evans & Lloyd, 56a Hope Street, Wrexham.
" 13	Southall—School-Church	Church Trust	T. Winn & Sons, Architects, 84 Albion Street, Leeds.
" 13	Coventry—Office, &c.	Corporation	C. G. Miller, Architect, 65 Chancery Lane, W.C.
" 15	Ystradgynlais—Chapel	Trustees	F. W. Stevenson, Engineer, Gasworks, Coventry.
" 16	Bury St. Edmunds—Alterations, &c.	County Council	P. Morgan, Penrhos, Ystradgynlais, Wales.
" 16	Leeds—Police-station, &c.	Watch Committee	A. Ainsworth Hunt, County Architect, Sndbury.
" 17	Uxbridge—Workhouse Extensions	Guardians	H. Aschough Chapman, Architect, Prudential Bldgs., Park Row, Leeds.
" 17	Llandudno—School	Governors	W. L. Eves & J. Freebairn Stow, Architects, Uxbridge.
" 17	Hendon—Offices	Guardians	G. A. Humphreys, Architect, Llandudno.
" 19	Swindon—Schools	Corporation	E. P. Thompson, Architect, 25 Finsbury Square, E.C.
" 20	Belfast—Shops, &c.	Rural District Council	Nicholls & Stockwell, Architects, 25 Regent Circus, Swindon.
" 20	Malpas—Cottages	Primitive Methodists	T. Houston, Architect, Kingscourt, Wellington Place, Belfast.
" 22	Great Hale—Chapel	Education Committee	T. M. Lockwood & Sons, Architects, Foregate Street, Chester.
" 29	Ipswich—School	Hospital Committee	Rev. J. McKinney, 35 Northgate, Sleaford, Lincs.
" 31	Thirsk—Extension	Education Committee	J. A. Schenermann, Architect, 23 High Street, Ipswich.
No date	London, S.W.—Enlargements, &c.	Weavers, Winders and Warpers Association	T. Stoes, Architect, Westgate, Thirsk, Yorks.
"	Oswaldtwistle—Hall, &c.	Guardians	B. S. Gott, Secretary, Education Committee Middlesex Guildhall, Westminster, S.W.
"		Guardians	G. Riley, Architect, 24 Albert Street, Oswaldtwistle.
ENGINEERING:			
Jan. 4	Stamford—Heating	Guardians	R. M. English, Clerk, 40 Broad Street, Stamford
" 4	Milnsbridge—Mill	Rural District Council	J. Kirk & Sons, Architects, Huddersfield.
" 4	London, S.E.—Water-softening Plant	Corporation	Newman & Newman, Architects, 31 Tooley Street, S.E.
" 4	Farrington—Water-supply Works	Water Co.	A. P. I. Cotterill, M.I.S.E., 28 Baldwin Street, Bristol.
" 4	Glasgow—Repairing Embankment	Urban District Council	Office of Public Works, City Chambers, Glasgow.
" 6	Lydd—Water Tower	Corporation	A. F. Phillips, Engineer, 38 Parliament Street, S.W.
" 8	Shaw—Sludge-Pressing Machinery	Guardians	T. Mitchell, Sewage Works Superintendent, Shaw.
" 8	Basingstoke—Water-mains	Harbour Board	F. R. Phipps, Engineer, Town Hall, Basingstoke.
" 8	Bristol—Boilers, &c.	Pier Company	J. J. Simpson, Clerk, St. Peter's Hospital, Bristol.
" 9	Auckland—Wharf, &c.	North Eastern Railway Co.	W. & A. McArthur, 150 Leadenhall Street, London, E.C.
" 10	Southsea—Pier Extension	Metropolitan Asylums Board	A. H. Bone, Engineer, 148 High Street, Portsmouth.
" 10	West Hartlepool—Reconstruction of Graving Dock	Metropolitan Asylums Board	T. M. Newell, Engineer, Dock Office, Hull.
" 10	Sutton—Wire-guards, &c.	Metropolitan Asylums Board	Metropolitan Asylums Board, Embankment, London, E.C.
" 10	London, S.W.—Repairs to Pontoon, &c.	Metropolitan Asylums Board	Metropolitan Asylums Board, Embankment, London, E.C.
" 10	London, N.—Filter	Metropolitan Asylums Board	Metropolitan Asylums Board, Embankment, London, E.C.
" 13	Leeds—Heating	Gas Committee	T. Winn & Sons, Architects, 84 Albion Street, Leeds.
" 17	Nelson—Inclined Retort Stack	Harbour Trustees	A. J. Hope, Engineer, Gas Offices, Nelson.
" 18	Swansea—Pier Extension	Corporation	A. C. Schenk, Engineer, Harbour Offices, Swansea.
" 19	Glasgow—Precipitation Tanks	Corporation	City Engineer, City Chambers, Glasgow.
" 22	Stratford-upon-Avon—Pumping Machinery	Corporation	Willcox & Raikes, Engineers, Union Chambers, 63 Temple Row Birmingham.
" 22	Wimbledon—Air Compressors	County Council	C. H. Cooper, Borough Engineer, Town Hall, Wimbledon.
" 23	London, E.—Swingbridge	Urban District Council	Maurice Fitzmaurice, Engineer, County Hall, Spring Gardens, S.W.
" 24	Pendlebury—Sprinklers	Urban District Council	H. Entwistle, Surveyor, Council Offices, Swinton.
May 1	Talcahuano, Chili—Dock	Urban District Council	Direccion de Material, Valparaiso.
IRON AND STEEL:			
Jan. 4	Totnes—Fencing	Rural District Council	S. S. Rendle, Highway Surveyor, Hillside, Marlton Road, Paignton.
" 5	Manchester—Iron and Steel Work	Gas Committee	C. Nickson, Superintendent, Gas Department, Town Hall, Manchester.
" 5	Shewsbury—Iron Pipe	Rural District Council	J. R. A. Wilson, Surveyor, 24 St. John's Hill, Shrewsbury.
" 6	Manchester—Pipes	Waterworks Committee	Secretary, Waterworks Offices, Town Hall, Manchester.
" 15	Durban—Pipes	Corporation	W. H. Radford, C.E., Albion Chambers, Nottingham.
" 16	London, S.W.—Slot Rails	County Council	Engineer's Department, County Hall, Spring Gardens, S.W.
" 17	London, E.C.—Spans	East Indian Railway Co.	C. W. Young, Secretary, Nicholas Lane, E.C.
PAINTING AND PLUMBING:			
Jan. 8	Manchester—Fitting-up Baths, &c.	Baths Committee	City Architect, Town Hall, Manchester.
No date	London, S.W.—Painting Works, &c.	Education Committee	Secretary, Education Committee, Middlesex Guildhall, Westminster.
ROADS AND CARTAGE:			
Jan. 4	Bognor—Street Works	Urban District Council	Surveyor, Council Offices, Bognor.
" 4	Leeds—Paving, &c.	Corporation	City Engineer's Office, Municipal Buildings, Leeds.
" 4	Saltburn-by-Sea—Forming, &c.	Urban District Council	G. S. L. Bains, Surveyor, Council Offices, Saltburn-by-Sea.
" 4	Ramsgate—Street Works	Corporation	Borough Engineer's Office, Ramsgate.
" 6	Uppermill—Materials	Urban District Council	Surveyor, Saddleworth Urban District Council, Uppermill.
" 8	London, S.E.—Road Works	Borough Council	Surveyor's Department, Town Hall, Catford.
" 9	London, N.—Making-up	Urban District Council	G. Eades Eachus, M.I.C.E., Town Hall, Lower Edmonton.
" 9	Hamsted—Materials	Urban District Council	E. Bailly, Surveyor, Council House, Hamsted.
" 10	Erdington—Wood-block Paving	Urban District Council	H. H. Humphreys, Surveyor, Public Hall, Erdington.
" 14	Midhurst—Macadam, &c.	Rural District Council	A. G. Gibbs, Surveyor, Council Offices, Midhurst.
" 15	Reading—Carting	County Council	County Surveyor's Office, Bank Chambers, Cross Street, Reading.
" 17	London, S.W.—Roads and Sewers	Borough Council	H. R. G. S. Smallman, Architect, 8 Queen Street, Cheapside, E.C.
" 17	London, S.W.—Making-up	Borough Council	F. Wood, Borough Surveyor, Town Hall, Fulham, S.W.

Complete List of Contracts Open.—continued.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
SANITARY :			
Jan. 4	Rishton—Sewage-disposal Works	Urban District Council	C. J. Lomax, Engineer, 37 Moss Street, Manchester.
" 4	Burton-upon-Trent—Sewers	Corporation	C. T. Lynam, Surveyor, Town Hall, Burton upon-Trent.
" 8	Jarrow—Scavenging, &c.	Council	J. Petree, Borough Surveyor, Jarrow.
" 8	Bolsover—Reconstruction of Sewage-disposal Works	Urban District Council	T. C. Furness, Engineer, Town End, Bolsover.
" 8	Dover—Sewers, &c.	Town Council	H. E. Sulgoe, M.I.C.E., Maison Dieu House, Dover.
" 13	Droitwich—Drainage Works	Corporation	Borough Surveyor's Office, Friar Street, Droitwich.
" 13	Monmouth—Sewer, &c.	Corporation	G. F. Grimwood, Engineer, Monmouth.
" 15	Shalford—Scavenging	Rural District Council	F. Smallpiece, Clerk, 138 High Street, Guildford.
" 18	Maidstone—Sewage-disposal Works	Corporation	G. R. Strachan, M.I.C.E., 9 Victoria Street, S.W.
" 22	Shelf—Sewage Works	Urban District Council	J. Drake & Son, Engineer, Queensbury, near Bradford.
" 24	Ashchurch—Sewage-disposal Works	Rural District Council	H. A. Badham, Clerk, Tewkesbury.
" 24	Twickenham—Sewage-disposal Works	Urban District Council	F. W. Pearce, Surveyor, Town Hall, Twickenham.
" 26	Macroom—Sewerage Works	Urban District Council	T. Murphy, Clerk, District Council, Macroom, Ireland.
" 30	Hillingdon—Drainage Works	Rural District Council	Engineer, Corn Exchange, Uxbridge.
TIMBER :			
Jan. 9	London, S.W.—Timber	Crown Agents	Crown Agents for the Colonies, Whitehall Gardens, London, S.W.

List of Competitions Open.

DATE OF DELIVERY.	DESIGNS REQUIRED.	AMOUNT OF PREMIUM.	DEPOSIT REQUIRED FOR CONDITIONS, &c.	FROM WHOM PARTICULARS MAY BE OBTAINED.
Jan. 13	Llanidloes—Public Building	50, 30 and 20 guineas	£1 rs.	W. J. Evans, Llandinam Hall, Llandinam, Montgomeryshire.
" 31	Hackney—Library	£30, £20 and £10	10s. 6d.	W. A. Williams, Town Clerk, Town Hall, Hackney.
" 31	Crompton—Library	£50, £30	—	F. F. Gartside, Clerk, Town Hall, Shaw, near Oldham.
Feb. 15	Wrexham—Schools (W. E. Willink, Assessor)	£25 and £15	—	Clerk to Education Committee, Wrexham.
Mar. 20	Bangor—Free Library	—	£1 rs.	W. H. Worrall, Municipal Offices, Bangor, North Wales.
" 31	Birmingham—Council House Extension (Sketch Plans).	—	—	Town Clerk, Council House, Birmingham.
No date	Coventry—Municipal Offices and Shops (Local Architects only)	£50	—	G. Sutton, Town Clerk, 10 Hay Lane, Coventry.



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ARCHITECT'S ASSISTANT (nearly 22); over 5 years' London experience; student R.I.B.A.; design, working drawings, surveying, specifications, perspectives, correspondence, and general routine; salary moderate.—M., 7, Goulton Road, N.E. 1507

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ARCHITECTURAL DRAUGHTSMAN, 12 years' London and Provincial experience, requires engagement (28). Designs, working and detail drawings, specifications, perspectives, surveys and general routine, excellent references from leading firms. Salary 24 guineas.—Hookway, 36, Juer Street, Battersea Park, S.W. 1516

ARCHITECT'S JUNIOR ASSISTANT (22) desires **ENGAGEMENT**; 5 years' experience, neat and accurate draughtsman; elementary and advanced building construction and architecture certificates; sal. 25s.—Address, ASSISTANT, 34, Wingate Road, Hammer-smith, W. 1556

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ARCHITECT and ENGINEER'S ASSISTANT, age 26, desires **ENGAGEMENT**; 11 yrs. exp.; good draughtsman, surveying, levelling, quantities, supervision of works. Salary, £3.—RICHARD P. BLAKLEY, 4, Zion Terrace, Sunderland. 1498

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See p. xx for the Employment Register.

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COUNCIL HOUSE EXTENSION.

TO ARCHITECTS.

The Lord Mayor and Corporation of the City of Birmingham are desirous of EXTENDING the present MUNICIPAL BUILDINGS, and invite ARCHITECTS to submit DESIGNS for the same.

Sketch Plans only are required to be sent in by MARCH 31, 1906, and from those submitted a selection of not less than six nor more than ten will be made, the authors of the selected designs receiving each an honorarium of 100 guineas upon submitting complete Designs in a final competition amongst those so selected.

The Corporation has appointed Sir ASTON WEBB, R.A., and Mr. E. INGRESS BELL to act for them as their Professional Advisers in this competition.

Particulars of conditions, with Plan of Site, &c., can be obtained on the payment of One Guinea (to be returned to bona fide competitors), on application to the Town Clerk, Council House, Birmingham.

Contracts Open.

TO BUILDERS AND CONTRACTORS.

The Gas Committee of the Coventry Corporation invite TENDERS for the ERECTION at their Foleshill Works of the following buildings:—

Weigh Office (one story), 23 ft by 14 ft.

Engine and Governor Houses (one story) 24 ft. sq. and 12 ft sq. respectively.

Messroom and Stores (two stories) 62 ft. by 20 ft.

Entrance Gates and Boundary Walls.

Form of Tender, schedule of quantities, specification, and general conditions may be had from the undersigned on payment of one guinea deposit, which will be returned on receipt of bona fide Tender.

Drawings may be seen at the Gas Works.

The Committee do not bind themselves to accept the lowest or any Tender.

Tenders must be delivered, sealed, on or before first post MONDAY, JANUARY 15th, 1906, endorsed "Tender for Weigh Office, Messroom, &c.," and addressed to the CHAIRMAN of the Gas Committee, Gas Works, Coventry.

FLETCHER W. STEVENSON,

Engineer and General Manager.

Gas Works, Coventry,
December 23rd, 1905.

HANWELL URBAN DISTRICT COUNCIL.

TO CONTRACTORS AND OTHERS.

The Council are prepared to receive TENDERS for SEWERING, LEVELLING, PAVING, METALLING, FLAGGING, CHANNELLING, PROVIDING MEANS OF LIGHTING AND MAKING UP of the under-mentioned ROAD and FOOTWAYS thereof, within their district, viz:—

MANOR COURT ROAD—extending from Church Road North to "Beaumont."

The plan, sections, specification and form of Contract may be seen, and bills of estimated quantities and forms of Tender obtained, on payment of one guinea (cheques will not be accepted), which will be returned only to those persons who send in Tenders in conformity with the conditions specified, on application to the Surveyor, Mr. SIDNEY W. BARNES, Assoc. M.Inst.C.E., at the Council's Offices as under, between the hours of TEN a.m. and FIVE p.m., any day after SATURDAY, 30th DECEMBER, 1905.

Sealed Tenders to be delivered here (in envelopes supplied) not later than MONDAY, 15th January, 1906.

The Council do not bind themselves to accept the lowest or any Tender.

Any person, firm or company canvassing any member of the Council will be disqualified for receiving orders or Contracts from the Council.

By Order,

P. J. DENNIS,

Urban District Council Offices, Clerk to the Council.
Church Road West Hanwell, W.
28th December, 1905.

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Nothing is more trying than to be out of employment, but the difficulty of the position is terribly augmented when money has constantly to be paid for advertisements in order to find other occupation.

On the other hand an Employer who has just obtained an important contract most likely needs you; and has a post to fill that you are wanting, but neither of you can find each other.

THE REGISTER serves this purpose and so meets both cases. For those wanting employment it is an inexpensive means of keeping their names and qualifications before the right people, and for the Employer it is a ready means of finding just the man he wants, without delay.

We are encouraged to find how largely our columns have been instrumental in meeting the requirements of both parties in the manner indicated above, and we thank those advertisers who have written expressing their pleasure and indebtedness to THE REGISTER.

Many have found it an invaluable aid in getting appointments, and we would urge all those who are out of work, or want to change their situations, in fact, all who have a "want," to make use of these columns and thus make THE REGISTER a record of still more value to Employers and Employed.

For 3s. we give 3 insertions (four lines), in our "Appts. Wanted" Columns, and also 6 insertions in the "EMPLOYMENT REGISTER" (see page xx).

Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

DURING THE WEEK ending December 29th nine failures in the building and timber trades in England and Wales were gazetted.

H. SARGENT, builder, Forest Gate. Adj. Dec. 20th.
J. WRIGHT, builder, &c., Bournemouth. R.O. Dec. 16th.
S. ALBONE, builder, Stevenage. R.O. Dec. 16th.
W. H. THOMPSON, painter, Cradley. R.O. Dec. 19th.
J. W. LUCAS, builder and contractor, Bournemouth. R.O. Dec. 18th.

ADDIS & Co., decorators, Hounslow (late South Kensington). Adj. Dec. 19th.

MARSHALL & Co., builders, London, W.C. R.O. Dec. 20th.

TIMSON & ADAMS, builders' merchants and contractors, Leicester. Deficiency £5,497.

HOUSTON & TEAGUE, builders, Merton and Putney. P.E., Kingston C.C., Feb. 6th, at 2.30.

E. CANFIELD, builder, Cranborough. First meeting, Swan Hotel, Tunbridge Wells, Jan. 8th, at 3. P.E., Tunbridge Wells Town Hall, Jan. 8th, at 12.

G. H. WHEELER & Co., builders' merchants, Preston and Brighton. First meeting, O.R.'s, Brighton, Jan. 3rd, at 11. P.E., Brighton C.C., Jan. 11th, at 12.

J. J. DAVIES, painter and decorator, Llandilo. First meeting, O.R.'s, Carmarthen, Jan. 3rd, at 12. P.E., Carmarthen Guildhall, Jan. 10th, at 12.

Building Trade Failures in 1905.—From a statistical abstract of failures published in "Kemp's Mercantile Gazette" during the past year we learn that there were 645 failures in the building and timber trades as compared with 628 in 1904—these figures being far higher than those for any other trades, with the exception of the grocery and provision trades, in which there were 991 failures last year. The "gazetted" failures in the building and timber trades during the past five years are as follows:—

1905.	1904.	1903.	1902.	1901.
720	711	710	721	671

Coming Events.

Friday, January 5.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—Mr. Mowbray A. Green on "The Eighteenth-century Architecture of Bath."

Monday, January 8.

LIVERPOOL ARCHITECTURAL SOCIETY.—Mr. Percy Scott Worthington on "The Houses of the Monks in the Middle Ages."

Tuesday, January 9.

ARCHITECTURAL ASSOCIATION OF IRELAND.—Sir Charles Cameron on "The Ventilation of Workshops and Dwellings," at 8 p.m.

Wednesday, January 10.

EDINBURGH ARCHITECTURAL ASSOCIATION (Associates' Section).—Mr. Ramsey Traquair on "Tombs," at 8 p.m.

Monday, January 15.

SURVEYORS' INSTITUTION.—Ordinary General Meeting at 8 p.m.

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Tenders.

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Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Aberystwyth.—Accepted for the erection of the David Davies Science Laboratories, for University College. Mr. A. W. S. Cross, F.R.I.B.A., architect:—
Henry Wilcox, Wolverhampton.

Bexhill.—Accepted for the erection of a new school, for the Town Council:—
R. Cook & Sons, Crawley £6,525

Dover.—Accepted for the erection of the Duke of York's Military School, for the Board of Works:—
Messrs. Hudson, London £105,000

Draycott.—For extension to Victoria Mills, for Mr. E. Jardine, of Nottingham. Mr. F. S. Antliff, architect and surveyor, Draycott, near Derby. Quantities by the architect:—

E. Hind	£4,870
J. & J. Warner	4,520
H. Vickers & Son	4,390
W. Gell & Son	4,365
F. Messon	4,345
W. Maule & Co.	4,320
J. Brown & Son	4,266
J. Dickinson	4,198
F. Perks & Son,* Bridge Street, Long Eaton	3,975

* Accepted.

Kirton.—For the erection of an infants' school at the Kirton Church End Council Schools. Mr. James Rowell, architect, Church Lane, Boston:—

J. Gutteridge, Peterborough	£1,745 0 0
T. Long, Nottingham	1,700 0 0
J. G. Codd, Butterwick	1,450 0 0
A. J. Elmes, Gainsborough	1,395 0 0
J. Richardson, Leake	1,269 0 0
J. Langley & Son, Kirton	1,267 0 0
Comer, Boston	1,235 0 0
W. Greenfield, Boston	1,208 0 0
J. Lucas, Boston	1,140 0 0
H. W. Parker & Son,* Boston	1,042 10 0

* Accepted.

Limerick.—For the erection of a medical officer's residence, &c., at Limerick Union, for the Guardians:—

J. Coughlan, Catherine Street	£1,357
P. Kennedy & Sons, O'Connell Avenue	1,328
J. Kenny & Sons, Richmond Street	1,160
M. Gough,* Colonoey Street	1,115

* Accepted.

Leek.—For the erection of a new post-office, for H.M. Office of Works, &c.:—

	Credit.
J. Gallimore	£4,846 .. £40
J. Heath & Sons	4,530 .. 15
S. Hall	4,475 .. 30
T. Grace	4,325 .. 100
C. Cornes & Sons	4,245 .. 20
J. & J. Warner	3,920 .. 100
T. Godwin*	3,256 .. 30

* Accepted.

Llanfair.—Accepted for the erection of a new bridge at Llanfair, for the Highways Committee of the Montgomeryshire County Council:—

E. Davies £2,320

London, E.—For the erection of a factory, Neville Road, Upton Park, E., for Messrs. Weeks & Cooper.

Mr. W. J. Pamphilon, architect and surveyor, 21, Finsbury Pavement, E.C.:—

Larke & Son	£3,718
Harris & Co.	3,572
Perry Brothers	3,370
Quartermaster	3,233
Crossley & Son	3,197
Miskin & Son	3,168
Hosking	3,126
Appleyby & Son	3,100
Thompson & Beveridge	3,091
Harris & Wardrop	3,073
Harswill	2,949

London, S.E.—For the erection of a church parlour and caretaker's residence at Wesleyan Church, Brockley Road, S.E., for the Trustees. Mr. John J. Downes, architect, 199, Lewisham High Road, S.E.:—

G. Parker	£944 15 0
F. J. Gorham	905 0 0
S. R. Best	833 5 0
R. Soper & Son,* Deptford	698 15 0

* Accepted.

North Mundham.—For alterations and the erection of new classrooms, &c., at North Mundham Council school. Mr. G. C. Vernon-Inkpen, architect, 40, Commercial Road, Portsmouth:—

J. Croad	£1,125 0 0
P. J. Durrant	1,123 9 0
I. Waters & Sons	1,067 0 0
W. Potter	1,050 0 0
F. J. Privett	1,045 9 0
Rowland Brothers,* 52, East Street, Horsham	1,019 0 0

* Accepted.

St. Albans.—For the erection of a new post-office for H.M. Office of Works, &c.:—

C. W. Dumbleton	£3,350
D. Parkins & Co.	3,290
F. W. Stanley	3,205
E. Dunham	3,197
J. T. Bushell	3,147
Spreckley & Smith	3,035
F. & G. Foster	2,989
W. H. Hyde	2,885
A. W. Nash	2,852
G. Wiggs	2,790
F. Gough & Co.	2,784
H. Salisbury & Son	2,780
C. Miskin & Sons	2,780
Vail & Williamson	2,777
E. Brown & Son*	2,650

* Accepted.

Stranolar.—For the erection and completion of a new Presbyterian church. Mr. John M'Intyre, architect Letterkenny:—

Smith Brothers, Londonderry	£2,270 0 0
J. McClay, Strabane	1,896 0 0
S. Woods, Baillybofey	1,701 0 0
S. Donnell & Co.,* Strabane	1,498 10 0

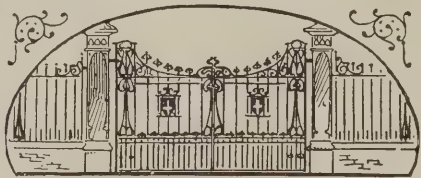
* Accepted.

New Companies.

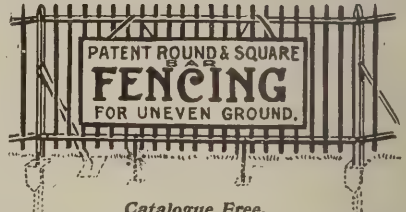
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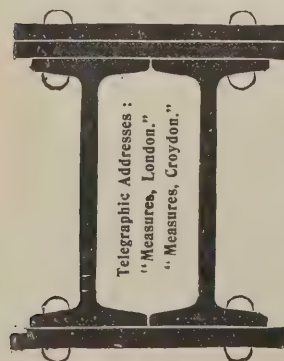


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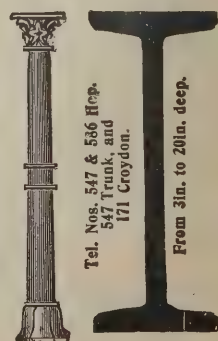
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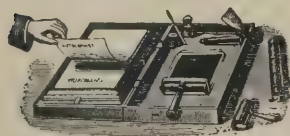
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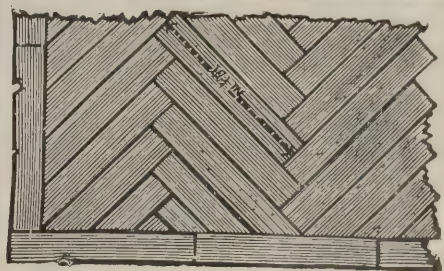
(See displayed Advt. in issue for December 27, p. vii.)

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Clover, best ...	per load	3	12	0	4	0	0
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Sainfoin mixture ...	do.	3	5	0	3	15	0
Straw ...	do.	1	8	0	1	14	0

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Castor Oil, French ...	per cwt.	1	1	10	1	2	15
Colza Oil, English ...	do.	1	5	0	—	—	—
Copperas ...	per ton	2	0	0	—	—	—
Lard Oil ...	per cwt.	2	15	0	2	17	0
Lead, white, ground, carbonate ...	per ton	16	0	0	—	—	—
Do. red ...	do.	15	0	0	0	19	0
Linseed Oil, barrels ...	per cwt.	1	0	9	—	—	—
Petroleum, American ...	per gal.	0	0	6 ³ / ₄	0	0	6 ³ / ₄
Do. Russian ...	do.	0	0	5 ³ / ₄	0	0	6 ³ / ₄
Pitch ...	per barrel	0	8	0	—	—	—
Shellac, orange ...	per cwt.	9	0	0	—	—	—
Soda, crystals ...	per ton	3	2	6	3	5	0
Tallow, Town ...	per cwt.	1	5	9	—	—	—
Tar, Stockholm ...	per barrel	1	5	0	—	—	—
Turpentine ...	per cwt.	2	8	6	—	—	—

METALS.

Copper, sheet, strong ...	per ton	95	0	0	—	—	—
Iron, Staffs., bar ...	do.	7	0	0	8	10	0
Do. Galvanized Corrugated sheet ...	do.	12	2	6	12	10	6
Lead, pig, Soft Foreign ...	do.	17	10	0	17	15	0
Do. do. English common brands ...	do.	17	15	0	17	17	6
Do. sheet English, 3lb. per sq. ft. and upwards ...	do.	18	0	0	—	—	—
Do. pipe ...	do.	18	10	0	—	—	—
Nails, cut clasp, 3in. to 6in. ...	do.	9	5	0	—	—	—
Do. floor brads ...	do.	9	0	0	—	—	—
Steel, Staffs., Girders and Angles ...	do.	7	0	0	7	5	0
Do. do. Mild bars ...	do.	7	5	0	7	10	0
Tin, Foreign ...	do.	160	10	0	161	0	0
Do. English ingots ...	do.	164	10	0	165	10	0
Zinc, sheets, Silesian ...	do.	31	7	6	—	—	—
Do. do. Vieille Montaigne ...	do.	31	10	0	—	—	—
Do. Spelter ...	do.	29	2	6	29	7	—

TIMBER.

Soft Woods.

Fir, Dantzic and Memel ...	per load	2	15	0	5	0	0
Pine, Quebec, Yellow ...	do.	4	2	6	7	10	0
Do. Pitch, American ...	do.	2	19	0	5	0	0
Laths, log, Dantzic ...	per cu. fath.	4	0	0	6	0	0
Deals, Archangel, White, 1st, 3x11 ...	per std.	14	5	0	—	—	—
Do. do. 2nd, 3x11 ...	do.	11	0	0	—	—	—
Do. do. 2nd, 3x10 ...	do.	9	5	0	—	—	—
Do. do. 3rd, 3x9 ...	do.	9	5	0	—	—	—
Do. do. Yellow, 2nd, 4x11 ...	do.	17	15	0	—	—	—
Do. do. 2nd, 3x11 ...	do.	17	5	0	—	—	—
Do. do. 3rd, 4x11 ...	do.	12	10	0	—	—	—
Do. do. 3rd, 3x11 ...	do.	10	15	0	—	—	—
Do. do. 3rd, 3x9 ...	do.	10	10	0	—	—	—
Do. Nederkalix, Yellow, 1st, 4x9 ...	do.	11	10	0	—	—	—
Do. do. 1st, 3x9 ...	do.	10	15	0	—	—	—
Do. do. 1st, 2x7 ...	do.	10	0	0	—	—	—
Do. do. 2nd 4x11 ...	do.	9	0	0	—	—	—
Do. Brahestad, Yellow, Unsorted, 4x8 ...	do.	9	5	0	—	—	—
Do. St. Petersburg, Yellow, 1st, 3x10 ...	do.	10	5	0	—	—	—
Do. do. 1st, 2x7 ...	do.	9	10	0	—	—	—
Do. do. 2nd, 3x11 ...	do.	9	5	0	—	—	—
Do. do. 2nd, 3x9 ...	do.	9	15	0	—	—	—
Do. do. 2nd, 2x7 ...	do.	9	5	0	—	—	—
Do. do. 3rd, 3x11 ...	do.	7	10	0	—	—	—
Do. do. 3rd, 3x9 ...	do.	8	0	0	—	—	—
Do. Quebec, Yellow, Pine, 1st, 3x11 ...	do.	23	5	0	—	—	—
Do. do. Spruce, 2nd, 3x7 ...	do.	8	10	0	—	—	—
Do. Mesane, Larch, Unsorted, 3x10 ...	do.	9	0	0	—	—	—
Do. do. do. 3x9 ...	do.	9	5	0	—	—	—
Do. Oxelosund, Yellow, 2nd, 3x7 ...	do.	8	10	0	—	—	—
Do. Lewisport, Pine, 3rd, 3x7 ...	do.	8	10	0	—	—	—
Do. Gamleby, Yellow, Unsorted, 3x4 ...	do.	7	10	0	—	—	—
Battens, all kinds ...	do.	0	10	0	9	10	0
Flooring Boards rin. prepared, 1st ...	per square	0	9	0	0	11	0
Do. 2nd ...	do.	0	8	9	0	10	0
Do. 3rd, &c. ...	do.	0	7	0	0	9	0

HARD WOODS.

Ash, Quebec ...	per load	4	0	0	7	15	0
Birch, New Brunswick ...	do.	2	7	6	4	10	0
Do. Quebec do. ...	do.	2	12	6	5	0	0
Box, Turkey ...	per ton	7	0	0	20	0	0
Cedar, Cuba ...	per ft. sup.	0	0	3	0	0	4
Do. Honduras ...	do.	0	0	6 ³ / ₄	—	—	—
Do. Tobasco ...	do.	0	0	5 ³ / ₄	—	—	—
Elm, Quebec ...	per load	4	5	0	8	10	0
Jarrah, plank ...	per ft. cu.	0	2	6	0	3	0
Mahogany, Average Price for Cargo, Honduras ...	per ft. sup.	0	0	5 ³ / ₄	—	—	—
Do. Tobasco ...	do.	0	0	5 ³ / ₄	—	—	—
Do. Cuba ...	do.	0	0	4 ³ / ₄	—	—	—
Do. African ...	do.	0	0	3 ³ / ₄	—	—	—
Oak, Wainscot ...	per log.	3	15	0	7	5	0
Teak, Indian, logs ...	per load	10	0	0	19	0	0
Do. do. planks ...	do.	13	0	0	20	0	0
Whitewood, American, logs ...	per ft. cu.	0	1	3	0	1	6
Do. do. planks and boards ...	do.	0	1	3	0	3	0

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" 54 in. "	7/6 "

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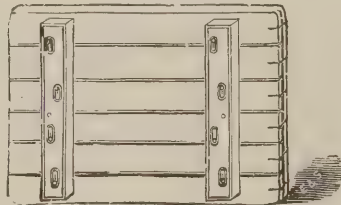
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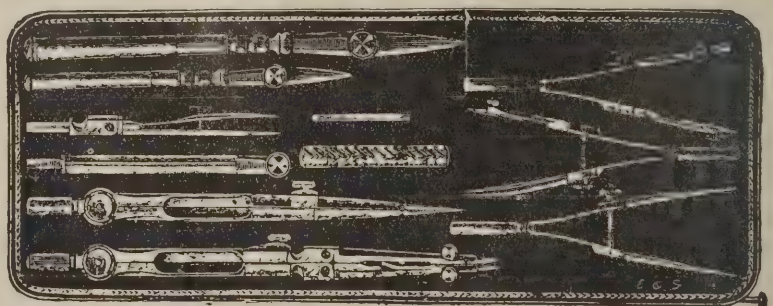
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THE BUILDERS' JOURNAL

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Foreign Slates and the Tariff Question. THERE is a good deal of talk just now about the advantage to be derived from the taxation of all sorts of foreign goods, and certain politicians have said, in regard to the slate industry, that if a tax were put on French slates it would be of great assistance to the Welsh slate trade, which is certainly in a bad way at present. The same thing might be said in connection with other foreign slates—American, Norwegian and German. The idea, however, is fallacious. We say nothing about the truth of the contentions as to the advantages or otherwise of a protectionary tariff, but so far as the slate trade is concerned we do not think any particular advantage would immediately accrue from the imposition of a tariff on French slates. The slate trade feels the effect of depression in the general building trades as much as any other branch, and the present depression is due to the smaller demand. We constantly hear of the inferiority of French slates as compared with Welsh, and while this is undoubtedly true,

the point of the matter is missed, because French slates are used simply on account of their exceeding cheapness. In the production of slates, material and freight amount to very little; about 75 per cent. of the cost of production is expended on labour, and labour in France is cheap. At the same time the French quarries are of very large size, well organized, and are thus able to place on the market slates which serve for classes of work for which Welsh slates would be too expensive. Welsh slates have admittedly good qualities, but it is going a little too far to say that everyone ought to be forced to use them. To insist on this would only add to the already increased cost of building, compared to some years ago, and this would naturally restrict the demand. As regards American slates, we are now getting some very good and cheap greens from there which are suitable for purposes where Westmoreland green slates are too expensive and too thick and heavy. The American slates gained a bad name some years ago because they were exported in steamships. The vibration of the machinery, combined with the placing of the slates in the hold of the vessels (with all the other cargo on top), and the quick unloading always adopted in steamers, caused a great deal of breakage. But now that slates are sent in sailing vessels, this trouble is not so great. Norwegian slates have a rich green colour, and compete well with the American variety. German slates are not much favoured. We do not think that a 10 per cent. duty on French slates would be sufficient to keep them out, and moreover it is not apparent that any particular benefit would be derived by us from the imposition of such a tax. The building trades seem to be furnishing instances at the present moment for arguments in favour of tariff reform, but we think that the industry is not particularly serviceable in the way of examples, as it is dependent upon the general necessitous trades of the country, and of course there is very little in the nature of export to take into account, whereas in other trades the exports govern the situation.

Defective Bricklaying. We have heard somewhat too much of how American methods are so much superior to our own. The engineering profession have frightened us into imagining that whatever innovations are produced in America are necessarily improvements on the methods adopted here. Though the Americans have shown us that we often expend much more labour upon work than is required to make it efficient for its purpose, and consequently are wasteful, very often our friends across the sea overshoot the mark, and their work, in the end, is shoddy. A correspondent in one of our American contemporaries recently called attention to the bad practices current in the States, more especially in regard to brick-

work. Speaking as a practical bricklayer, he contrasted American brickwork very unfavourably with English. He pointed out that American brickwork is practically without bond. This of course is due to the tendency to depend upon steel framework for strength, and the treating of the brickwork simply as a filling-in to keep out the weather. Dependence is placed solely upon the cement and mortar, and chief attention is given to a fair face to the work. Whereas in English bond we start with a header and a 2in. bat, and at the most have three courses of stretchers to one course of headers, in the United States bricklayers start with a three-quarter-bat in a heading course and have five courses of stretchers to one course of headers. Again, where in an 18in. wall we insist upon the header on the outside being on a level with the header on the inside, in the States they do not bond their 16in. walls properly because they put the inside header two courses below the outside header. The correspondent who makes these remarks says there are very few foremen bricklayers in the States who know how to lay the various bonds in use in England. As for the ordinary American workman, he is simply driven to execute the greatest amount of work in the shortest time without any trouble about bond. He is often called upon to lay bricks in cement without wetting them in the hot summer months. All this is good enough for the time being, but depreciation goes on in the course of years; and though the brickwork may look fairly well and neat to start with, as in some cases where architects have insisted upon stretching courses only being used, in a few years the work will begin to deteriorate. We think English architects should make a special point of resisting any attempt to disregard bond. We do not say that the strongest bond should be used, but where the walls are as thin as they can be (and economy would naturally dictate this) the bonding should be fairly good. The correspondent above referred to raises another question which must not be overlooked. This concerns constructional iron and steelwork. He says that whereas in England every stanchion and column is carefully plumbed, and if not true is packed underneath with asbestos until upright, in the States all ironwork is bolted or riveted, and if not true it is racked plumb by powerful levers, which practice of course weakens the whole construction, and even then it is not always plumb. To make the stanchions plumb it would be better, however, to insist upon the steelwork being accurately made in the shops, because packing, though certainly preferable to racking into the perpendicular, renders a joint liable to give under the vibration which continually goes on. Stresses are then introduced which the steelwork was never designed to sustain, and thus serious overstrain results.



CONSTRUCTING CONCRETE ROOFS.

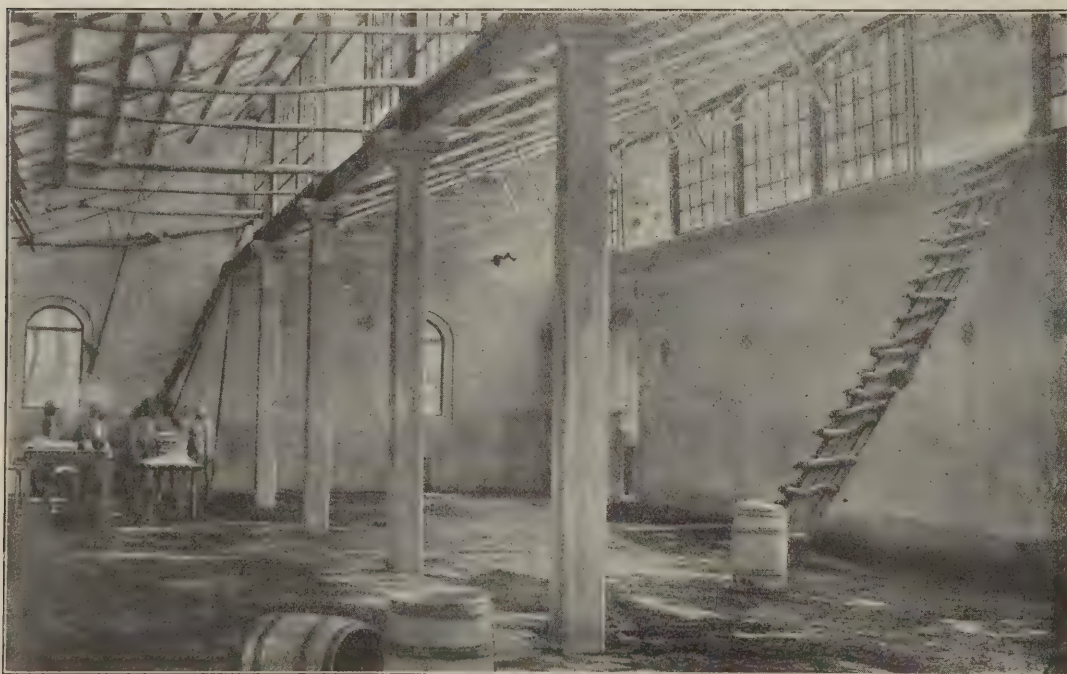
REINFORCED CONCRETE WORK IN INDIA.

IN this country we are now becoming accustomed to regard reinforced concrete as one of the regular methods of construction, and its use for all kinds of work—especially foundation work—gets more and more extensive as the merits of the system are more widely known. Our own methods of executing it are the same as those adopted in other European countries, but these are not universal methods, and it is interesting in this connection to turn to the accompanying photographs showing the erection of a cotton-spinning weaving mill at Bombay. In India, we may mention, the old conservatism about handwork holds exclusive sway, and as a consequence there is practically no machinery in use for building jobs: indeed, a glance at the illustrations here given is sufficient to show what very primitive methods of work are still followed by the native workmen.

The walls of the mill in question are constructed of stone, but the roof and columns are entirely of reinforced concrete. It will be observed that the concrete is carried up ladders formed by tying short pieces of bamboo across boards or uprights. The materials are transferred by hand into a



SWAN MILLS, BOMBAY.



INTERIOR OF SWAN MILLS, BOMBAY.

small receptacle—made of basket-work, earthenware, wood or metal—such as the one shown in the foreground in the view on the opposite page.]

† The mixing on this job was done in the concrete mixer shown in the view at the bottom of the opposite page, which, it will be observed, is worked by hand. The columns carrying the roof are formed of light steelwork reinforced with expanded steel and concrete. While the roofs were in course of construction these columns were protected by binding cocoanut fibre around them, as shown in the middle view on the opposite page, where also the bamboo scaffolding is to be seen. The roofs are of novel construction. They are of the saw-tooth pattern, the concrete having an average thickness of 2 ins. The view at the top of this page shows the patent centering used by the contractors, Messrs. Marsland, Price & Co., a well-known firm in Bombay. This consists of slightly curved sheet-iron sustained by rods inclined from the top flange of one longitudinal joist to the bottom flange of the

next joist. When the roof is complete these rods are withdrawn and the metal sheets so released. The roof is not constructed as one whole, but is divided into panels with a joint between the overlapping slabs so as to allow for expansion under the great heat of India. The joints are caulked with oiled paper. These joints are shown by the longitudinal lines in the above view of the completed building. These concrete slabs are reinforced with sheets of expanded steel. The trussed rafters of the roof are shown in the interior view on this page. The floor of the weaving shed is constructed in granite concrete.

It will thus be seen how all the details of a system essentially modern are carried out by Indian workmen imbued with primitive ideas but working under European direction.

RURAL BUILDING BY-LAWS.

Interesting Letter from the Local Government Board.

THE Local Government Board have sent the following letter to rural district councils throughout the country:—

Whitehall, January 5th.

Sir,—I am directed by the Local Government Board to state that it appears from a Parliamentary return which they have recently caused to be prepared relating to the by-laws with respect to new streets and buildings in force in the rural districts of England and Wales that throughout the whole of 169 and in parts of 114 rural districts by-laws are in force based on what is known as the Urban Model Series. The series is a comprehensive one, including clauses on most of the subjects upon which urban district councils are authorized under section 157 of the Public Health Act, 1875, to make by-laws.

Urban Model too Extensive.

Since the issue of this code, which was primarily intended for use in urban districts, it has been strongly urged that its adoption in districts which are of a rural character has led to interference with reasonable building operations, and the Board feel that a series of by-laws so extensive as the Urban Model is not necessary for a district or part of a district quite rural in character, where little building is going on and aggregations of population are not likely to develop in the near future. In such cases it is considered that a less elaborate code of building regulations would generally be found sufficient. In order to meet the requirements of such localities, the Board in 1901 compiled a model series of building by-laws for rural districts, dealing only with the subjects which appeared to them to be most in need of regulation and control in such districts from a sanitary point of view. This series has commended itself to rural district councils in a large number of cases, and, as appears from the Parliamentary return, by-laws of the character of this model have already been adopted throughout 106 and in parts of 32 rural districts.

Rural-Urban Districts.

The Board are aware that there are in not a few rural districts areas possessing urban characteristics or containing considerable aggregations of rapidly-growing populations for which a more comprehensive series of by-laws is desirable. Indeed, in areas of this kind the by-laws might properly and desirably approximate to those in force in urban districts. Parts of rural districts having such special circumstances can always be separately dealt with if such areas can be suitably defined. But the Board think it probable that amongst the rural districts in which the Urban Model Series is in force there are many parishes or other areas which cannot be said to have urban characteristics, and in which the by-laws in some respects impose undue restrictions on building and are more onerous than the circumstances require.

The Board are desirous that no obstacles should exist which can properly be avoided in the way of an extension of housing accommodation, whether by local authorities or private persons, and the object of this circular is to secure that whilst sanitary requirements should be strictly observed, all unnecessary impediments in the development of building should be avoided.

Assistance of Rural Councils asked for.

The Board would be glad if the rural district council would carefully review the circumstances of their district for the purpose of seeing whether any modification of the present by-laws is desirable, and whether any part of the district might more suitably be placed under a series based on the Rural Model, or, if this is not thought suitable, by

B



CONSTRUCTING FLAT CONCRETE ROOF.



SWAN MILLS, BOMBAY IN COURSE OF CONSTRUCTION.



MIXING CONCRETE AT SWAN MILLS.

such a series supplemented by a limited selection of clauses from the Urban Model. In some cases relaxation has already been given by a clause exempting detached dwelling-houses from certain of the restrictions as to the construction of walls. Even where it is considered that the full code of by-laws should be retained, the existing by-laws, unless made very recently, might with advantage be reviewed in connection with the latest form of the Urban Model. This contains many additions and modifications based on the experience of the working of the old model, and at the same time is framed so as to give more elasticity in the administration of the by-laws.

The Board wish to be informed of the result of the consideration of this letter by the rural district council, and they will be pleased to supply draft forms for use in connection with any revision of the present by-laws and to afford any information which they have at their disposal on the subject of by-laws of the kind in question.

I am, Sir, your obedient servant,
(Signed) S. B. PROVIS, Secretary.

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Correspondents are particularly requested to be as brief as possible.

The querist's name and address must always be given, not necessarily for publication.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

S.K. Examinations.

SIDMOUTH.—DOWN SOUTH writes: "What is the latest date of entry for the South Kensington examinations in architecture; also for the examination in architectural design? What are the dates of each examination? Where can I obtain the 1905 examination papers in each subject?"

The latest date of entry for the South Kensington examinations, and the date of the examinations, can be obtained from the nearest technical school or on application to the secretary, Board of Education, Secondary Division, South Kensington, S.W. The 1905 examination papers can be obtained from Messrs. Wyman & Sons, or through any bookseller, for 6d. HENRY ADAMS.

Deflection of Joists in Flat Roof.

LONDON.—R. S. J. writes: "I am rather puzzled by Professor Adams's reply about joists for Vulcanite flat roof on p. 342 of your issue for December 13th. He recommends main girders with a depth of only $\frac{3}{4}$ the span, and cross joists with a depth of only $\frac{1}{10}$ the span. I have always understood that the span should never exceed $22\frac{1}{2}$ times the depth. If there are cases in which this rule may be ignored, I shall be glad to know of them."

The span of any free rolled joist must not exceed twenty-four times the depth if the tabular loads are applied, but the span may always be increased when the load is reduced in accordance with a sliding factor of safety, namely, factor of safety = $\frac{\text{span in feet}}{\text{depth in feet}} \times 0.287$. For further information on this point see "Designing Ironwork," 2nd Series, part 4. In the case referred to, the load per foot super. was assumed at 28 lbs., which would apparently be high for the class of roof, and the size of rolled joist (12 ins. by 5 ins. by 32 lbs.) was stated to be the minimum. With this load the deflection in the centre would be about 2 ins., but if the load were taken as 10 lbs. per ft. super., which is the nett weight of roof covering, the deflec-

tion would only be about $\frac{1}{2}$ in., and in either case cambering the joist would remove the deflection. If it were desired to find the load that this joist would carry with the ordinary limit of deflection, the procedure would be as follows:—

$$\frac{\text{span in feet}}{\text{depth in feet}} \times 0.287 = \frac{37}{1} \times 0.287 = 10.62$$

proper factor of safety to allow for the given ratio of span to depth. Allowing 30 tons per square inch ultimate strength of mild steel, then $\frac{30}{10.62} = 2.8$ tons per sq. in. safe load. The modulus of section for the

$$\text{above joist} = 36.82 : \text{bending moment} = \frac{wl}{8}$$

$$= \frac{w \times 37 \times 12}{8} = \frac{111}{2} = 55.5 w. \text{ Then } 55.5 w$$

$$= 36.82 \times 2.8. \therefore w = \frac{36.82 \times 2.8}{55.5} = 1.85$$

tons safe distributed load, which works out at about 10 lbs. per ft. super. for roof. With 28 lbs. per ft. super. the cross joists will deflect $\frac{1}{2}$ in. in the centre, but with 10 lbs. per sq. ft. the deflection would only be about $\frac{1}{2}$ in.

HENRY ADAMS.

Quantity Surveyors' Examinations.

SOHAM writes: "Please give a list of text-books required for the quantity surveyors' examinations. I already have 'Specifications' by Bartholomew, 'Quantity Surveying' by Leaning, 'Fixtures' by Sidney Wright, 'Measuring and Valuing' by Dobson & Tarn, 'Practical Surveying' by Usill, and Inne's 'Law of Easements.'"

The syllabus of the Quantity Surveyors' Association states: "The examiners do not recommend any particular text-books, as it is desired to make the examinations rather a test of the candidate's practical knowledge of the subjects generally than to find his acquaintance with any particular book or books." Besides the books named in your enquiry, you should study "Specification" (2s. 6d. nett), Macey's "Conditions of Contract" (15s. nett), Rea's "How to Estimate" (7s. 6d. nett), Stratton's "Public Health Acts" (7s. 6d.), Laxton's "Price-Book" (4s. 6d.), Shearman & Evans's "Guide to the Practice of the London Chamber of Arbitration" (2s. 6d.), Macer's "Dilapidations" (5s. nett), and Jensen's "House Drainage and Sanitary Fittings" (5s. nett).

HENRY ADAMS.

[The above books can be obtained from our offices post free at the prices named.]

Heraldic Designs on Oak Panels.

SOUTH WOODFORD.—ANTIQUE writes: "I have to prepare some detail drawings for painting heraldic designs on oak panels. Can you give me a drawing or sketch of the 'Catherine wheel' as emblazoned on shields, or refer me to a work which publishes a drawing of such an ornament? Also, is the spear notch in a shield at top or bottom?"

A drawing of St. Catherine's wheel appeared in THE BUILDERS' JOURNAL for March 7th, 1900—in the last of a series of five articles on heraldry, the other four appearing in the issues for January 10th, January 24th, February 7th and February 21st, 1900. Designs, however, differ considerably. You can see examples in Edmondson's "Heraldry," and better ones in Willement's "Regal Heraldry." It is practically a wheel, with curved knives at the ends of the spokes outside the felloe. The notch, or lance rest, in a shield is not obligatory, and, indeed, not usual, except as regards the bearings of a military man. The notch should be at the top. Although occasionally seen towards the bottom, this is unusual and merely due to the freakish idea of the artist. You can, of course, vary the shape of the shield in harmony with the rest of the decorative details. G. C. R.

A Wrong Tracing.

MISTAKEN writes: "I traced the wrong question whilst sitting for my 'advanced' certificate in building construction in May last. I made certain of all my other questions being correct. Would my mistake mean a 'fail' for me?"

As the tracing at the May examination in building construction and drawing was compulsory, a candidate tracing the wrong example would of necessity fail, but it is too much to assume that the other questions were all correctly answered.

HENRY ADAMS.

Books for Assistant Surveyors' Examination.

TEDDINGTON.—E. J. K. writes: "Please give titles and prices of books on the following subjects for assistant surveyors' examination, Board of Works:—(1) Sanitary engineer, (2) principles and practice of valuations and easements. Books concise in treatment and reasonable in price preferred. Also what was the date of the last examination and of the previous one?"

(1) The best book upon sanitary engineering is Moore's "Sanitary Engineering," published by B. T. Batsford, 94, High Holborn, price 32s. nett. There is no other work covering the whole subject, and a number of books dealing with various branches of the subject will cost more. (2) "Valuations and Compensations," by Banister Fletcher, published by B. T. Batsford, price 6s. 6d., will serve your purpose on the subject of the principles and practice of valuation and easements. A very excellent, though more costly, book is "Hints to Young Valuers," by A. R. Cragg and I. R. Marchant, published by The Land Agents' Record, Ltd., 149, Strand, price 25s. H. Y. M.

Porous Brickwork.

Referring to the enquiry under this head on p. 12 of our issue for last week, Messrs. Robert W. Blackwell & Co., Ltd., of 59, City Road, E.C., write: "We are at present supplying our 'Giant waterproof sheeting' for the damp-proofing of walls. For this purpose the material will be found invaluable and far superior to any other waterproof sheeting made. It is manufactured from a first-class Manila stock, impregnated and coated on each side with an absolutely water- and acid-proof compound. The thickness we recommend is the 1 or 2 ply. The material is applied to the wall by sticking with an adhesive solution which we supply, and we contend that if this paper is properly stuck to the wall there cannot be any question as to damp penetrating. Ordinary wallpaper can be pasted on the material, and will give every satisfaction."

Lead Hot-water Pipes.

KIRKINTILLOCH.—X. writes: "A lead hot-water pipe giving a supply to a scullery sink was embedded in a concrete floor and after being in use for a year showed signs of leaking. On being taken up the pipe was found to be cut across at various parts. Would this be caused by expansion and contraction of the lead? There is no flow and return, but simply a branch pipe lead to the sink."

The cutting of the pipe is no doubt caused by the movement of the heated and cooled pipe against some sharp edge, as of a piece of broken brick or stone. Making that portion of the concrete of smooth pebbles will prevent the damage, I think; but laying the lead pipe inside an iron one will be safe in any case. Expansion when heated from freezing-point to boiling point of water:—

$$\text{Lead } \frac{1}{80} \text{ in. Iron } \frac{1}{160} \text{ in.}$$

Expansion in each 100 measures of length, when heated as above:—

Lead nearly $\frac{3}{8}$	-	-	-	-	of one measure.
Iron $\frac{1}{4}$	-	-	-	-	" "
Stock brick $\frac{1}{2}$	-	-	-	-	" "
Various micaceous sandstones, from $\frac{1}{8}$ to $\frac{1}{16}$	-	-	-	-	" "
Granite nearly $\frac{1}{80}$	-	-	-	-	" "
York paving nearly $\frac{1}{4}$	-	-	-	-	" "

These figures take no notice of time, and the expansion of concrete depends much on the stuff it is made of. Heat conducting power of materials:—

Copper	- 892	Marble	- 24
Wrought-iron	- 374	Porcelain	- 12
Lead	- 180	Terra cotta	- 11

These figures do take notice of time, and though the total expansion of concrete may be the same as that of lead, yet if the concrete expansion be that of porcelain, the concrete takes a quarter of an hour to transfer as much heat as the lead can transfer in one minute, and the swift movement of the lead does the damage.

O. WHEELER.

Solutions for Oak Work.

WIGAN.—E. P. writes: "Is there any method of treating English oak so as to prevent rain penetrating into the timber (thus helping to prevent excessive splitting and warping when, afterwards, the sun dries the timber), but not to prevent it 'ageing,' i.e., turning grey in the course of a few years?"

It might possibly be done by dipping the timber in melted bees or paraffin wax, the former for preference. But perhaps some of our readers can offer suggestions.

Mortar for Brickwork.

VAUX writes: (1) "Selenitic lime has been used in the mortar for brickwork in a building now nearing completion. The mortar is mixed in the proportions of 2 parts sand to 1 of blue-lias lime. During the recent wet weather the mortar has swelled to such an extent that in several places the brickwork has buckled and shows cracks. The maker of the lime has seen the work and says the mortar is too strong, and should have been mixed 4 or 5 to 1 in lieu of 2 to 1. I shall be glad to have your opinion as to the cause of swelling. Should not the mortar be better mixed 2 to 1, and not 4 or 5 to 1? Where can the lime be tested? (2) Please also give me the rule for ascertaining the scantling of floor joists to first floors of dwelling-houses."

(1) Selenitic cement was invented by General Scott. His method was to add plaster-of-Paris (sulphate of lime) to a good hydraulic lime; but lime may be selenitized by adding any sulphate or sulphuric acid even. The action of the sulphate is to arrest the slaking action, cause the cement to set more quickly and enable it to be used with a much larger proportion of sand than ordinary lime. The proportion of sulphate added varies from 4 to 7 per cent., the usual proportion being 5 per cent. Selenitic cement should be used in accordance with the instructions issued by the makers. If other proportions are used the results are often unsatisfactory. The proportions recommended are 1 of cement to 5 or 6 of sand, and an excess of cement does not add to the strength, but is detrimental. The lime would be best tested by a qualified analytical chemist, such as Mr. Bertram Blount, 76-78, York Street, Westminster. (2) The scantling of floors is often specified by the by-laws on the basis of the Model By-laws of the Local Government Board. These are, however, far too excessive, and the size should be calculated by the formula for the safe load $\frac{wl^2}{16} = bd^2$, assuming a reasonable load per square foot on the floor. A useful series of tables and criticism of the existing by-laws is contained in "Roofs and Floors of New Buildings," by Ernest H. Essex, published by the St. Brides' Press, Ltd., 24, Bride Lane, E.C., price 2s. 6d.

Books on Ornament and Decoration.

A. B. writes: "Please inform me as to a course of study in (1) ornament and decoration of buildings; (2) designing lead lights, tiles, textiles, papers, &c. I have Meyer's handbook, but wish to know of works not

too expensive that give a clear explanation of the principle to be followed in each case; also is there a work on Byzantine Ornament?"

See list of books on Art, Decoration and Design in our "Book List No. 2."

Ordnance Survey Maps.

ASHBY-DE-LA-ZOUCH—DELA writes: "(1) Are the areas as given on the Ordnance survey maps calculated from stool to stool of hedge, including any ditch or ditches that may be in the field; or is the usual 4ft. allowed for ditches deducted from the field in which it actually is, and its contents added to the field in which the hedge stands? (2) Please name one or two gentlemen who coach for the R.I.B.A. examinations."

(1) The areas given on Ordnance survey maps are calculated from centre to centre of the hedges or other boundaries, and if a property is bounded by both hedge and ditch, the centre of the hedge is taken as the boundary line, and the area of the ditch is added to the area of the field in which it occurs. It should be noted that these areas do not necessarily give the legal extent of any particular property, as all boundaries such as hedges, fences, &c., are shown where they actually occur, while the legal boundaries may be 3ft. or 4ft. on either side of the hedge or fence, according to the custom prevailing in any particular county. Moreover, a landowner may form a hedge and ditch as wide as he likes, with the ditch on whichever side of the hedge he may choose to place it, provided he does not encroach upon his neighbour's legal boundary. When fields are divided by means of hedges and ditches, and no definite legal boundary has been legally fixed, it is an almost universal rule that the edge of the ditch remote from the hedge marks the division of the adjoining properties. (2) The names of gentlemen who "coach" for the R.I.B.A. examinations, will be found under the head of "Educational" in our advertisement columns.

H. Y. M.

Stability of Tall Chimney.

BECKENHAM.—F. J. B. writes: "I should be obliged if Professor Adams could help me with the following question in Mitchell's 'Brickwork,' as having been set at a War Office Examination:—

'A square chimney, 100 ft. high, 6 ft. wide at the base, and 4 ft. wide at the top, has to withstand a wind-pressure of 56 lbs. per sq. ft. What must be the average thickness of the brickwork, assuming the chimney to be simply resting upon and not attached to its base? Assume weight of bricks to be 120 lbs. per cub. ft.'

I have tried to work it by the ordinary wind-resistance against walls formulæ, but cannot get the work thick enough. Is a chimney ever built 100 ft. high and only 6 ft. square at base?"

The London County Council rules for tall chimneys stipulate that the width of a shaft at the base, if square on plan, must be at least one-tenth the total height, and if circular on plan at least one-twelfth. A shaft must have a batter of $2\frac{1}{2}$ ins. in every 10 ft. of height = 1 in 48. The brickwork must be at least $8\frac{1}{2}$ ins. thick at the top of the shaft and for 20 ft. below, and must be increased $4\frac{1}{2}$ ins. in thickness for every 20 ft. in additional height, measured downwards. No portion of the enclosures of a shaft is permitted to be constructed of firebrick, and any firebrick lining to be used must be in addition to the thickness of, and independent of, the brickwork. No cornice or other projection is allowed to project more than the thickness of the brickwork at the top of the shaft. These are sound rules and may be applied to all cases. In the case submitted, the area exposed to wind-pressure will be $\frac{4+6}{2} \times 100 = 500$ sq. ft., and the pressure being 56 lbs. per sq. ft., the total pressure will

be $500 \times 56 = 28,000$ lbs. This may be assumed to act at the centre of gravity of the face, giving a leverage of $\frac{1}{2}h\left(\frac{b+2t}{t+b}\right)$

$$= \frac{1}{2} \times 100 \left(\frac{6+2 \times 4}{4+6} \right) = 46\frac{2}{3} \text{ lbs. The active}$$

moment will then be $28,000 \times 46\frac{2}{3} = 1,306,666\frac{2}{3}$ lbs.-ft. The resisting-moment must equal this, and will be made up of the weight of the brickwork multiplied by the distance from the centre of base to the centre of resistance. Let B and b be the inner and outer width at base, then the limiting distance of centre of pressure from centre of base for zero pressure on windward side, i.e., no tension on inner edge, will be $\frac{B^2 + b^2}{6B^2}$, but

the thickness not being known b cannot be found directly. Rankine says, in his "Applied Mechanics," that $\frac{1}{3}B$ is a sufficiently accurate estimate of the required distance for practical purposes when applied to square factory chimneys, but it is probable that in the present case, owing to the smallness of the base, the value would be nearer $\frac{1}{3}B$, which is the limit for a solid square. Taking it as $\frac{1}{3}B$

$= \frac{1}{3} \times 6 = 2$ ft., we shall have $\frac{1,306,666\frac{2}{3}}{2} = 653,333\frac{1}{3}$ lbs., as the required weight of brickwork. At 120 lbs. per cub. ft., this will require $\frac{653,333\frac{1}{3}}{120} = 5,444\frac{1}{4}$ cub. ft. The

chimney being 100 ft. high, 4 ft. diameter at top and 6 ft. diameter at bottom, the contents if solid would only be $\frac{1}{3}h(A + a + \sqrt{A \times a})$

$$= \frac{1}{3} \times 100(36 + 16 + \sqrt{36 \times 16}) = \frac{100}{3}$$

$$(52 + \sqrt{576}) = \frac{100}{3}(52 + 24) = \frac{100 \times 76}{3} =$$

$2,533\frac{1}{3}$ cub. ft., or less than half the required weight, but the chimney shaft is already assumed to be filled up solid, so that the question is absurd.

HENRY ADAMS.

Carrying up Chimneys.

TALL-BOY writes: "Is it compulsory to carry up low chimneys of adjoining owners when building a new house next to same?"

It is impossible to decide this question on general lines, as so much depends on the particular circumstances of each case—the degree of damage (if any) done, and the age of the first chimney. Speaking broadly, one is answerable for any action which injuriously affects one's neighbour, and if a reasonable demand be made I do not advise resistance.

F. S. I.

The United Service Club in Pall Mall, built in the 'twenties from designs by Nash, has been entirely re-decorated and restrained: a large addition made to the smoking-room on the ground floor; lavatories, dressing-rooms and bath-rooms provided in the basement; an electric passenger lift installed by the Otis Elevator Co.; new heating system and additions to the cooking apparatus; additional staircases; and alterations and improvements to the kitchens, larders and offices generally. The architects for the work were Messrs. Isaacs & Florence, of Gray's Inn—who designed the Carlton Hotel. The drainage system has been carried out under the supervision of Messrs Shone & Ault, being the first installation of this system executed in London since it was applied to the Houses of Parliament. Messrs. Aldin Brothers & Davies, of South Kensington (whose contract amounted to nearly £15,000), were the general contractors for the alterations and additions to the Club, which have been carried out by them under the personal supervision of their manager, Mr. Leslie Shingleton, assisted by Mr. Robinson as their general foreman.

REGISTRATION.

The Provincial View, by a Provincial Architect.

A GREAT deal has been said about the advisability of making the status of architects equal in the eye of the public to that of lawyers and medical men; and much has also been said against the proposal.

The law of this country will not allow a man, unless registered, to practice the art of drawing out a fellow-creature's teeth, but it places no restriction on anyone wishing to practice as an architect—Tom, Dick or Harry—in most unfair competition with qualified men.

The London practitioner hardly appreciates the state of things in the provinces. It is there where the evil is most felt. In the Metropolis the public is better aware how to distinguish between the genuine and the bogus architect; and such men as flourish in the country by imposture would soon be exposed in town.

When it is remembered that the great bulk of practitioners are provincial men, there should be no hesitation on the part of architects to join together unanimously in making architecture a closed profession.

But many London architects who have achieved fame and fortune cannot see with any focus except that sighted on the conditions of thirty years ago, and, as a consequence, they say that what served them should serve younger men in their struggles in the profession. It is easy, however, for a man who is famous and has a prosperous banking account to pooh-pooh the idea of registration—or indeed any other reform which may interfere with his peaceful existence. Do such men as these dream of what is going on in the provinces every day? Every member of either the Institute or the Society of Architects practising in provincial towns knows only too well that, instead of being protected against impostors by such membership, his hands are tied behind his back by regulations, whilst his dishonest opponent is free to use any tactics he chooses for securing business which should rightfully go to the qualified man.

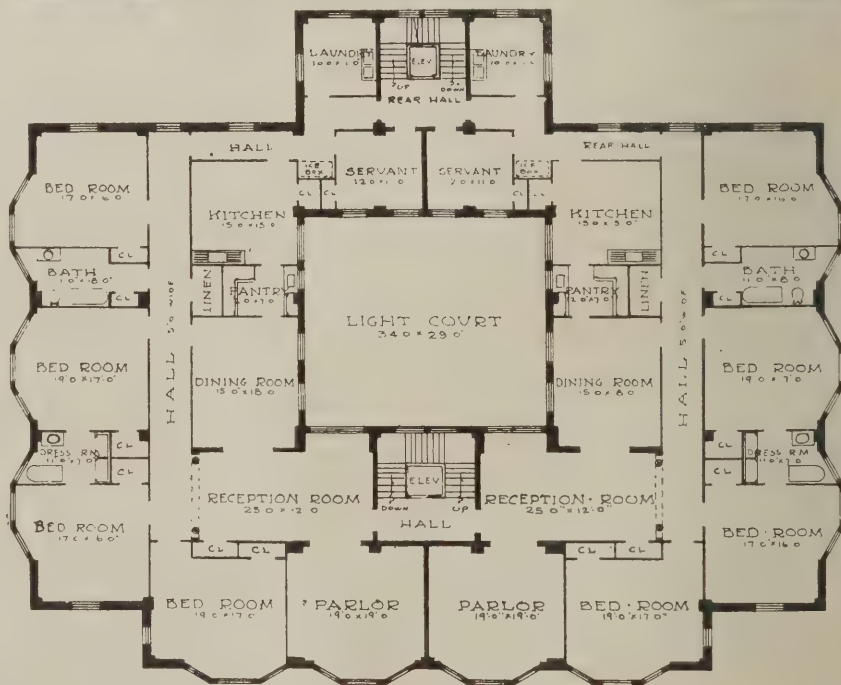
The provincial public is guided solely by appearances, and the loud-talking, loudly-dressed, vulgar and pushful trickster is as successful as the celebrated Mr. Striver in Dickens's "Tale of Two Cities," whilst the man who has spent years in making himself competent is elbowed aside.

The Only Way Out of Chaos.

Now what is required, and what is the only way out of the present chaos, is to adopt registration on lines drafted by the Institute with the assistance of the other professional bodies. So let us get such a Bill passed as quickly as possible, backed up by the whole profession; and when this has been done, let the Institute take the equivalent position of the Incorporated Law Society, and let every registered practitioner—and such only—be entitled to call himself an architect; but if he be already a member of the Institute, let that fact be known by the usual letters after his name, and let the other professional bodies become incorporated with the Institute.

With regard to the Bill going through the Houses of Parliament, there would be no difficulty if the profession acted unitedly. It is only because such a spirit has not hitherto manifested itself that the Act for the registration of architects is not now on the Statute book.

Members of Parliament are all in favour of the public being protected, and of architects being protected as well. North-country members say: "We would support such a Bill if the profession as a whole wished it." It is only the fear of falling between two stools which makes members somewhat chary of taking up the matter strongly.



Typical Floor Plan.

MCKINLEY APARTMENT HOUSE, ST. LOUIS, MO. W. ALBERT SWASEY, ARCHITECT.

Letters have been written and replies have been received, and the sum and substance of the replies is as stated above.

A future generation will indeed look back upon us as half-hearted representatives of the profession of architecture unless those who have spent the best part of their lives in educating themselves as architects make a firm stand and insist upon State recognition.

If the days of such of the auctioneers, joiners, builders, house-agents, &c., who

practice as architects are to be numbered, let a commencement be made at once. It is folly to say that the public can discriminate between merit and fraud in the architectural profession. It cannot, and does not. Whilst all men calling themselves architects are architects in the eye of the public, the only question in the minds of the people requiring plans is "Who will prepare them most cheaply?" And that is a state of thing which ought not to continue. X. Y. Z.

Notes and News.

Architect's Suicide.—Mr. A. R. Thorn, aged 34, an architect of Elm-park Gardens, S.W., committed suicide last week by cutting his throat with a razor on Putney Heath.

The Victoria Memorial at Agra, recently unveiled by the Prince of Wales, consists of a bronze standing statue, 13ft. high, placed on a marble pedestal 14ft. high, the sides of which are flanked by allegorical figures of Truth and Justice. Mr. Thomas Brock, R.A., was the sculptor for the work.

The International Society of Sculptors, Painters and Gravers.—The first section of the International Exhibition, consisting of sculpture and oil paintings only, was opened on Monday at the New Gallery. Water-colour pastels, engravings and black and white will be shown in February and March.

The New York Building Trade has come practically to a standstill by reason of a strike of the structural ironworkers. The strike threatens to become international, taking out men all over the United States and Canada. The men demand five dollars (£1 os. 10d.) a day. They are now receiving 4 dollars 50 cents (18s. 9d.).

"Architects and the General Election."—Referring to the leader on this subject in our issue for last week, a correspondent gives us the name of another architect entered in the lists—Mr. William Hunt, of Norfolk Street, Strand, who is contesting South Islington as a tariff reformer. Mr. Hunt is ex-mayor of Wandsworth, a J.P., and a member of the London County Council. We are also informed that Mr. Philip E. Pilditch, architect to Drury Lane Theatre, is putting up for St. Ives; also that Mr. Sears, L.C.C., is contesting the Cheltenham division. From a table in the "Daily Express" it appears that there are altogether 9 architects, 19 engineers and 9 estate agents putting up for Parliament, as against 181 barristers and solicitors, 154 naval and military representatives, 82 journalists and authors, and 59 artisans.

Messrs. Dargue, Griffiths & Co., Ltd., of Liverpool and London, send us one of their neat little pocket diaries for 1906. In it are included some illustrations of the King's Sanatorium, Camberwell Infirmary, and the large hospital at Seacroft, Leeds, where the firm have carried out extensive heating and hot-water supply contracts on their "Economic" steam system. Instead of the usual system of conveying live steam to calorifiers placed under every building, or the practice of placing a furnace in each, this system consists in placing only a few calorifiers under the immediate eye of the engineer. These are heated by exhaust steam from engines, &c., and from them water is pumped all over the institution for heating and domestic hot-water supplies.—An accident policy is included in the diary.

"Vibrationitis" is a discovery of the "Daily Mail." To a representative of that newspaper last week Dr. Winter Blyth, medical officer of health for St. Marylebone, said that in consequence of the excessive vibration caused by heavy motor traffic and underground railways there had been numerous instances of new stoneware drains in St. Marylebone becoming defective, and he had been compelled to recommend iron in place of earthenware pipes. Mr. Spurrell, surveyor and engineer to the Holborn Borough Council, said that while the drainage in the borough had been affected but slightly, the subsidence of buildings, owing to the various tunnels, causing the water to be drained away from beneath them, was the most serious trouble to be contemplated.

Mr. Henry Ough, A.M.I.C.E., architect and surveyor, of 64, Basinghall Street, E.C., having retired from business, has transferred his practice to Mr. John Moir Kennard, A.R.I.B.A., of 13, Railway Approach, London Bridge, S.E.

San Francisco's Æsthetic Charter—as a plan for the future development of the city which has been drawn up by Messrs. D. H. Burnham & Co., well-known architects of Chicago, is called—suggests improvements that it is thought will cost £10,000,000, and take some fifty years to execute. It will seem to some that this was rather overshooting the mark, and that there would have been a gain in presenting a scheme more financially reasonable and immediately practicable. However, San Francisco is strong, confident, ambitious, and contains many men of wealth; and it may be supposed that Mr. Burnham knew the conditions and aspirations best. The chamber of the Board of Supervisors was thronged with interesting spectators when the plan was presented, and the record is that only one voice was raised in protest. Its owner was promptly removed from the room by the sergeant-at-arms. Mr. Burnham gives great credit to his chief of staff, Edward H. Bennett, who had charge of most of the actual designing.

R.I.B.A.

A BUSINESS meeting of the Royal Institute of British Architects was held on Monday evening at 9, Conduit Street, W.

Site for New Premises.

After the minutes had been read, the chairman moved: "That the Council be instructed to enter into negotiations concerning a site for new Institute premises, and to report to a general meeting."

Notable New Fellows.

The following elections took place:—

Fellows.

Reginald Blomfield.
Gerald C. Horsley.
Prof. W. R. Lethaby.
E. L. Lutyens.
Mervyn Macartney.
Walter Cave.
E. J. May.
Ernest Newton.
Halsey Ricardo.
E. S. Prior.
H. Thackeray Turner.
E. P. Warren.
H. Chatfield Clarke.
Ambrose M. Poynter.
R. Burns Dick (Newcastle-on-Tyne).
W. Hawke (Cape Town).
B. S. Jacobs (Hull).
W. C. Marshall.
J. H. Morgan.
Segar Owen (Warrington).
C. J. Tait.
R. J. Thomson (Wimbledon).
T. H. Thorpe (Derby).
W. Turnbull (Wellington, N.Z.).
L. A. Westwick (Mansfield).
F. A. Whitwell.
W. H. Woodroffe.

Associates.

J. A. Lucas (Exeter).
W. D. Quirke.

Hon. Corresponding Member.

Martin Nyrop (Copenhagen).

[Of London where not otherwise stated.]

President's At Home.

Mr. Belcher will be again "At Home" in the rooms of the Institute on Monday next, from 8.30 to 11 p.m. A small exhibition of working drawings is being arranged for the occasion.

THE FORTHCOMING ARCHITECTURAL CONGRESS.

FULL particulars have now been issued of the Seventh International Congress of Architects which is to be held in London from July 16th to 21st next. The programme of subjects to be dealt with is the same as that given on p. 287 of our issue for November 15th, except that a tenth subject has now been added, namely, "The Organization of Public International Architectural Competitions."

The council of the Institute have made a grant of £500 to the Congress Fund, but in an undertaking of this nature the expenses are exceedingly heavy, and it is to the subscriptions of members of the Congress that the executive committee have to look for the means of defraying them.

Members' Subscriptions.

As in the preceding Congresses, there will be two classes of members—donors, who subscribe £4 and upwards to the funds of the Congress, and subscribing members, who pay a minimum subscription of £1. There will also be a class of lady members, intended to include ladies who accompany members of the Congress: the subscription will be 10s., and lady members visiting London will be constituted hon. members of the Lyceum club (for ladies).

The Privileges of Members

will be as follows:—A card of identity, a Congress badge, all literature issued in connection with the Congress, the final *Compte Rendu* of the Congress, an invitation to the inaugural meeting, an invitation to the reception by the Lord Mayor of London, an invitation to the garden party given by the Institute, invitations to such other fêtes as may be given by bodies or persons outside the committee of the Congress. Members will also be privileged to attend the meetings of the Congress and the visits, entertainments and the farewell banquet on payment (as is usual) of such charges as may be necessary.

In addition to the Lord Mayor's conversation at the Mansion House on Tuesday, July 17th, and the garden party to be given by the Institute, visits will be arranged to the Universities of Oxford and Cambridge, Greenwich Hospital, Hampton Court, Hatfield (the residence of the Marquis of Salisbury) and the monuments, historic houses, new buildings, workyards, schools of architecture, &c., of London. The usual farewell banquet will take place on Saturday, July 21st.

An Exhibition

in connection with the Congress, organized by the executive committee, will also be held, the chief features of which will be:—(1) A chronological exhibition of English architecture from the Norman Conquest (1066) to the death of Sir Charles Barry (1860); (2) oil paintings and water-colour drawings of English architecture; (3) English furniture and silver work.

The British railway companies will issue return tickets to London, available from July 11th to the 25th inclusive, at the rate of a single fare and a quarter, to members of the Congress.

The executive committee will be glad to receive papers for presentation to the Congress. Papers may be written in English, French, Italian or German. Each paper must be accompanied by an abstract of not more than 1,000 words. Paper and abstracts must reach the executive committee before April 30th next.

All communications should be addressed, and all cheques and postal orders made payable, to "The Secretary, Seventh International Congress of Architects, 9, Conduit Street, London, W."

THE LIVERPOOL TIMBER TRADE.

(By our Own Correspondent.)

THE closing month of 1905 brought a considerable amount of business for timber merchants and brokers at Liverpool. Allowing for the interruption caused by Christmas, the timber trade of December may be spoken of as good. Holders of builders' wood have been favoured by the long run of mild weather. Contractors in the Liverpool district who have had work in hand have made good use of the last few weeks, and a large quantity of roofing joists and flooring timber has been worked up.

Soft Woods.

Light arrivals of Quebec pine-deals and a very fair consumption have left the stock of this timber smaller than at the beginning of 1905, and values very firm. Quebec spruce-deals came to hand more freely than last year; and though the demand for these was moderately good, the year closed with a larger stock than twelve months ago.

New Brunswick and Nova Scotian spruce and pine-deals arrived in slightly less quantities than a year ago. The demand for these woods has been fairly active and sustained, so that the stocks in hand are lighter. Values have improved, and timber of the kind is in a strong position.

Whitewood planks and boards from the United States also came to hand in smaller quantities, but notwithstanding the consumption, large stocks of whitewood boards and planks are now held.

Norway flooring boards were received in moderate quantities, but have not had an active sale. Stocks are slightly in excess of those of a year ago. Baltic red-deals and boards, though not arriving in large quantities, came to hand more freely and left stocks materially larger than at the beginning of last year.

Pitch-pine has reached Liverpool in comparatively small quantities of late, and stocks of hewn, sawn and planks show a considerable shortage compared with twelve months ago. Prices have further advanced, and, as the consumption is maintained, all kinds of useful wood are strongly held.

Hardwoods.

The December sales of mahogany were well attended and the competition generally was brisk. The best average was made by seventy-three logs of Labou wood, which sold at prices ranging from 2½d. to 3s. 6d.; the average being 5½d.

American walnut in logs is held in good supply. Active business has been done in logs, planks and boards, and full prices have been obtained.

Oak from western ports has come to hand in moderate quantities, and stocks are much lighter than at the commencement of last year. Prices are fair to moderate, according to the class of wood.

Teak has been received in larger quantities, but sales are small and prices show little change.

The Timber Trade and the Dock Board.

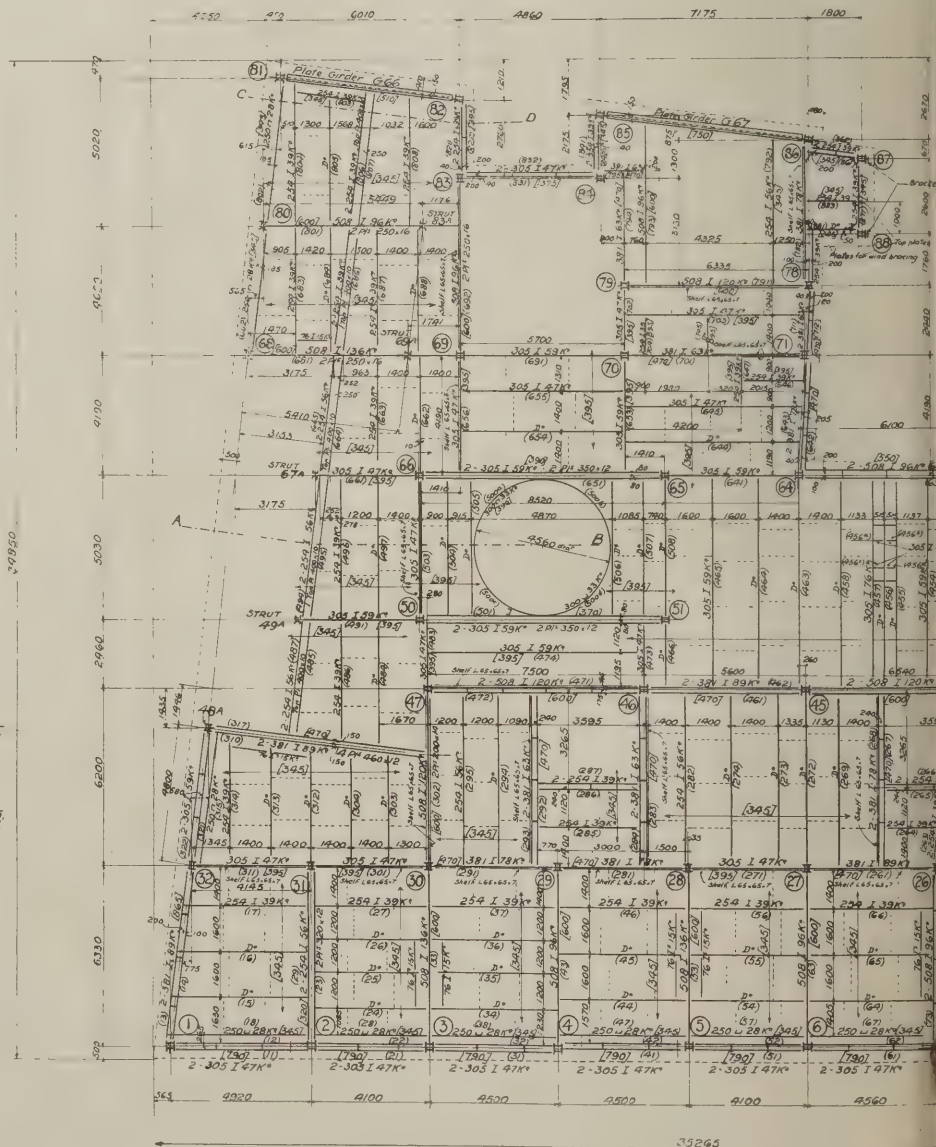
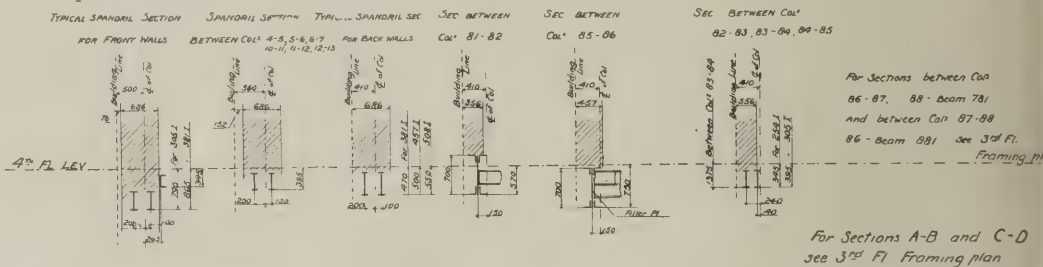
The attempt of the Liverpool timber trade to obtain representation as a trade on the Mersey Docks and Harbour Board, at the recent election of members of the Board, was not successful. Five of the retiring members of the Board, and a candidate nominated in place of a member who retired and did not seek re-election, were returned; two candidates who had been nominated to

represent trading interests which have lately been without direct representation on the Board failing to obtain seats. One of these, Mr. Holford Harrison, was nominated as a representative of the timber trade. Mr. Harrison fought a good fight, 790 votes being given for him, as compared with 1,036 for the returned member, who polled the smallest number of votes; and 1,280 for the member who polled the greatest number.

That 790 votes were given for Mr. Harrison was proof of the existence of a strong feeling among the electors favourable to granting the claim of the trade to representation on the Dock Board. Mr. Harrison's candidature will have been of service, as it has caused the position of the trade in respect of accommodation, the value of the trade to the port, and the relationship between the

trade and the Dock Board to be freely discussed in Liverpool.

Though Mr. Harrison was not elected a member of the Board, it must not be assumed that many of the electors who voted for other candidates did not approve of the claims of the timber trade. The truth is that unless some strong cause be shown why an old member of the Dock Board should not be re-elected, a newly-nominated candidate will have little chance of being elected—unless, as in the case of one candidate at the recent election, a new candidate be nominated by an interest which has had representation—to take the place of a retiring candidate. As the timber trade has not had a representative on the Board of late, the majority of the electors voted for the representatives of the old interests.



NOTE: Figures in brackets thus [] denote the distance from finished floor to bottom flange of beam
Figures in brackets thus () denote the number of beam
Figures in circle thus ○ denote the number of Col.

RITZ HOTEL, PICCADILLY, LONDON

THE RITZ HOTEL.

ON this page we give the steelwork framing plan for the fourth floor of the Ritz Hotel, now being completed in Piccadilly, London.

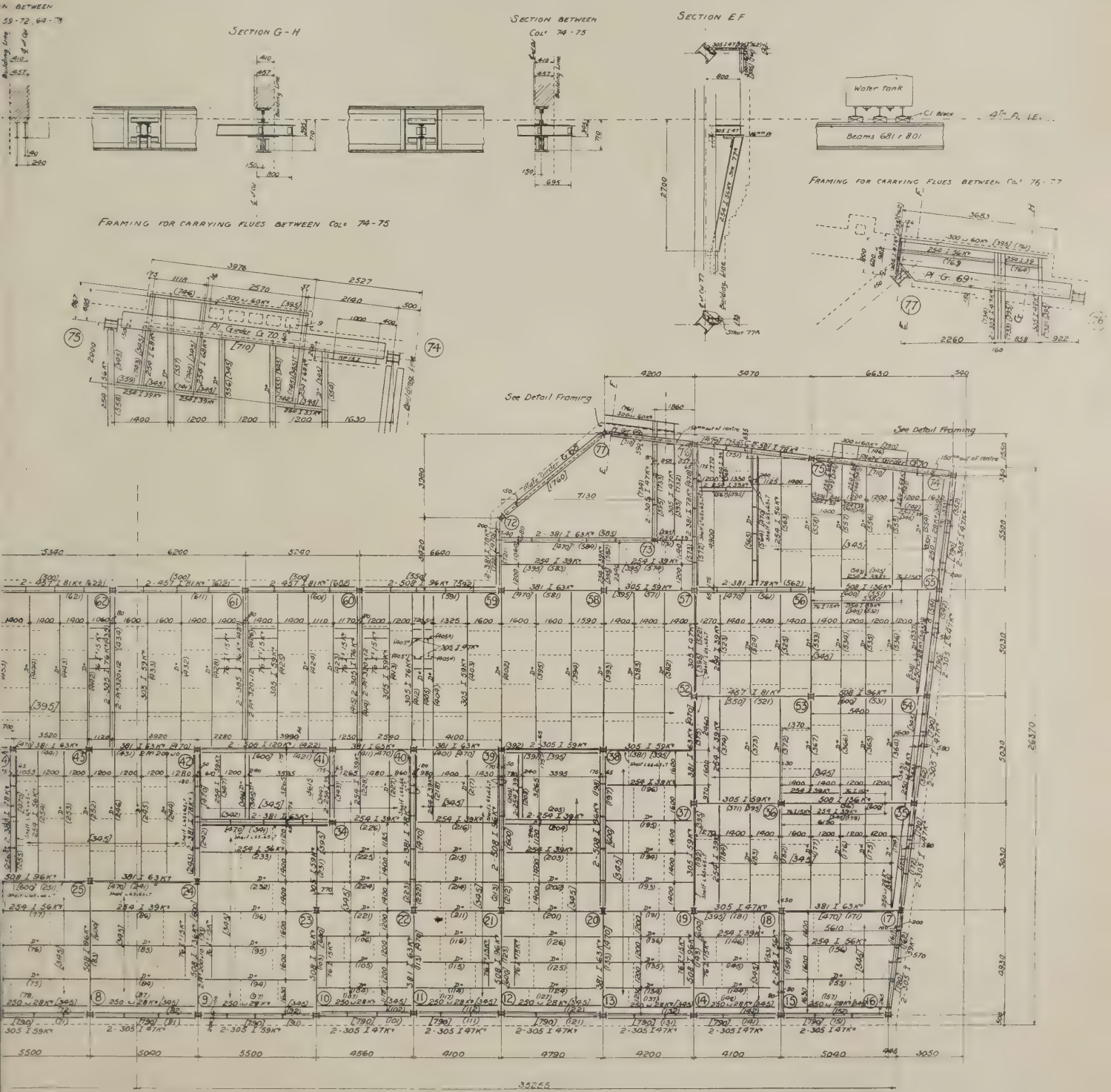
The general principles and indications on the drawing have been explained in connection with other framing plans of the hotel published in our pages (see our issue for March 22nd, 1905). The chief feature of this plan is the construction between columns 77 and 74 for carrying the chimney stack. This stack is carried from the fourth-floor level on cantilever roin. by 6in. I-beams. The system adopted is indicated on section G—H. A hole is cut in the web of the plate-girder G 70 and the beams are extended through and form the canti-

lever. The web of girder G 70 is strengthened by means of web reinforcing plates and angles. Opposite column 77 no cantilever could be used, as it would interfere with the staircase. An inclined strut of roin. by 6in. I-beams is used for supporting the beams for the stack. Sections through the set-back wall next to Arlington Street were shown on the third-floor framing plan in our issue for September 13th, 1905. In the first panel from the open court will be noticed three beams placed close together and marked 455, 456, 457, &c. They are connected by four diaphragms marked 456 a, b, c, d. These diaphragms are so made of plates and I-beams that a load placed on the centre-beam will be uniformly distributed on the three beams. These beams carry chimneys. No deep beams could be used by reason of

their showing in the ground-floor hall. In the upper left-hand corner of the plan on this page is shown the position of the spandrel beams in the walls.

Change of Address.—Mr. William H. Thorp, F.R.I.B.A., has removed his offices from No. 61, Albion Street to Phoenix Chambers, South Parade, Leeds.

The Catholic Apostolic Church, Glasgow.—A new aisle on the north side of this church—in Catherine Street, Glasgow—has just been completed from designs by Messrs. Salmon & Son & Gillespie, of Glasgow, together with new south and west porches, baptistery and ladies' room, at a cost of about £3,500. The original church was built from sketch designs by Pugin.



OUR PLATES.

ST. ALBAN'S CHURCH, Southend, has been recently completed by Messrs. Leaney & Co., builders, of Southend. The design is of the simplest character, working out at about £7 per sitting. The interior is finished in plaster without stone dressings, but some of the furniture is of more elaborate character. The rood screen shown in the illustration was carried out in oak by Mr. H. K. Kuchemann, of Pitsea, Essex. The church has no east window, it being hoped eventually to fresco the whole of the east wall. The rood screen, pulpit and altar were designed by the architects, Messrs. Nicholson & Corlette, of London.

St. Matthew's Church, Cockington, Devon, was begun about ten years ago, when the nave and aisles were built. It has been completed lately by the addition of the chancel, tower and side chapel. The tower is placed over the last-named, and, owing to the fall of the ground, the vestries are placed in a large vaulted crypt underneath the chancel. The church is built of a hard red stone quarried in the parish, and is lined with ashlar of Paignton conglomerate. The external dressings are of Doulting stone. The church has cost about £7,500, including fittings, and it holds 500 worshippers. The western portion was built by Mr. R. F. Yeo and the eastern by Messrs. E. P. Bovey & Son, both builders of Torquay. The font shown in the illustration is of polyphant stone. The two statues were carved by Mr. E. Lynn Jenkins, sculptor, of London. The oak canopy was the work of the late Mr. Herbert Read, of Exeter, whose son made the oak pulpit. The font, pulpit, &c., were designed by the architects, Messrs. Nicholson & Corlette.

We would mention that our photographs are not without deficiencies, more especially in regard to the tracery in the window behind the font at Cockington. They serve, however, to represent this excellent modern church work by two notable architects.

THE BUILDING TRADE IN 1905.

The following further reports on the state of the building trades in various centres during the past year have come to hand:—

England.

Coventry.—There was a further decrease in the number of plans approved and number of buildings completed over former years. The former amounted last year to 685 and the latter to 426, as against 716 and 746 respectively for the former year.

Gainsborough.—Trade has been fairly prosperous here.

Long Eaton.—Building has been fairly brisk in 1905.

Nottingham.—The building trade has been fairly active, and the figures would undoubtedly have shown an increase on those of 1904 had it not been for the threatened strike during the six months from April to September. Despite this, 1,782 buildings were completed and nine new streets laid out. In 1904 the total was 1,949, a decrease on 1903, which was a record year.

Shipley.—Here again trade has been stagnant.

Sunderland.—Last year 365 plans were approved.

Worthing.—Trade has been quiet, but this year is expected to be an improvement.

Scotland.

Dundee.—Trade had been very dull during the year. In 1904 the value of buildings erected was about £167,000, but the total for 1905 will be considerably short of this. There has been no trade dispute and wages have shown no change.

Edinburgh.—Trade has generally been dull.



ST. MATTHEW'S CHURCH, COCKINGTON, NEAR TORQUAY. NICHOLSON AND CORLETTE, ARCHITECTS.

The record of work passed by the Dean of Guild Court for the year represents a value of £658,015. Embraced in this amount were 713 warrants for sixty-two tenements, fifty-one villas, 260 self-contained houses, 132 public and other buildings, and 492 alterations. For the corresponding period last year the total work represented a value of £977,883, representing 832 warrants for sixty-seven tenements, seventy-one villas, 212 self-contained houses, 123 public and other buildings and 583 alterations. In the central division of the city there has been nothing of note to chronicle save the completion of the Professional and Civil Service Store in George Street. In the west end some tenements and business premises have been erected, and at Murrayfield the same steady building of better class villas has been in progress during the year, and it is not supposed that this locality will be at a standstill until all available building ground has been taken up. In Morningside there have not been so many houses built as in former years, but they are of a very desirable class. A number of tenements have also been built in this neighbourhood, and also a branch library. In Portobello there has not been so much speculative building in this locality for a considerable time; it embraces both tenements and self-contained houses. The new Roman Catholic church is well advanced, and citywards may be noted the erection of a large new building for the manufacture of bricks. At Granton a large addition has been made to the huge premises of the Edinburgh and Leith Gas Commissioners. Beyond Craigleith Station a number of self-contained houses are being built, but in Comely Bank, where of late there has been so much work in operation, a sudden collapse has taken place. Extensions have been made to printing works in Causewayside, and also at Parkside. In the latter case the Hennebique patent system of ferro-concrete fire-proof construction is being introduced for the first time in the city.

Glasgow.—The past year has not been a

prosperous one for the trades connected with the building industry. For several months they were all affected by a large number of the operatives in two of those trades stopping work with a view to resisting a reduction of wages, and other differences arose between employers and employed in reference to working rules. There has been a considerable falling off in the number of applications to the Dean of Guild Court of Glasgow for new buildings, as well as in the value of all classes of property, in contrast with previous years; indeed, the value is the lowest since 1896. No doubt the reason for this has been that within the city the supply is sufficient for present requirements. The large amount of building of dwelling-houses which is in progress in the suburban districts of the city has also to be taken into account. These houses in most cases become occupied as soon as they are ready, showing that there is a growing disposition to migrate from the city to the suburban districts. Speculative building is for the present practically at a standstill. The total valuation of the new property which came before the Dean of Guild Court last year is £1,439,434, as against £2,118,800 for the previous year.

Leith.—The building trade in Leith has been in a very depressed condition during the year, and there are no signs of work becoming brisker for some time to come. The Dean of Guild Court granted 100 warrants for new buildings—value estimated at £92,000. In 1904 the value was £180,000 and in 1903 £269,000.

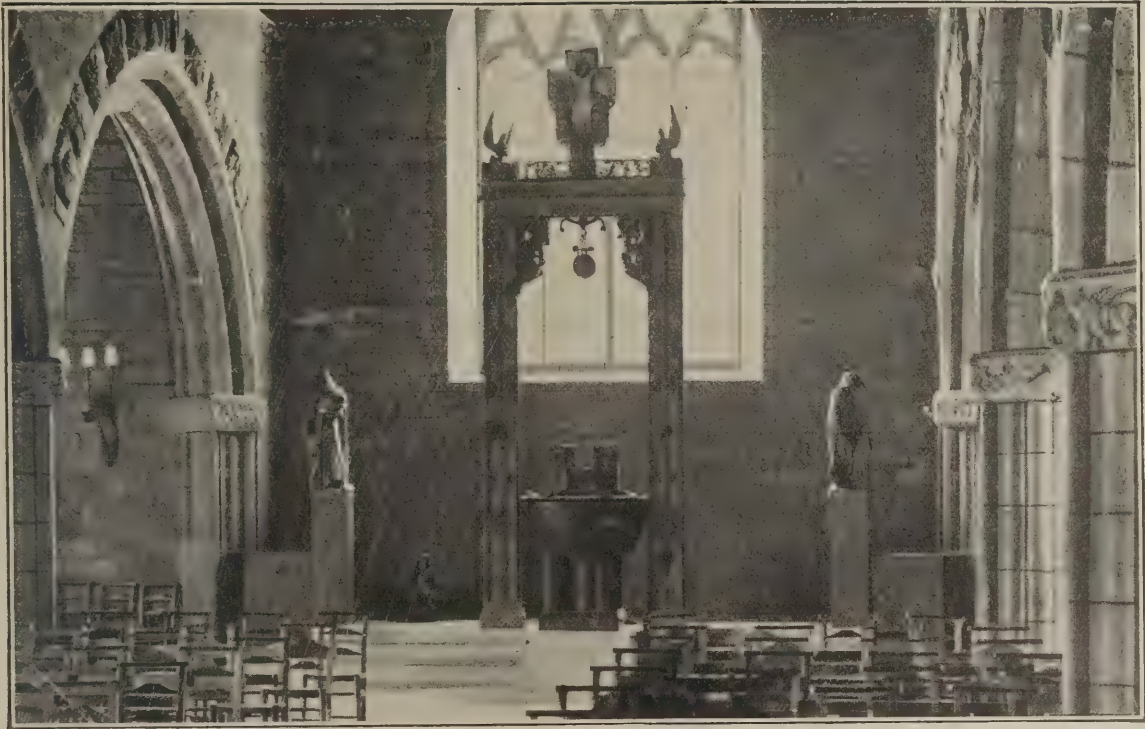
Ireland.

Belfast.—The depression which followed the "slump" in the building trade a few years ago still hangs over the trade, and during the year the hoped-for improvement has not taken place—at any rate with regard to large contracts. True, there have been some important work in progress, but most of these were a legacy from previous years, and very few new buildings of any magnitude have been initiated.

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THE SCREEN, ST. ALBAN'S SOUTHEND-ON-SEA.

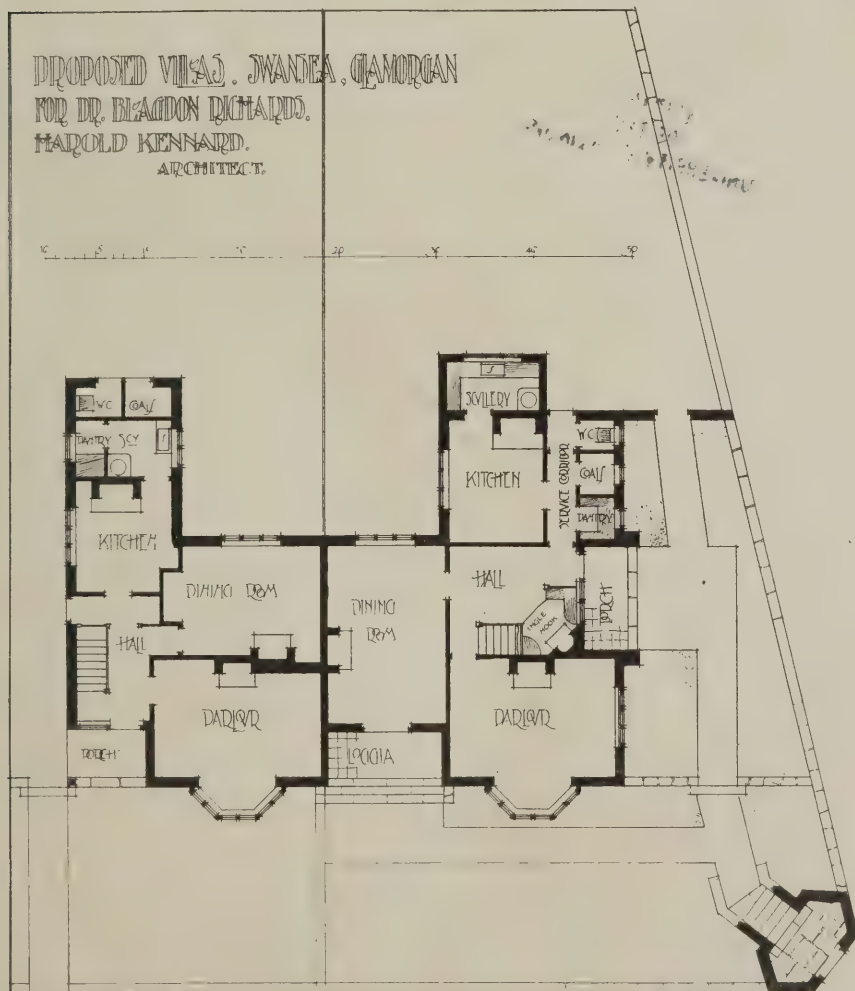


THE FONT COCKINGTON CHURCH.



ST. MATTHEW'S CHURCH, COCKINGTON, NEAR TORQUAY, LOOKING EAST. (Rood and Beam Temporary Only.)

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This pair of villas, for Dr. Blagdon Richards, is one of ten pairs now in course of erection on the Coedsaeson Estate, Sketty, Swansea, for the Grosvenor Building Club. The materials are stock bricks faced with Portland cement, rough-cast; wood frames and sashes painted white; roofs covered with best Welsh green slates; and the chimneys faced with Lawrence & Sons' No. 6 cherry-red facing bricks. The boundary walls, steps, &c., are all of local stone. The contractors are Messrs. Pye, Parkinson & Co., Ltd., of Eversleigh Road, Sketty, Swansea, and the architect is Mr. Harold Kennard, of 13, Railway Approach, London Bridge, S.E., and 33, Castle Street, Swansea.

Correspondence.

Christ Church, Moss Side, Manchester,

To the Editor of THE BUILDERS' JOURNAL.

SIR,—In illustrating the above in your issue for last week you referred to me as being an "F.R.I.B.A." Kindly permit me to say that this is an error, as I have not the honour of being connected with the Institute in any way. The letters referred to were added to my name without my knowledge, and immediately I saw the mistake I wrote to the secretary of the Institute pointing out this fact to him. Yours truly,

W. CECIL HARDISTY.

MANCHESTER.

[We regret the error to which Mr. Hardisty draws attention. It was purely an oversight on our part.—Ed. B.J.]

The new Cathedral at Berlin.

To the Editor of THE BUILDERS' JOURNAL.

SIR,—Accompanying the excellent little illustration of the new cathedral at Berlin in your issue for December 27th you give some particulars of the size of the building. It is stated that the cross on the central cupola reaches to a height of about 374ft.—"which is nearly 79ft. less than St. Peter's, Rome, and more than 9ft. higher than St. Paul's. The total length of the building is 374ft. and the width nearly 80ft."

I spent some time in Berlin during the past summer, and the assertion (which I am aware has been freely made) that Berlin's much over-praised Dom is really higher than St. Paul's Cathedral in London is certainly not correct; nor the statement that it is only 80ft. wide. In regard to the latter I may add that the central dome itself has an external diameter of 125ft. (internal 102ft.).

There appear to be several different semi-official renderings as to the dimensions of this building. Bradshaw's "Continental" says: "It is 350ft. long, 260ft. broad and 360ft. high"; whilst Baedeker's "Berlin" says: "Length 394ft., breadth 262ft., and to the highest point of the dome 361ft."

It might be useful if anyone can say what

is the real extreme length, width and height.
—Yours truly,
HARRY HEMS.
EXETER.

[We have no official figures about the new cathedral at Berlin. The dimensions we gave were those published at the time of the opening of the cathedral last year. St. Paul's is 363ft. to the top of the cross, so that, on Bradshaw's and Baedeker's figures given above, the two cathedrals are about equal in height. St. Peter's, Rome, is 437ft. 6ins. to the highest point. The width of the nave of St. Paul's—or rather the nave and aisles, but not including recesses—is 123ft., and the dome about 100ft. diameter at the whispering gallery level. It is difficult to get at precise figures in these matters, and we should be glad therefore to hear from anyone who can state exactly what are the dimensions of the new cathedral in Berlin. Ed. B.J.]

Mitchell Library, Glasgow.

To the Editor of THE BUILDERS' JOURNAL.

SIR,—Not the least valuable feature of your very interesting double number for December 27th is the list of competitions in 1905, which, so far as I am aware, is the only complete list published, and on that account likely to be widely used for reference. Permit me therefore to point out that the result of the Mitchell library competition is recorded in a manner that is almost certain to convey to your readers the impression that three designs selected by the assessors have been passed over and a design not selected by them accepted by the Corporation. This, however, is not the case, as the accepted design is that placed first by the assessors, the first-, second- and third-premiated designs being placed next in order of merit.—Yours truly,

W. B. WHITIE.

GLASGOW.

[It was difficult to record exactly how this competition was decided, but the above letter from Mr. Whitie, the author of the selected design, makes the matter clear. Ed. B.J.]

Competition.

1 Norwich Shire hall Extension.

The committee of the Norfolk County Council, on the advice of their assessor, Mr. A. J. Wood, of Surrey Street, W.C., recommend that the first premium of £100 in the competition for extensions to the Shirehall at Norwich be awarded to the design marked "M"; the second premium of £50 to the design marked "G"; and the third premium of £25 to the design marked "D." The names of the respective authors are not yet announced. The architect of design "M" estimates the cost at £8,850, but Mr. Wood puts the cost at £13,820; the architect of design "G" estimates the cost at £13,210, Mr. Wood's estimate being £13,640; while the architect's estimate of design "D" is £9,500 and Mr. Wood's estimate £13,400. It is probable, therefore, that the cost of the extension will not exceed £14,000. The names of the successful architects in this competition will be announced later.

THE TIMBER TRADE.

London Market in 1905.

THE year 1905 has been one of chequered fortune for the timber trade, but it may be said to have come nearer on the whole to realizing the hope of better things with which it started than seemed probable between March and October.

Messrs. Churchill & Sim observe, however, that the London trade for the year must be pronounced unsatisfactory. Importers bought too early and too freely, and thus were in stock during the early part of the year while prices were falling. This put them out of heart, so that, as a whole, they had no courage to buy again in the mid-summer period, when prices were at their lowest; and the rise having come in the late autumn, they are now lightly stocked, and cannot do much more than recoup the losses of the earlier part of the year. Then, too, the building trade in and around London was persistently bad during 1905, but there are signs at last to be drawn from the figures of the estimated consumption which point to better things this year. The shrinking process which has been coincident with the new century has been checked in 1905. The dock deliveries show a further reduction of some 16,000 standards on those for 1904, but this is nearly balanced by an improvement of some 13,000 standards in the overside deliveries; and it has to be remembered, in thinking of the life of a trade, that this shrinkage in the consuming powers of the London market has only been going on for about four years, and if this is to be the bottom of it for the time, as now seems likely, it has not reached nearly so low an ebb as, say, in the lean years before 1897. The London wood trade wants all the help it can get. The danger that it will be left out altogether is one that should be risked, and can be minimized by judicious and moderate purchases of such supplies as are certain to be required. The London market will be helped this year by the concession of increased facilities for cheaper railway transit for wood from the Surrey Commercial Docks, skilfully and patiently worked for and brought to a successful issue last month by the directors of that company, to whom the thanks of the trade are due. Other efforts in the direction of cheapening the Port are greatly to be desired, but must be looked for more on the lines of the rearrangement and adaptation of the incidence of existing rates to the changing and varying phases of the trade than by the pleasant wholesale reductions advocated by some who forget that there are two sides to most questions.

The Board of Trade returns give the following figures:—

WOOD IMPORTED INTO THE UNITED KINGDOM IN 1905.			
Sawn and planed:—		Loads.	Value.
Russia	-	2,120,520	£4,962,192
Sweden	-	1,522,399	3,442,227
Norway	-	499,127	1,363,161
United States	-	490,632	1,695,466
Canada	-	1,160,169	3,266,591
Other Countries	-	192,938	583,543
		5,985,785	£15,253,180

The record of the past year in its general features bears a close resemblance to that of 1904. Both years have been marred by the severe depression which has prevailed since the outbreak of the Russo-Japanese war. Messrs. Foy, Morgan & Co. state that the diminution in the consumption during the past two years may be reckoned at about 10 per cent. of the average consumption of the busier period from 1898 to 1903, while the returns show a reduction of about 9 per cent. in the importation of sawn and planed wood goods during the last two years as compared with the averages of 1900-1-2 and 3. It is interesting to notice, moreover, that the average cost of the supply has also consistently fallen from £9 6s. 3d. in 1900 to £8 8s. 3d. per standard at the present time; but notwithstanding this circumstance the lowered cost has been powerless to stimulate business owing to the stagnation in the building trade.

Russian Supplies Foremost.

As regards the sources of supply, Russia easily takes the first place, having shipped to the United Kingdom a larger volume of wood goods than has hitherto been sent by any exporting country—a record which is especially significant in that it happens to coincide with such a striking reduction in the general volume of the import.

The main deficiency is found in the reduced shipments from Canada and the United States, which are wholly the result of the home consumption, due to the enormous growth of population and prosperity throughout the American Continent. This change in the character of the import calls for special attention, owing to its persistence from year to year; for whereas in 1900 and earlier the supplies from Sweden were always, and from Canada frequently, in excess of those from Russia, it would seem at the present time that we are not able to take from Canada much more than half nor from Sweden more than three-fourths of the quantity procurable from Russia.

Financial Profits.

While the resemblance between the last two years has been statistically very close, the record of 1905 from a profit-making point of view has fortunately been much more favourable to the trade than it was in 1904. Allowing for the sustained depression under which business operations have been conducted, prices have kept uniform, and a working profit, even if a small one, has been the reward of the majority. Contrasted with the previous year, when constant losses due to falling markets were the rule rather than the exception, the result of the past year's trading must on the whole be considered satisfactory so far as it goes, but it must not be overlooked that the great reduction in the import for two years in succession has been the main foundation of this successful trading. Another result of this curtailment of supplies—less desirable if the uniformity of prices is in the long run the best criterion of safe business—is seen in the abnormal reduction in the stocks left in this country, which are now probably far below the level they have reached for many years past. It

ABSTRACT OF STOCK, CONSUMPTION, &c. IN LONDON DOCKS, FOR DECEMBER.

S.C. Dks. and M. Dks.	Deals (Fir.)	Battens (Fir.)	Pine.	Spruce.	Pitch-pine Deals.	Deals and Battens in Aggregate.	Rough Boards (All Countries).	Flooring.	Floated Timber.
	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Loads.
Public dock stock	1,428,876	2,948,674	939,976	817,231	33,928	6,167,685	4,209,333	7,562,173	23,408
Monthly public dock consumption	212,689	411,110	87,671	109,893	6,331	827,694	394,957	967,647	2,205
Overside stock	784,822	1,516,996	323,506	495,505	—	3,029,940	1,457,391	1,306,323	—
Overside consumption (estimated of dock):—									
92 per cent.	195,674	378,221	80,657	101,102	—	755,654	363,360	599,941	—
62 "Sawn Planed									
Duration of supply at same rate of consumption	5'42 months.	5'66 months.	7'51 months.	5'80 months.	5'20 months.	5'81 months.	7'47 months.	5'66 months.	10'62 months.

is scarcely probable that, amid the many signs of revival in general trade, the demand for wood should remain on the same restricted scale that has characterized the recent years of depression, and it scarcely needs pointing out that the effect of even a slight expansion in consumption falling upon unusually small stocks might quickly lead to an inflation of prices which, however welcome to large stockholders for the time being, would inevitably react to the disadvantage of the home markets in the coming season.

The statistics relating to London call for particular attention just now. In the first place, the dock stocks all round are the smallest carried in recent years, and in fact, to go beyond the figures actually printed, it may be added that in this respect deals constitute a record for twenty-one years, while the same may be said regarding battens, pine, spruce and floorings respectively for some ten or eleven years. On the other hand, the increase in the overside returns is very considerable, but this fact to some extent tends to qualify the immediate inference that might be drawn from the extraordinary figures of the dock stocks, because the overside returns, especially at this time of the year, should be regarded more as an addition to stock than as consumption. So, if the dock stocks are smaller, it seems to follow that the stocks held at private depôts are so much the larger.

ANNUAL IMPORT INTO LONDON, JANUARY 1ST TO DECEMBER 31ST.

		1905.	1904.	1903.
Deals (fir) - Pieces		4,817,157	4,812,297	5,443,205
Battens (fir) - "		10,959,191	10,925,513	12,555,281
Pine - - - "		1,762,994	1,718,875	2,539,041
Spruce - - - "		2,375,140	2,493,918	2,705,526
Pitch-pine deals* - "		76,977	90,121	103,048
Deals and battens } in aggregate		20,030,572	20,049,724	23,426,547
Rough boards - "		7,996,009	9,660,860	11,004,506
Planed boards - "		22,338,397	20,879,949	27,717,462
Floated timber - Loads		31,857	33,633	67,276

* The pitch-pine import excludes any delivered overside.

STOCK OF WOOD IN LONDON PUBLIC DOCKS ON DECEMBER 31ST.

		1905.	1904.	1903.
Deals (fir) - Pieces		1,428,876	1,774,228	2,155,830
Battens (fir) - "		2,948,674	3,583,431	4,092,187
Pine - - - "		939,976	1,305,176	1,403,515
Spruce - - - "		817,231	1,137,848	1,396,256
Pitch pine deals - "		32,928	60,032	62,432
Deals and battens } in aggregate		6,167,685	7,860,715	9,110,220
Rough boards - "		4,209,333	4,443,931	5,185,200
Planed boards - "		7,562,173	8,947,611	10,772,483
Floated timber - Loads		23,408	29,511	41,342

American Hardwoods.

Oak.—Messrs. Foy, Morgan & Co. report that there seems to be less demand for quartered oak, and prices are lower. During the early part of the year there was a scarcity of really prime plain oak, and prices sensibly advanced. Since the summer the supply has somewhat improved, but not sufficiently to cause any appreciable reduction in values. Lower grades have been in steady demand at somewhat reduced prices. Boards have done well during the year, and prices are fully maintained.

Whitewood.—So far as can be estimated the volume of business transacted during the past year has been very much on a parity with that of 1904. It is impossible to arrive at anything like close figures, as such a large proportion of the trade is done by means of overside and "ex quay" deliveries, of which no public records are kept. Prices during the year have continued firm, and the only fluctuations have been the momentary ones which have occurred now and then when particular grades or sizes happened to be in short supply for the time being.

Maple Flooring.—A steady business continues to be done in this article, the merits of which are becoming more and more appreciated by all classes of users. Prices have slightly advanced during the year, and it is not unlikely that they will go still higher in the near future. Even a still further moderate rise in price would not make maple an expensive flooring when the lasting qualities of the wood are taken into account.

Australasian Hardwoods.

The consumption of jarrah has been below and the import above the average, and prices are consequently now rather weaker than at the commencement of 1905. Forest mahogany has not been imported, and there is only a limited outlet for it, but blackbutt has been extensively employed and is growing in favour for wagon construction, and also for paving. Moaewood has been experimented with as a substitute for teak, but has made little headway in England, in spite of the high cost of teak. The British Admiralty, after trial, decided against its use.

Teak.

In their review of the past year Messrs. Leary & Co. state that the trade in East Indian teak exceeded that of 1904, but was smaller than that of 1903 by no less than 31 per cent. as regards imports, though only 1 per cent. in consumption. Stocks are 22 per cent. less than the figures at the same date last year, themselves 27 per cent. below those of 1903, constituting a record for more than twenty years. Prices advanced rapidly and uninterruptedly throughout the year, and although present values constitute a record it is to be feared we have even now not reached high-water mark, as there is no sign of the demand diminishing. Attempts to introduce second-class timber have met with some success, and if the experiment is satisfactory to consumers regular shipments will doubtless follow.

Messrs. Denny, Mott & Dickson state that the stocks of teak in Europe at the present time are the smallest for at least fifteen years. In respect to Java, whilst it is certain that this source of supply will continue to be developed, and will increasingly find its way into consumption—however much it may be objected to for not being so light or mild as Burmah wood—it must be recognized that the want of length in this wood unfits it for much of the high-class construction in which teak is required, and this drawback chiefly arises from the conditions of growth in Java

as compared with those in Burmah and Siam, and cannot therefore be greatly modified by better supervision of the shipments.

Mahogany.

In so far that it has seen no sudden or violent fluctuations either in demand, imports or prices, the past year has been satisfactory as regards the mahogany market. The volume of business done has been considerable. Honduras and the African from Axim, &c., are the only items which show any increased supply worthy of special mention; imports of Guatemalan and Panama advanced considerably, but even so the total business done in these descriptions was insignificant; all the other producing countries were either represented by negligible supplies or have sent us distinctly less. The nett result is a considerable decrease in the total arrivals, compared with 1904, although they are well above the average for the last ten years; the consumption is, on the same average, even more satisfactory. A table showing the import of logs during the year is given below.

Views and Reviews.

English Gothic Architecture.

We have not space to adequately summarize the many conclusions which Mr. Bond has come to in this most important work on the history of Gothic architecture, and we must confine ourselves to general remarks. Previous to the appearance of this book, the subject was almost in a state of chaos, notwithstanding the great influence of the Gothic Revival. The older authors are altogether untrustworthy, their theories are far too narrow, and their endeavour to obtain a hard-and-fast classification has been a stumbling block to any intelligent advance. Mr. E. S. Prior's "Gothic Art in England" was the only modern treatment worth anything, but he left much undone. It has therefore remained for Mr. Bond to write the first thorough and reliable book on our national architecture, a subject which should be interesting to every educated man. Mr. Bond refers to the fact that nowadays the public are indifferent to architecture, and recalls the time when our aristocracy studied it with enthusiasm. We ourselves could wish the present indifference and almost total ignorance were dispelled, but there is no doubt that the advance of education has widened the sphere of interest (embracing science, for instance), and we cannot expect the same enthusiastic interest in architecture to return.

Mr. Bond has taken an evolutionary view of architecture, and shows how Gothic work developed from the constructive needs. He has succeeded in treating the subject broadly enough to counteract in great part the natural tendency of historical treatment to arbitrarily classify buildings. He shows the relation of English architecture to the architecture of France and Rome, and discusses the planning, the systems of vaulting employed, the buttresses, the drainage of roofs and protection of walls, and decorative elements such as capitals, bases, window tracery, doorways and porches, towers, spires, &c. The book is remarkably well illustrated. In fact, there are 28 whole-page collotypes, 785 reproductions in the text, in addition to 469 diagrams, such as plans, mouldings, sections, &c. One noticeable feature, too, is the inclusion of many measured drawings and the classification of mouldings, bases, &c., in a much ampler and better form than they have ever been done before. Every student should read this book, which is very cheap considering its size and the fine way in which it is produced.

"Gothic Architecture in England," by Francis Bond, price 31s. 6d. nett. London: B. T. Batsford 94, High Holborn, W.C.

IMPORTS OF MAHOGANY LOGS DURING 1905.

	Laguana and Tobasco Coast.	Honduras and Guatemalan.	Nicaragua and Costa Rica.	Panama and Colombian.	African.	Cuba.	St. Domingo and Jamaican.	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
London - - - -	4,078	12,705	7,167	235	6,402	6,667	177	37,331
Liverpool - - -	2,009	—	1,114	19	42,654	4,017	904	51,317
Glasgow - - - -	285	—	202	—	838	—	—	1,375
Other U.K. Ports -	925	—	—	—	—	—	25	950
Germany - - - -	4,303	768	297	—	13,281	1,250	35	19,931
France - - - - -	7,545	—	—	227	7,397	4,847	301	20,317



STONDON MASSEY CHURCH.

Mediaeval Architecture in Essex.

Mr. Godman has published on his own account the first of a promised series of volumes on the mediæval architecture of Essex. As he himself says, this is a task that looms large, and one closes the book with a feeling that the State ought to have all such matters in hand. If there is doubt on this point it will be removed by reading the recently published work by Prof. Baldwin Brown on "The Care of Ancient Monuments," in which the shameful indifference of England to the fate of historic monuments is compared (to her disadvantage) with the zeal of some foreign States. After generalising we must particularize, proceeding to thank Mr. Godman heartily for having shown in this volume on Essex how the survey of which there is need should be started. Since the county of old consisted so largely of forest, the extensive employment of timber by the mediæval builders is not surprising, nor is the ingenuity shown by the use of it in the solution of structural problems. There being no workable stone in Essex, and the art of brick-making having been lost when the Romans left, the wooden buildings would head the list, but unhappily at the present day there is only one such left, and it seems better to speak of what the county can boast of still. As in the neighbouring counties, buildings of flint bedded in rubble, depending for their ornamentation entirely on imported workable stone, form a considerable class by themselves, but still special to Essex are her fine churches of brick with their towers and spires, which, as Mr. Godman says, are worthy of illustration, and careful and sympathetic record.

The accompanying illustrations of Stondon Massey Church and St. Mary's Church, Shenfield, are typical examples of the wooden spire so characteristic of the county of Essex.

"Mediaeval Architecture in Essex," by Ernest Godman, secretary of the Committee for the Survey of the Memorials of Greater London. Published by the author at Sunnyside, Banstead. Edition limited to 250 copies.

Obituary.

The late Mr. H. H. Armstead left estate which has been proved at £14,600.

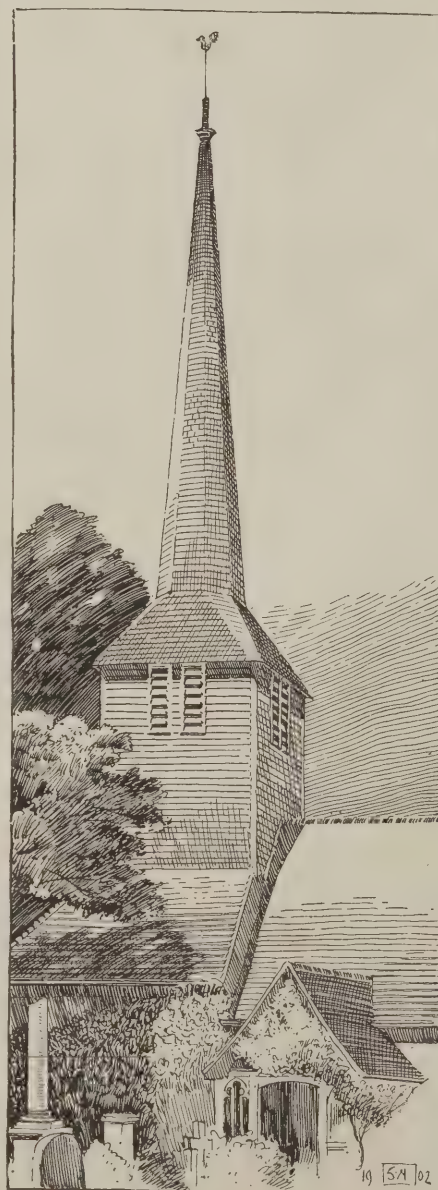
Mr. W. H. R. Crabtree, borough surveyor of Doncaster, died recently, aged 48.

Mr. W. Smith, builder, of Newark, died recently. He erected most of the important buildings in Newark, including the hospital, the school of art, and the infirmary extension.

Mr. A. E. Johnson, F.R.I.B.A., of Melbourne, died recently. He designed many important buildings in Melbourne, including the post-office, the Bank of Victoria, the Imperial Insurance Office, Union Bank and the Athenæum.

Mr. G. Waizbom, builder and contractor, of St. Helens, died recently in his seventy-fifth year. Deceased was the oldest builder in the town, having been in business for more than thirty years: he retired four years ago. Among public works carried out by him at St. Helens are a sub-police-station, library, bowling green pavilion, shelter-houses, and the extension to the Conservative Club.

Mr. A. W. Mills, of Bowden, Cheshire, architect of the Manchester Royal Exchange and other public buildings in Manchester and elsewhere, left estate valued at £92,046. He has bequeathed £8,000 to the Manchester Society of Architects, of which at least £5,000



ST. MARY'S CHURCH, SHENFIELD.

is to be set aside to form a permanent source of income, the Royal Institute of British Architects to decide as to the investment and expenditure of this fund if the local council are unable to agree; £4,000 to Owens College, Manchester, to be invested to form a permanent endowment for the college; £3,000 to the Manchester Royal Infirmary and Dispensary; and £3,000 to the Manchester Grammar School, to found scholarships tenable for boys at either the Universities of Oxford or Cambridge who for three years previously to their matriculation at the selected university shall have been educated at the Manchester Grammar School.

Mr. William Gabby, a well-known Belfast builder, was found cut to pieces by a train at Carnalea Station, Co. Down Railway, last week. He executed many and large contracts in Belfast and vicinity, and for the past fifteen years his services as an arbitrator were often requisitioned by litigants in the building trade. Two years ago he acted as building expert for the Board of Trade.

Mr. Frederick Sang, "the father of coloured architecture in this country," died at Twyford Abbey recently, aged 94. He was born in Germany, but he settled in England and became a British subject. His chief work was the decoration of the Royal Exchange when it was opened by Queen Victoria and Prince Consort. These decorations still exist, especially in the ceilings of the Grand Ambulatory, some of them being frescoes. He also decorated the Coal Exchange and several other important buildings in the City; St. George's Hall, Liverpool; and St. Pancras Hotel and Station. In the West End he decorated all the principal clubs and the chief mansions of the nobility. In architecture he also did much work during his long career. He received the first prize in the competition for covering the quadrangle of the Royal Exchange with a glass roof, though the actual commission was executed several years later by Mr. Barry. His Westminster improvements, the scheme for the concentration of the Government offices, and the decoration for a new National Gallery in Trafalgar Square were exhibited at the Royal Academy. He also sent in designs for the Albert Memorial, the proposed Royal Mint on the Embankment, the Roman Catholic Cathedral at Westminster and Brompton Oratory. Abroad, he planned the overland route to India by way of North Africa and the Euphrates Valley; and also the docks and granaries on the Danube. In the latter scheme the present veteran Emperor of Austria, as well as the then King of Bavaria, took a great interest, granting audiences to the architect to enable him to explain his project.

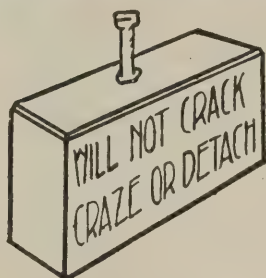
A Mahometan Mosque is to be built in Paris on a site near the Invalides.

Watts's "Physical Energy": Proposed. Cast for Edinburgh.—A project has been mooted to obtain for Edinburgh a cast in bronze of the late Mr. G. F. Watts's "Physical Energy." This, it will be recalled, is a figure of a youth on horseback, and was meant to be an embodiment of the restless energy of the present day and of the wonderful control which science has secured over the forces of nature, though it may also be interpreted to symbolize the foresight and courage of an explorer who has ridden his horse to a lofty summit, from which he has discovered a new country, of which he is prepared to take possession. The Treasury of the late Government, with the consent of Mrs. Watts and the Watts trustees, authorized a cast in bronze to be made from the group to be set up in some prominent place in London as a memorial of Mr. Watts. It is estimated to cost £2,000. The effort to get a cast for Scotland owes its initiation to Mr. Pittendrigh MacGillivray, R.S.A.

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THE LADY OF THE HOUSE AND THE LOCAL DECORATOR.

What the Architect has to Suffer.

IN a paper on "Interior Domestic Decoration" which he read recently before the Natal Institute of Architects Mr. Reginald G. Kirkby, A.R.I.B.A., referred to the question of clients and their tastes.

The architect, he said, was rarely allowed a free hand in the execution of his decorative schemes. His work was usually more or less of a compromise. The habits, tastes and mode of living of the client had to be carefully considered, but in the event of a client wishing to introduce colours and features which did not harmonize, difficulties were created which were not easily overcome, and often excellent schemes were wrecked by the insistence of ideas out of keeping with the general design. Such was the case when the architect had to consult the lady of the house, who had set ideas on certain lines formed by influences which were not always in the true interests of art. Thus the enthusiasm of the architect was often crushed by the compromise that had to be made in the carrying out of his designs. How often did we not find that the client who was most uninformed was the most interfering and difficult to deal with. Almost every woman when she possessed a home of her own seemed to think that she had been endowed by Nature with special gifts to decorate it, without ever having studied the underlying principles or read such works as would give her a proper idea of the subject. Many decorative schemes had been utterly spoilt at the outset by a client having recklessly purchased articles of furniture which were of themselves expensive and interesting but not at all in keeping with the general atmosphere of a home, and so making a satisfactory result impossible. Or perhaps wallpapers were purchased without any due regard to the size, shape and aspect of the room. The local decorator (spelt with capital letters) often came to the assistance of the client. He knew what was best and what would suit the room without ever having seen it or its position, and by his persuasive powers made the would-be purchaser believe that this or that paper was just the one needed, and that if the purchaser did not like it in the dining-room, then it would suit the bedroom equally well.

In this respect there was an increasing need for properly-equipped schools of art, which had a great field open to them to train the younger generation of decorators aright, so that they might intelligently advocate those goods which were of the best design and give some evidence of a serious study of modern decorative motives, instead of the listless and inanimate results it was our lot to endure. The local decorator in a large measure controlled the progress of decorative art, but unfortunately he was rarely qualified to advise his customers properly; and such schools might also do a great deal in the advancement of art amongst the gentler sex, who were so largely responsible for the good or ill effect of domestic decoration.

New Art.

Speaking of the New Art, Mr. Kirkby said its advent was like a thunderbolt dropped amongst dry bones. The old schools of designers at first ignored it, then ridiculed it, but soon realized that it possessed life and power, and had come to stay.

Our art was riddled with styles and conventions; individuality possessed no liberty; designs had to conform to some recognized precedent or were considered a failure; and thus our homes showed little variety in the way of ornamentation.

Those who at first condemned L'Art Nouveau soon became its champions. Like all new ideas and methods possessed of merit,

it passed through the same treatment, but in the end succeeded. The effect of this New Art had been to break down the traditions of the past and to revolutionize the whole of the decorative arts, developing new ideas, methods and features, and applying materials to fresh uses. But whilst deserving so much praise, it was to be hoped that it would not be carried to the excesses of some foreign schools, thereby sacrificing use and comfort to novelty. Owing to the increasing demand for goods executed to the designs of the modern schools, manufacturers had been compelled to fall in line, realizing that unless they did so they would obtain no sale for their goods. The lead in this respect had been taken by many craftsmen who had made a study of the New Art and adopted its principles to their materials, and who had been quickly repaid by the immediate response of the public to appreciate their efforts in this respect.

Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

DURING THE WEEK ending January 5th twenty-one failures in the building and timber trades in England and Wales were gazetted.

J. BOND, builder, High Wycombe. First meeting, 1, St. Aldate's, Oxford, Jan. 10th, at 12.

J. W. LUCAS, builder and contractor, Bournemouth. P.E., Poole Town Hall, Jan. 10th, at 10.30.

J. WRIGHT, builder, &c., Bournemouth. P.E., Poole Town Hall, Jan. 10th, at 11.30.

CAVE & Co., builders, Bourne. P.E., Peterborough Law Courts, Jan. 12th, at 12.

A. G. BATTRUM & Co., builders, Crouch End (late Finchley. Adj. Dec. 30th).

J. WATSON, builder, Whitely Bay. P.E., Newcastle-on-Tyne C.C., Jan. 11th, at 11.

F. H. CLARKSON, junr., plumber, Ipswich. R.O. Dec. 29th.

W. H. THOMPSON, painter, Cradley. P.E., Stourbridge C.C., Jan. 15th, at 2.

S. HIPWELL & Co., builders, Wisbech. First meeting, King's Lynn C.C., Jan. 18th, at 11. P.E., King's Lynn C.C., Jan. 18th, at 10.

G. SMITH, builder, East Ham. First meeting, London Bankruptcy Court, Jan. 11th, at 11. P.E., same, Jan. 30th, at 12.

R. SHAW, plumber, Darwen. First meeting, Blackburn C.C., Jan. 10th, at 11. P.E., Blackburn C.C., Jan. 10th, at 10.30.

MARSHALL & Co., builders, London, W.C. First meeting, London Bankruptcy Court, Jan. 10th, at 12. P.E., same, Feb. 9th, at 11.

Coming Events.

Wednesday, January 10.

EDINBURGH ARCHITECTURAL ASSOCIATION (Associates' Section).—Mr. Ramsey Traquair on "Tombs," at 8 p.m.

Thursday, January 11.

MANCHESTER SOCIETY OF ARCHITECTS.—Mr. Hugh Miller on "Architectural Sculpture," at 6.45 p.m.

Friday, January 12.

GLASGOW TECHNICAL COLLEGE ARCHITECTURAL CRAFTSMEN'S SOCIETY.—Prof. F. O. Bower, M.A., D.Sc., F.R.S., on "Dry Rot," at 8 p.m.

Monday, January 15.

SURVEYORS' INSTITUTION.—Ordinary General Meeting at 8 p.m.

Tuesday, January 16.

MANCHESTER SOCIETY OF ARCHITECTS.—Debate at 6.45 p.m.

ARCHITECTURAL ASSOCIATION CAMERA AND CYCLING CLUB.—Mr. G. Trotman on "Winchester Cathedral," at 7.30 p.m.

Wednesday, January 17.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Mr. W. T. Oldrieve on "What H.M. Office of Works is doing for Historic Buildings in Scotland," at 8 p.m.

NORTHERN ARCHITECTURAL ASSOCIATION.—Mr. R. G. Hutton on "Jacobean Floral Patterns," at 7.30 p.m.

QUANTITY SURVEYORS' ASSOCIATION.—Adjourned Discussion on Mr. F. B. Hollis's paper, "Some Thoughts on the Quantity Surveyor, and his relation to the Building Owner, the Architect and the Builder," at 7 p.m.

Friday, January 19.

INSTITUTION OF MECHANICAL ENGINEERS.—Meeting at 8 p.m.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—Address by Mr. E. C. Middleton.

ARCHITECTURAL ASSOCIATION.—Mr. F. Lynn Jenkins on "The Consideration of Sculpture by Architects," at 7.30 p.m.

Current Market Prices

FORAGE.

		£	s.	d.	£	s.	d.
Beans	per qr.	1	13	0	1	15	0
Clover, best	per load	3	12	0	4	0	0
Hay, good	do.	3	5	0	3	17	0
Sainfoin mixture	do.	3	5	0	3	15	0
Straw	do.	1	8	0	1	14	0

OILS AND PAINTS.

Castor Oil, French	per cwt.	1	1	0	1	2	15
Colza Oil, English	do.	1	5	0	—	—	—
Copperas	per ton	2	0	0	—	—	—
Lard Oil	per cwt.	2	15	0	2	17	0
Lead, white, ground, carbonate	per ton	16	0	0	—	—	—
Do. red	do.	15	0	0	0	19	0
Linseed Oil, barrels	per cwt.	1	1	9	—	—	—
Petroleum, American	per gal.	0	0	6½	0	0	6½
Do. Russian	do.	0	0	5½	0	0	6½
Pitch	per barrel	0	8	0	—	—	—
Shellac, orange	per cwt.	9	1	0	9	2	0
Soda, crystals	per ton	3	2	6	3	5	0
Tallow, Town	per cwt.	1	5	9	—	—	—
Tar, Stockholm	per barrel	1	5	0	—	—	—
Turpentine	per cwt.	2	7	3	—	—	—

METALS.

Copper, sheet, strong	per ton	95	0	0	—	—	—
Iron, Staffs, bar	do.	7	0	0	8	10	0
Do. Galvanized Corrugated sheet	do.	12	2	6	12	10	0
Lead, pig, Soft Foreign	do.	17	11	6	17	13	9
Do. do. English common brands	do.	17	17	6	—	—	—
Do. sheet English, 3lb. persq. ft. and upwards	do.	18	0	0	—	—	—
Do. pipe	do.	18	10	0	—	—	—
Nails, cut clasp, 3in. to 6in.	do.	9	5	0	—	—	—
Do. floor brads	do.	9	0	0	—	—	—
Steel, Staffs, Girders and Angles	do.	7	0	0	7	5	0
Do. do. Mild bars	do.	7	5	0	7	10	0
Tin, Foreign	do.	163	2	6	163	12	6
Do. English ingots	do.	166	10	0	167	10	0
Zinc, sheets, Silesian	do.	31	7	6	—	—	—
Do. do. Vieille Montaigne	do.	31	10	0	—	—	—
Do. Spelter	do.	29	5	0	29	10	0

TIMBER.

Soft Woods.

Fir, Dantzic and Memel	per load	2	15	0	5	0	0
Pine, Quebec, Yellow	do.	4	2	6	7	10	0
Do. Pitch, American	do.	2	19	0	5	0	0
Laths, log, Dantzic	per cu. fath.	4	0	0	6	0	0
Deals, Keret, Yellow, 1st, 3x9	per std.	18	0	0	—	—	—
Do. do. 2nd, 3x11	do.	15	5	0	—	—	—
Do. do. 2nd, 3x9	do.	14	15	0	—	—	—
Do. Nederkalix, Yellow, 1st, 3x9	do.	11	5	0	—	—	—
Do. Rø, Yellow, 5th, 3x9	do.	7	5	0	—	—	—
Do. Soderhamn, Yellow, 3rd, 3x7	do.	9	15	0	—	—	—
Battens, all kinds	do.	6	10	0	9	10	0
Flooring Boards 1in. prepared, 1st	per square	0	9	0	0	11	0
Do. 2nd	do.	0	10	3	—	—	—
Do. 3rd, &c.	do.	0	6	0	0	10	0

HARD WOODS.

Ash, Quebec	per load	4	0	0	7	15	0
Birch, New Brunswick	do.	2	7	6	4	10	0
Do. Quebec do.	do.	2	12	6	5	0	0
Box, Turkey	per ton	7	0	0	20	0	0
Cedar, Cuba	per ft. sup.	0	0	3	0	0	4
Do. Honduras	do.	0	0	6½	—	—	—
Do. Tobasco	do.	0	0	58	—	—	—
Elm, Quebec	per load	4	5	0	8	10	0
Jarrah, plank	per ft. cu.	0	2	6	0	3	0
Mahogany, Average Price for Cargo, Honduras	per ft. sup.	0	0	58	—	—	—
Do. Tobasco	do.	0	0	53½	—	—	—
Do. Cuba	do.	0	0	47½	—	—	—
Do. African	do.	0	0	38½	—	—	—
Oak, Wainscot	per log.	3	75	0	7	5	0
Teak, Indian, logs	per load	10	0	0	19	0	0
Do. do. planks	do.	13	0	0	20	0	0
Whitewood, American, logs	per ft. cu.	0	1	3	0	1	6
Do. do. planks and boards	do.	0	1	3	0	3	0

New Companies.

GIRDERLESS FLOOR CO., LTD. Capital: £1,000.

C. B. KING, LTD., builders, decorators, &c. Capital: £10,000.

CERN BRITHDIR BUILDING CO., LTD. Capital: £7,500.

NEWCOMBE ESTATES CO., LTD., builders and contractors, &c., Market Harborough. Capital: £50,000.

BRITISH GARDEN CITIES, LTD., to acquire the Wigmore Estate, Chatham. Capital: £10,000.

ALFRED BIST & Co., LTD., decorators, plumbers, &c. Manchester. Capital: £2,000.

TIMBER TRADES ASSOCIATION FOR THE PROTECTION OF THE TIMBER, BUILDING AND FURNISHING TRADES, LTD., Liverpool. Capital: £1,000.

THOMAS BOISTON, LTD., to acquire the business of quarry owners and stone merchants carried on by F. Boiston & J. Boiston at Durham. Capital: £10,000.

A. WALKER & SON, LTD., to acquire and carry on the business of contractors, &c., carried on at Leeds by A. Walker & Son. Capital: £15,000.

TOOTH BROTHERS & PEMBERLEY, LTD., to acquire and carry on the business of sanitary engineers, plumbers, glaziers and fitters, carried on by A. Tooth & Ellen Tooth at Ross, Hereford. Capital: £3,000.

Complete List of Contracts Open.

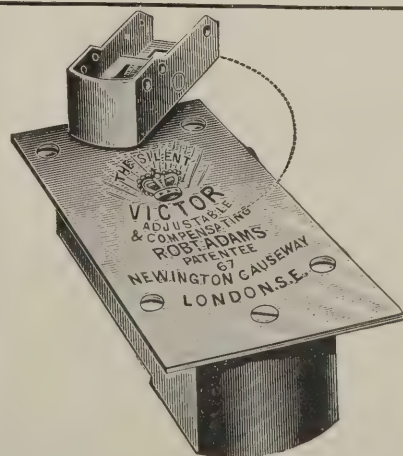
DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:			
an. 11	Lancaster—Town Hall	Corporation...	E. W. Mountford, Architect, 17 Buckingham Street, Strand, W.C.
11	Wembley—Houses	Great Central Railway Co.	Engineer's Office, Marylebone Station, London.
11	Lindley—Mill, &c.		J. Kirk & Sons, Architects, Huddersfield.
11	Liversedge—Stores, &c.	Co-operative Society	H. Stead, Architect, Heckmondwike.
11	Rawtenstall—School Extension, &c.	Corporation	A. Brocklehurst, Architect, St. James's Chambers, Waterfoot.
12	Cookham—Schools	Education Committee	Secretary, Education Committee, The Forbury, Reading.
13	Aylesbury—School	Governors	W. T. Farthing & Son, Architects, 46 Strand, London, W.C.
13	Birstall—Additions	Trustees	W. Hanstock & Son, Architects, Branch Road, Batley.
13	Sutton Mill—Baths, &c.	J. Bairstow	S. Jackson & Son, Architects, Tanfield Chambers, Bradford, Yorks.
13	Caversham—School, &c.	Education Committee	W. H. Ashford, Architect, 99 New Street, Birmingham.
13	Bwlchgwyn—Alterations	Education Committee	W. R. Evans & Lloyd, 56a Hope Street, Wrexham.
13	Leeds—Hoarding, &c.	Guardians	T. Winn & Sons, Architects, 84 Albion Street, Leeds.
13	Southall—School-Church	Church Trust	C. G. Miller, Architect, 65 Chancery Lane, W.C.
15	Coventry—Office, &c.	Corporation...	F. W. Stevenson, Engineer, Gasworks, Coventry.
15	Ystradgynlais—Chapel	Trustees	P. Morgan, Penrhos, Ystradgynlais, Wales.
15	Whitehead—Houses	Messrs. M'Gladdery	Graeme-Watt & Tulloch, Architects, 77a Victoria Street, Belfast.
16	Bedlington—Enlargement		S. James, Ivy House, Bedlington Station.
16	Bury St. Edmunds—Alterations, &c.	County Council	A. Ainsworth Hunt, County Architect, Sudbury.
16	Leeds—Police-station, &c.	Watch Committee	H. Ascough Chapman, Architect, Prudential Bldgs., Park Row, Leeds.
17	Uxbridge—Workhouse Extensions	Guardians	W. L. Eves & J. Freebairn Stow, Architects, Uxbridge.
17	Llandudno—School	Governors	G. A. Humphreys, Architects, Llandudno.
17	Hendon—Offices	Guardians	E. P. Thompson, Architect, 25 Finsbury Square, E.C.
18	Bristol—School Works	Education Committee	H. J. Jones & Son, Architects, 12 Bridge Street, Bristol.
19	Chepstow—Alterations	Guardians	Halliday & Roger, Architects, 14 High Street, Cardiff.
19	Swindon—Schools	Corporation...	Nicholls & Stockwell, Architects, 25 Regent Circus, Swindon.
20	Belfast—Shops, &c.		T. Houston, Architect, Kingscourt, Wellington Place, Belfast.
20	Malpas—Cottages	Rural District Council	T. M. Lockwood & Sons, Architects, Foregate Street, Chester.
20	Wigan—Convenience	Corporation...	Borough Engineer, King Street West, Wigan.
20	Ely—Houses	Mr. Miller	W. H. Dashwood-Caple, Architect, Church Street Chambers, Cardiff.
22	Folkestone—Shelters, &c.	Corporation...	A. E. Nichols, Borough Engineer, Folkestone.
22	Beckenham—School, &c.	Urban District Council	J. A. Angell, Surveyor, Backenham.
22	Great Hale—Chapel	Primitive Methodists	Rev. J. McKinney, 35 Northgate, Sleaford, Lincs.
29	Ipswich—School	Education Committee	J. A. Scheuermann, Architect, 23 High Street, Ipswich.
31	Thirsk—Extension	Hospital Committee	T. Stoes, Architect, Westgate, Thirsk, Yorks.
Feb. 2	Portslade-by-the-Sea—School	Education Committee	F. J. Wood, County Surveyor, County Hall, Lewes.
2	Cheshunt—Hospital	Urban District Council	A. C. Lee, Clerk to Council, Manor House, Cheshunt.
2	Chiddingly—School	Education Committee	F. J. Wood, County Surveyor, County Hall, Lewes.
2	Plumpton—Additions, &c.	Education Committee	F. J. Wood, County Surveyor, County Hall, Lewes.
12	Bedford—Extension	County Council	W. H. Leete, County Architect, Shire Hall, Bedford.
No date	London, S.W.—Enlargements, &c.	Education Committee	B. S. Gott, Secretary, Education Committee, Middlesex Guildhall Westminster, S.W.
	Oswaldtwistle—Hall, &c.	Weavers, Winders and Warpers Association.	G. Riley, Architect, 24 Albert Street, Oswaldtwistle.
ENGINEERING:			
13	Leeds—Heating	Guardians	T. Winn & Sons, Architects, 84 Albion Street, Leeds.
13	Airdrie—Gas-holder Tank	Town Council	A. Gillespie & Son, Engineers, 61 Bath Street, Glasgow.
13	Glasgow—Pipelaying	Corporation...	J. R. Sutherland, Engineer, 45 John Street, Glasgow.
15	Cromer—Water-mains	Urban District Council	J. C. Mellis, Engineer, 264 Gresham House, Old Broad Street, E.C.
16	Chorley—Tar Extractor	Corporation...	J. W. Allin, Gas Engineer, Chorley, Lancs.
16	London, S.E.—Rebuilding Engines	Guardians	G. E. Arnold, C.E., 26 Victoria Street, S.W.
16	Peasedown—Water-supply	Rural District Council	W. F. Bird, C.E., Midsomer Norton, Somerset.
17	Nelson—Inclined Retort Stack	Gas Committee	A. J. Hope, Engineer, Gas Offices, Nelson.
18	Swansea—Pier Extension	Harbour Trustees...	A. C. Schenk, Engineer, Harbour Offices, Swansea.
18	Bristol—Heating	Education Committee	H. J. Jones & Son, Architects, 12 Bridge Street, Bristol.
19	Glasgow—Precipitation Tanks	Corporation...	City Engineer, City Chambers, Glasgow.
22	Stratford-upon-Avon—Pumping Machinery	Corporation...	Willcox & Raikes, Engineers, Union Chambers, 63 Temple Row, Birmingham.
22	Wimbledon—Air Compressors	Corporation...	C. H. Cooper, Borough Engineer, Town Hall, Wimbledon.
23	London, E.—Swingbridge... ..	County Council	Maurice Fitzmaurice, Engineer, County Hall, Spring Gardens, S.W.
24	Pendlebury—Sprinklers	Urban District Council	H. Entwistle, Surveyor, Council Offices, Swinton.
27	Rotherham—Repairing Stage		P. van Waesberge & Zoon, Rotterdam.
27	Huddersfield—Sewage-disposal Works...	Corporation...	K. F. Campbell, Engineer, Town Hall, Huddersfield.
ay 1	Talcahuano, Chili—Dock		Direccion de Material, Valparaiso.
IRON AND STEEL:			
13	Durban—Pipes	Corporation...	W. H. Radford, C.E., Albion Chambers, Nottingham.
16	London, S.W.—Slot Rails... ..	County Council	Engineer's Department, County Hall, Spring Gardens, S.W.
16	London, S.W.—Spans	India Office	Director General of Stores, India Office, S.W.
17	London, E.C.—Spans	East Indian Railway Co.	C. W. Young, Secretary, Nicholas Lane, E.C.
PAINTING AND PLUMBING:			
12	Preston—Painting, &c.	Corporation...	Borough Surveyor, Town Hall, Preston.
5	Manchester—Painting	Lancashire and Yorkshire Railway Co.	Engineer's Office, Hunt's Bank, Manchester.

(Continued on p. xiv.)

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- 1570.—CLERK OF WORKS; town or country; abstainer, good refs.; mod. s.
- 1572.—BUILDER'S ASSISTANT; 19 yrs. exp.; drawing, quantities, measuring up, levelling, supervision, &c.
- 1573.—SURVEYS AND LEVELS undertaken; mod. charges.
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- 1576.—ARCHITECT AND SURVEYOR'S ASSISTANT; 4 yrs. exp.; ex. refs.; mod. s.
- 1578.—ARCHITECT'S ASSISTANT (25); 9 yrs. exp.; good draughtsman, design, wkg. drawings, details; London or country.
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See p. xx for the Employment Register.

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Tenders must be delivered, sealed, on or before first post MONDAY, JANUARY 15th, 1906, endorsed "Tender for Weigh Office, Messroom, &c.," and addressed to the CHAIRMAN of the Gas Committee, Gas Works, Coventry.

FLETCHER W. STEVENSON,
Engineer and General Manager.

Gas Works, Coventry.
December 23rd, 1905.

HANWELL URBAN DISTRICT COUNCIL.

TO CONTRACTORS AND OTHERS.

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MANOR COURT ROAD—extending from Church Road North to "Beaumont."

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Sealed Tenders to be delivered here (in envelopes supplied) not later than MONDAY, 15th January, 1906.

The Council do not bind themselves to accept the lowest or any Tender.

Any person, firm or company canvassing any member of the Council will be disqualified for receiving orders or Contracts from the Council.

By Order,
P. J. DENNIS,
Clerk to the Council.
Urban District Council Offices,
Church Road West Hanwell, W.
28th December, 1905.

TO BUILDERS and CONTRACTORS.

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December 21, 1904.

ALSO

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November, 1903.

December, 1903.

June, 1904.

January, 1905.

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Nothing is more trying than to be out of employment, but the difficulty of the position is terribly augmented when money has constantly to be paid for advertisements in order to find other occupation.

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We are encouraged to find how largely our columns have been instrumental in meeting the requirements of both parties in the manner indicated above, and we thank those advertisers who have written expressing their pleasure and indebtedness to THE REGISTER.

Many have found it an invaluable aid in getting appointments, and we would urge all those who are out of work, or want to change their situations, in fact, all who have a "want," to make use of these columns and thus make THE REGISTER a record of still more value to Employers and Employed.

For 3s. we give 3 insertions (four lines), in our "Appts. Wanted" Columns, and also 6 insertions in the "EMPLOYMENT REGISTER" (see page xx).

5 O'CLOCK P.M. MONDAY IS THE LATEST TIME FOR RECEIVING "WANT" ADVERTISEMENTS.
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Complete List of Contracts Open.—continued.

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Jan. 11	London, N.E.—Street Works	Council	Norman Scorgie, Borough Engineer, Town Hall, Hackney.
" 11	London, S.W.—Roads and Sewers		W. Newton Dunn, 1 and 2 Bucklesbury, Cheapside, S.E.
" 12	Brighton—Granite Kerb	Town Council	Borough Surveyor, Town Hall, Brighton.
" 12	Preston—Paving, &c.	Corporation	Borough Surveyor, Town Hall, Preston.
" 12	Northwood—Making-up	Urban District Council	W. Louis Carr, Surveyor, Council Offices, Northwood.
" 14	Midhurst—Macadam, &c.	Rural District Council	A. G. Gibbs, Surveyor, Council Offices, Midhurst.
" 15	Reading—Carting	County Council	County Surveyor's Office, Bank Chambers, Cross Street, Reading.
" 15	London, N.W.—Street Works	Urban District Council	S. Slater Grimley, Surveyor, Council Offices, Hendon, N.W.
" 16	East Ham—Tar-paving	Education Committee	R. L. Curtis, Architect, 11 and 12 Finsbury Square, E.C.
" 17	London, S.W.—Roads and Sewers		H. R. G. S. Smallman, Architect, 8 Queen Street, Cheapside, E.C.
" 17	London, S.W.—Making-up		F. Wood, Borough Surveyor, Town Hall, Fulham, S.W.
" 18	Merton—Street Works	Borough Council	R. M. Chart, Surveyor, Town Hall, Croydon.
" 18	Leytonstone—Granite	Guardians	F. E. Hilleary, Workhouse, Leytonstone, E.
" 23	London, S.E.—Roadwork, &c.	County Council	Maurice Fitzmaurice, Chief Engineer, County Hall, Spring Gardens.
" 27	Norwich—Granite	County Council	T. H. B. Heslop, County Surveyor, Norwich.
SANITARY:			
Jan. 11	Edinburgh—Sewer	Council	Burgh Engineer, Edinburgh.
" 13	Monmouth—Sewer, &c.	Corporation	G. F. Grimwood, Engineer, Monmouth.
" 15	Shalford—Scavenging	Rural District Council	F. Smallpiece, Clerk, 138 High Street, Guildford.
" 18	Maidstone—Sewage-disposal Works	Corporation	G. R. Strachan, M.I.C.E., 9 Victoria Street, S.W.
" 22	Shelf—Sewage Works	Urban District Council	J. Drake & Son, Engineer, Queensbury, near Bradford.
" 24	Ashchurch—Sewage-disposal Works	Rural District Council	H. A. Badham, Clerk, Tewkesbury.
" 24	Twickenham—Sewage-disposal Works	Urban District Council	F. W. Pearce, Surveyor, Town Hall, Twickenham.
" 26	Macroom—Sewerage Works	Urban District Council	T. Murphy, Clerk, District Council, Macroom, Ireland.
" 30	Hillingdon—Drainage Works	Rural District Council	Engineer, Corn Exchange, Uxbridge.

List of Competitions Open.

DATE OF DELIVERY.	DESIGNS REQUIRED.	AMOUNT OF PREMIUM.	DEPOSIT REQUIRED FOR CONDITIONS, &c.	FROM WHOM PARTICULARS MAY BE OBTAINED.
Jan. 13	Llanidloes—Public Building	50, 30 and 20 guineas	£1 1s.	W. J. Evans, Llandinam Hall, Llandinam, Montgomeryshire.
" 31	Hackney—Library	£30, £20 and £10	10s. 6d.	W. A. Williams, Town Clerk, Town Hall, Hackney.
" 31	Crompton—Library	£50, £30	—	F. F. Gartside, Clerk, Town Hall, Shaw, near Oldham.
Feb. 15	Wrexham—Schools (W. E. Willink, Assessor)	£25 and £15	£1 1s.	Clerk to Education Committee, Wrexham.
Mar. 20	Bangor—Free Library	—	—	W. H. Worrall, Municipal Offices, Bangor, North Wales.
" 31	Birmingham—Council House Extension (Sketch Plans)	—	—	Town Clerk, Council House, Birmingham.
No date	Coventry—Municipal Offices and Shops (Local Architects only)	£50	—	G. Sutton, Town Clerk, 10 Hay Lane, Coventry.
"	Bangor—New College Buildings (Names only)	—	—	Plans Committee, North Wales University College, Bangor.
"	King's Norton—School (Preliminary Competition)	—	—	J. F. Moore, Education Offices, King's Norton, near Birmingham.

Tenders.

Addressed postcards on which lists of tenders may be stated will be sent post free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Fetter Lane, E.C.

Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Canterbury.—For the erection of a new post-office at Canterbury, for H.M. Office of Works, &c. —

	Credit.
Paramor & Sons	£11,300
Amos & Foad	£12
W. H. Martin	10,990
G. Browning	10,750
W. J. Adcock	10,736
Sturly Building Co.	10,466
G. H. Denne & Son	10,348
N. White	10,160
W. Strange & Sons	10,057
Hayward & Paramor	9,943
W. H. Hyde	9,900
G. Barton	9,828
Rowland Brothers	9,800
Gann & Co.	9,733
G. E. Wallis & Sons	9,733
J. Shelbourne & Co.*	9,487
W. K. Grigg	9,474
	9,190
	9,134
	199

* Accepted.

Frinton-on-Sea.—Accepted for the erection of a shop, for Mrs. Mummy. Messrs. Harrington, Ley & Tomkins, architects, Frinton:—

Hawkins & Son £800 |

Frinton-on-Sea.—Accepted for the erection of coach-house and stabling, for Mr. Wheeler. Messrs. Harrington, Ley & Tomkins, architects, Frinton:—

W. Wash £225 |

Hucknall Torkard.—For the erection of a church and schools, Hucknall Torkard, Notts, for the Trustees of the Wesleyan Reform Church. Mr. Harry Spencer, architect. Quantities by the architect:—

Rowland Brothers, Kimberley	£3,564 15 0
Fish & Sons, Nottingham	3,324 0 0
H. Dugham, Basford	3,221 0 0
T. Barlow & Co., Nottingham	3,035 0 0
W. Maule & Co., Nottingham	3,036 0 0
F. Messom, Nottingham	2,986 0 0
J. A. Munks, Hucknall	2,965 0 0
J. Bodill, Hucknall	2,899 18 0
T. Cooper & Sons, Nottingham	2,850 0 0

* Accepted.

Hull.—For alterations and additions to the violent and troublesome and attendants' blocks at the City Asylum, Willerby, for the Asylum Committee. Mr. Joseph H. Hirst, city architect:—

Bowman & Sons £16,100 0 0 |

G. Houlton	£15,984 0 0
G. Eckles	15,500 0 0
A. J. Darneley	15,258 16 6
T. Goates	15,239 0 0
S. R. & T. Kelsey, Goole	15,203 0 0
H. T. Amott	15,197 4 10
Hebblewhite & Wilson	14,485 10 0
E. Good & Sons	14,023 16 6
G. H. Panton	14,000 0 0
G. Jackson & Sons, Witham	13,924 0 0
H. Arnold & Son, Doncaster	13,757 0 0
J. H. Fenwick, Albert Av., Hull	13,775 0 0

* Accepted. [Rest of Hull.]

London, E.C.—For rebuilding Nos. 75 and 76, Lombard Street, for Messrs. Slazenger & Sons. Mr. M. E. Collins, architect. Quantities by Messrs. Batstone Brothers:—

Lawrence & Sons	£15,911
Lascelles & Co.	15,910
Howard	15,700
Kilby & Gayford	15,527
C. Wall, Ltd.	15,450
J. Carmichael	15,409
Waring White Building Co.	15,382
Sheffield Brothers	15,222
Trollope & Colls, Ltd.	15,140
Chessum & Sons	14,929
A. N. Coles	14,825
J. Greenwood, Ltd.	14,803
Howell J. Williams, Ltd.	14,670
W. Downs	14,640
C. P. Roberts	14,550

London, E.—For repairs and decorations at "The Galloway Arms," Limehouse. Mr. Herbert Riches, architect, 3, Crooked Lane, King William Street, London, E.C.:—

J. T. Robey	£490
G. Barker	349
C. W. Staggs	278
Elkington & Sons*	255

* Accepted.

London, S.W.—Accepted for fitting-up two shops at Putney. Mr. Herbert Riches, architect, 3, Crooked Lane, King William Street, London, E.C.:—

Courtney & Fairbairn £247 10 0 |

London, N.W.—For alterations and additions to the Grange, West Heath Road, Hampstead. Messrs. Inman & Sturdee, architects, 7, Bedford Row, W.C. Quantities by Messrs. Smyth & Dearle, 7, John Street, Adelphi, W.C.:—

Ryder & Son	£10,762
Melbourne	10,307
S. S. Scott	10,147
J. Simpson	10,010
J. Dorey, Ltd.	9,700
Kilby & Gayford	9,483
J. Smith & Sons	9,289
W. King & Son	9,000
G. Godson & Sons	8,967
Miskin & Sons	8,960
Holland & Hannen	8,888

London, N.E.—For repairs and decorations at "The Mitford Tavern," Hackney. Mr. Herbert Riches, architect, 3, Crooked Lane, King William Street, London, E.C.:—

W. Irwin	£704
J. T. Robey	502
T. Osborn & Sons	410
Elkington & Sons	381
A. W. Derby*	368

* Accepted.

London, N.E.—For decorations to shop premises, Chatsworth Road, Homerton. Mr. Herbert Riches, architect, 3, Crooked Lane, King William Street, London, E.C.:—

A. W. Derby	£146 0 0
F. Parsons & Sons	128 10 0
Elkington & Sons	128 0 0
T. Osborn & Sons*	108 0 0

* Accepted.

Reading.—For the enlargement of Reading sorting-office, for H.M. Office of Works, &c. —

	Credit.
W. Jones	£2,595
W. Hawkins	£80
F. J. Stanbury	2,476
A. Faulks	2,391
W. T. Toogood & Co.	2,381
R. Curtis	2,250
G. H. Tucker	2,165
H. W. Godwin	2,165
Batten Brothers	2,137
W. H. Hyde	2,030
G. Pilgrim	1,986
Martin, Wells & Co.	1,979
G. E. Hughes	1,967
A. J. Colborne	1,910
McC. E. Fitt*	1,891
	1,774

* Accepted.

Southampton.—For rebuilding "The Old House at Home" public-house, and stabling, Shirley, for Messrs. Scarses Brewery Co., Ltd. Mr. A. A. Burnett, F.S.I., architect, 2, High Street, Southampton:—

Exors. of W. Franklin	£1,686
Rasley & Son	1,600
H. Stevens & Co.	1,556
Jenkins & Sons	1,545
A. Doggrell & Son	1,525
H. Cawte	1,509
Dyer & Sons	1,500
A. Wright & Son*	1,460

* Accepted. [All of Southampton.]

Southampton.—Accepted for reconstructing ice-lofts and stores, 16 and 17, French Street, and building additional offices at 124, High Street, for the Consumers Ice and Supply, Ltd. Mr. A. A. Burnett, F.S.I., architect, 2, High Street, Southampton:—

H. Cawte, Southampton £1,100 |

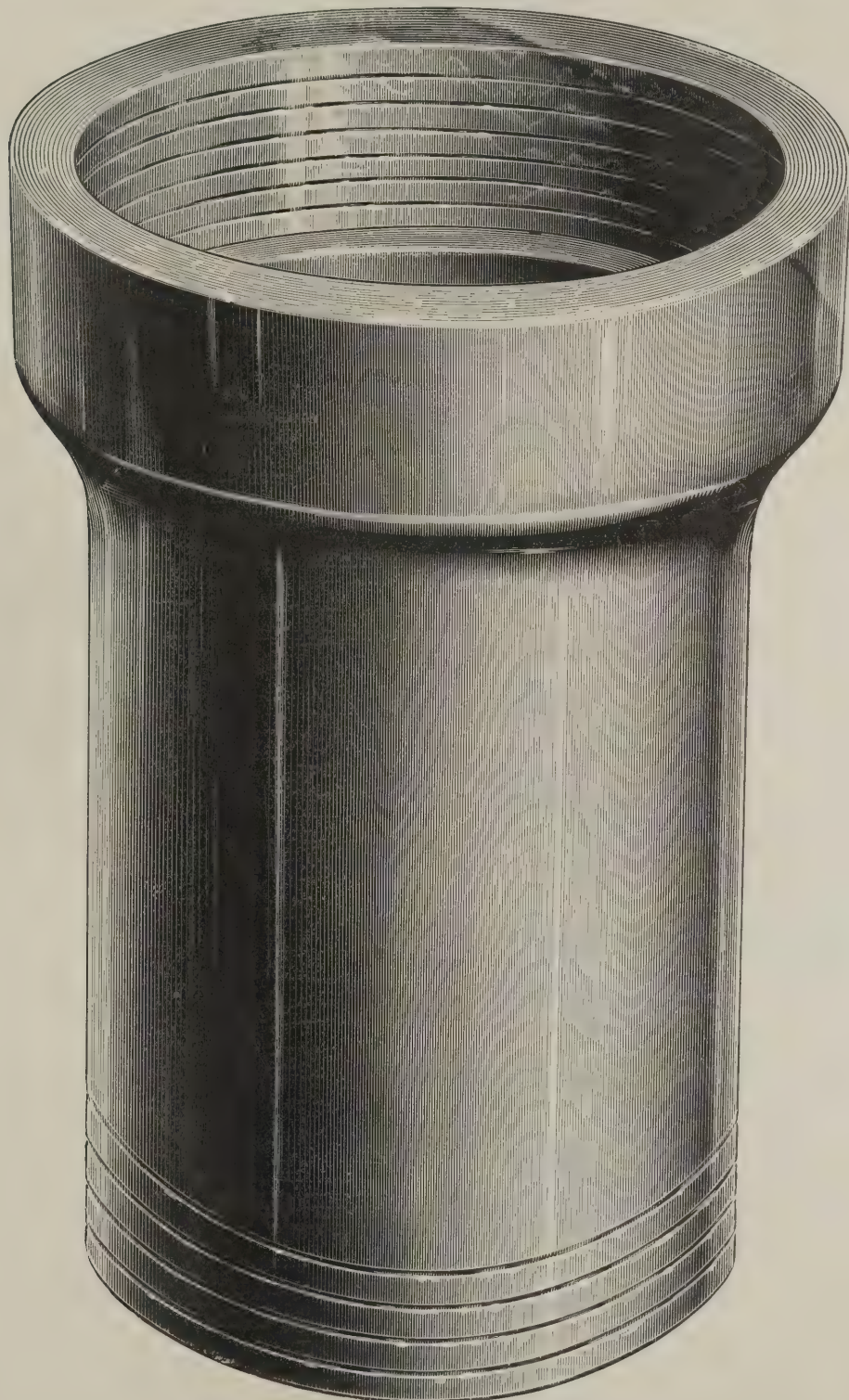
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TENDERS—cont. from p. xvi.

Sheffield.—For the erection of a residence in Graham Road. Mr. G. Malam Wilson, architect and surveyor, 37, Surrey Street, Sheffield. Quantities by the architect:—

J. H. S. Randall	£3,150	0	0
Smith & Nunn	2,500	0	0
T. Gray & Sons	2,216	0	0
Abbot & Bannister	2,175	0	0
D. Smith	2,003	0	0
Badger & Appleby	1,957	0	0
H. Broot & Son	1,913	0	0
J. Richerby	1,912	7	0
J. & H. Wheen	1,500	0	0
H. Kyme	1,899	0	0
E. B. Dyson & Son	1,871	16	0
W. & A. Forsdyke and Johnson & Appleyard	1,869	4	0
E. & W. Oxley	1,867	0	0
C. Portass	1,866	0	0
B. Powell & Son	1,860	0	0
C. Ward	1,815	12	7
J. T. Robertson	1,800	0	0
E. Moore	1,768	0	0
A. Bradbury	1,755	0	0

* Accepted subject to slight revision.

Southampton.—For alterations and additions to Meira House, Above Bar. Messrs. Hair & Bucknill, architects, Southampton. Quantities by Mr. C. I. Hair:—

Lawrence	£1,300
Jenkins & Co.	1,295
Long	1,260
Dyer & Sons	1,200
Bagshaw & Son	1,195
Wright & Son	1,194
Stevens & Co.	1,193
J. Nichol	1,137
Golding & Ansell	1,137
Rylands Brothers, Shirley	1,023

Sutton.—For the erection of a new post-office at Sutton, for H. M. Office of Works, &c.:—

W. Hopkins	£5,690
J. Longley & Co.	5,589
H. C. Payne	5,446
F. & E. Davey	5,260
J. Burges & Sons	5,227
Marrion & Salter	5,100
Martin, Wells & Co.	5,029
Drowley & Co.	4,999
Copley Brothers	4,993
Gathercole Brothers	4,990
E. P. Bulled & Co.	4,975
W. H. Hyde	4,968
C. Ansell	4,900
F. & G. Foster	4,870
F. J. Shopland	4,760

W. Smith & Sons	£4,748
J. Appleby & Sons	4,736
Braid, Pater & Co.	4,697
J. Shelbourne & Co.	4,614
F. Gough & Co.	4,590
R. Jones & Son*	4,554
J. F. Holliday	4,373
F. G. Lawrence	4,199

* Accepted.

Walsall.—For the erection of a new school for 336 senior boys and girls, with out-offices, together with a manual training centre for twenty boys, on a site at rear of present schools, Hillary Street, Walsall, for the Education Committee. Messrs. Bailey & McConnal, architects, Bridge Street, Walsall:—

G. H. Marshall, Stourbridge	£3,967
W. & J. Webb, Birmingham	3,690
Smith & Son, West Bromwich	3,685
W. Tapcote, Birmingham	3,666
G. Insley	3,638
T. & F. Wootton, Bloxwich	3,625
G. Webb, Handsworth	3,535
E. Mallin, West Bromwich	3,520
H. Willcock & Co., Wolverhampton	3,507
W. Listance	3,498
F. L. Jones, Wolverhampton	3,420
J. Herbert, Wolverhampton	3,400
J. Dallow & Son, Dudley, and W. Kendrick & Son	3,390
J. Barnsley & Son, Birmingham	3,388
T. Mason, Hednesford	3,345
T. & J. Ham, Wolverhampton	3,340
G. Guest & Son, Stourbridge, and T. Hall & Son	3,330
T. Hardy, West Bromwich	3,295
T. Tildesley, Willenhall	3,294
Brockhurst & Wood, Walsall, and G. E. Jackson, Oldbury	3,250
H. Gough, Wolverhampton	3,200
S. Wootton, Bloxwich	3,063

* Accepted. [Rest of Walsall.]

Messrs. Mellows & Co., Ltd., of Corporation Street, Sheffield, have secured the order for glazing on their patent imperishable "Eclipse" system the roof of the Newcastle-under-Lyne baths, Dixon's new mills at Grimsby, new sawmills at Malta, and extensions of works of the Northern Co-operative, Ltd., at Aberdeen and the Butterly Iron Works, Ltd., at Derby.

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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

January 17, 1906. Vol. 23, No. 571.

6, Great New Street, Fetter Lane, E.C.

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Substitution of Materials. THE building contractor receives a great deal of public opprobrium, but the sins of the black sheep in this trade are as nothing to the deceit which is practised in respect to the supply of materials. Some specialist firms seem to be in league to hoodwink the profession so as to be able to carry out a regular series of substitutions. The granite trade is one wherein such deception is often practised by firms large enough to be above such disreputable methods. The asphalt trade is another where the sources of supply are very little known, and the firms juggle with the materials from different mines just as the price or quantity available warrants. The paint, varnish, marble, slate and ironmongery trades are all open to similar criticism, while the same thing applies to specialist contractors who carry out such work as fireproofing and steelwork. These latter are often required and expected to do their work in the best manner and to work up to an accepted standard, yet if they have to compete rather closely with others (or perhaps because of their private finances being insecure) they do not scruple to substitute inferior work. Of course this is always bound to occur in all trades, but why we think it is particularly objectionable in the building trades is that firms of standing do not use their efforts to counteract the unscrupulous traders. Some large firms, indeed, are not honest themselves. The course of those who desire to break away from this practice is quite plain. They need only let the architectural profession know the true facts of the matter. We would ask them to state the sources of supply that are available at any moment, the quantity of materials that are in stock, and, in such a case as marble or granite work, to state what quarries have had their best material so worked out that it could not be used for a large job. Then they ought to clearly classify their first, second and inferior qualities of goods and so set up a standard by which there could be fair competition. Many mushroom firms rise nowadays and secure a considerable amount of work by methods which cannot be called anything but bluff. Not only the architectural profession but building contractors are constantly being hoodwinked. Very often they find out only too late that they have been deceived, but more often they do not discover the substitution, and the building owner or successive tenants are left to grin and bear it. A good many commercial travellers and principals of businesses are extremely plausible, and express their readiness to repair the little "mistakes" they are not above readily admitting, but at the same time they gently hint that the correction will take time—in fact, such a time that the building could not be delayed for this—and they know well enough that they will never be called upon to do the work. We would suggest that architects should be a little firm

with these gentlemen and hold them to their contract, and sue them for any breach of it. One or two examples of this kind might effect some reform. But we rely more upon the intentions of the majority of the members of the building trade to remove this stigma, the existence of which we believe is due more to apathy and inheritance than to any desire to practise dishonesty.

The Modern Arch. THE "theory" of arch design remained in an elementary state until the last century, when engineers were led to examine critically into all structural means in order to fit conditions of modern industry. They took the masonry arch and developed it a certain way, but they went little further than the greatest of the older builders, though they raised the average. Their empirical inelastic arch theory assumed the arch stones to be rigid and required the line of resistance within the arch ring (for safety within the middle third). In the latter part of last century, however, the theory of arch design began to advance again, particularly with Continental engineers. The construction of arches in metal marked the point of departure. The theory of elastic flexure was then applied to the theory of the arch, and the arched rib came into being. Instead, then, of it being a necessity for the line of resistance to be confined to the arch ring, it was easy, at small sacrifice of economy of metal, to stiffen the arch ring against flexure. This was now required to resist combined thrust and bending (with shear as a corollary). This is the elastic flexure theory of arch design. The older inelastic theory had led to the adoption of pin and similar joints at the crown and springing so as to give greater precision in design or to afford control of the line of resistance. The pin joints simplified the modern elastic flexure theory by allowing unknown quantities to be exactly determined, just as the fixing of one end of a roof truss and the freedom of the other simplifies the theoretical determination of stresses in such structural members. With the two-hinged arch (pin joints here being at the springing) or the three-hinged arch (a pin joint here being at the crown as well as at the springing) the analysis of stresses must be so conditioned as to make bending moments zero at the pin joints, whatever may be the condition of loading. This flexure theory has increased the range of the arch to immense spans. The Clifton Arch rib bridge at Niagara has a span of 800ft. The arched rib, too, is a graceful form of construction, and is much superior in line to the truss and cantilever, and we may therefore look forward to the future development of engineering structures with more equanimity than formerly. The modern theory of arch design finds its architectural application in reinforced concrete, of which there are examples with and without hinges.

A SHORT ANALYSIS OF ORNAMENT.

THE first decorations of surfaces appear to have been in stripes, partly because of greater facility in weaving narrow bands rather than broad widths and partly because a stripe defines a field in one direction only, making it possible to represent continuous action but not diffusing it.

Stripes

are closely associated with borders. Especially interesting striped patterns are to be found in Egyptian wall decoration, upon Greek vases, around Byzantine panels, and in the mouldings of all styles.

Chequers and Diagonals.

The chequer is common to all people, and is the simplest of geometric patterns.

The simplest of the diagonal line patterns are the zigzags, so strong and vigorous, though somewhat crude in effect. These are often to be found associated with chequers, and are especially prevalent in the so-called Romanesque mouldings; they are usually indicative of virile but unsophisticated work.

Parapet Patterns.

The parapet patterns and key patterns appear to have had an Oriental origin from the use of bricks in building and are to be found in all Oriental work from India to Morocco. They have been used in the European styles at times, but only in an imitative manner.

Frets

were so associated with Greek design that they are known as Grecques. Varieties of them appear in Japanese and Chinese design, and also in Mexican, but the fully developed fret is a thoroughly classic motive, and is scarcely to be found in decorative design between the fifth and fifteenth centuries until the Renaissance again establishes its use. Labyrinth patterns take the place of the fret in China; and the Swastica, or crossed key, which is often an integral part of a fret, is a Buddhist symbol.

In analyzing designs based upon curves it will be found that

The Circle

is the prolific source of motives. The circle has from the first been symbolic, and is the simplest and most conspicuous of all decorative spots. It found its place in the vocabulary of design at a very early date, although not appearing until chequer and triangle designs were well established. It is to be found in Egyptian and Assyrian ceiling patterns, in classic discs and rosettes, and especially in all early textiles, by far the larger proportion of which up to the tenth and eleventh centuries are based on wheel or circle patterns. From its association with the form of the arch it becomes one of the major architectural spaces from the time of the Romans.

The circle has strong

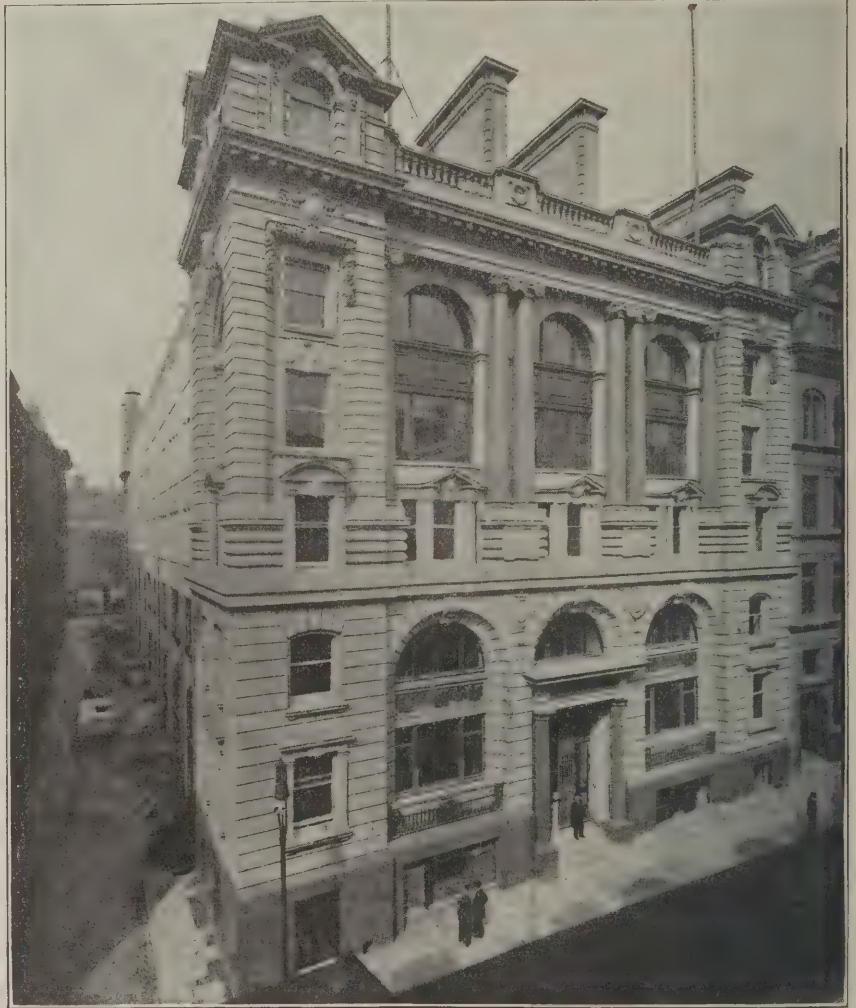
Capacity for Setting Scale

in design, and in all ornament in which it is introduced it naturally affects the relative scale of forms associated with it. Semicircles in parallel lines in the same direction produce scale patterns, and by interlacing produce the Guilloches, both of which are admirable foils for more complicated ornament. Alternation of semicircles in opposite directions produces meanders, which, if opposed, become the meneau, which is one of the universal patterns in textiles and dropped repeats. Portions of circles in one ratio, connected and progressing in one direction, form spirals, scrolls, and volutes. Scrolls appear first at an early date upon Egyptian seals and develop rapidly into wave and linked patterns and elaborate all-over patterns, but seldom appear as interlaces. The wave pattern is especially associated with Greek design, and disappears with the decline of Classic art, to reappear in the

Renaissance. The voluted designs attain their highest specialization in the Ionic capital. The opposed meander or meneau is the principal motive for Oriental wall surfaces from the eighth century, and becomes the motive for textiles in Europe in the fourteenth century. The radial motive is of a distinctly higher type than any of the preceding motives. It possesses all the

elements inherent in geometric design, and is dependent upon rhythm, which is not the case with the other systems. Rhythm may be defined as expression of motion caused by the action of some dominant force. The factors of a radial motive are rhythmical, both to each other and to the whole. The acanthus is the most thoroughly developed of the radial motives.

C. H. W.



(For particulars see p. 33.)

COLONIAL HOUSE, LIVERPOOL: NEW PREMISES FOR ELDER, DEMPSTER AND CO.
BRIGGS AND WOLSTENHOLME, F. B. HOBBS AND ARNOLD THORNELLY, ARCHITECTS.

THE THEORY OF PROPORTION IN ARCHITECTURE.

By C. B. Hutchinson, A.R.I.B.A.

THE papers by Mr. Claude Bragdon in THE BUILDERS' JOURNAL for October 25th and November 15th last open up an interesting point as regards the methods of proportion adopted in the early days of architecture. It must, however, be borne in mind that, though certain squares and equilateral triangles happen to fit in with the leading lines of a design, it does not necessarily follow that such were in the mind of the designer at the time. At the present day a building has complete accurate drawings prepared beforehand, but it is very doubtful as to how far this was the case even in mediæval times, and more so in Gothic work than in Classic or Renaissance. Again, the effect of perspective alters the proportion, for a building is seldom seen in true elevation.

It is clear, however, that the plans of ancient buildings were laid down to certain lines of simple proportion, such as 1 to 2, 2 to 3, and so on, the square and cube being often used, but, as Michael Angelo remarked, an architect must have a compass in his eye, not merely in his hand. Vitruvius and Alberti gave us their ideas of comparing simple proportions to notes and harmony in music, which are beautiful ideas in themselves. In music the vibration of sound produces harmony, or discord, for practical reasons regarding the wave lengths, but does this fully apply in a design except as regards the regular spacing of columns and other features in a Renaissance palace?

Harmony has been defined by Aristotle and Vitruvius in much the same terms as "the union of component parts having a ratio to each other," and this is of considerable importance in a design.

The Human Standard.

To get at the root of any matter one must trace it back to the earliest times. Here we have several motives—(1) those based on the proportions of the human figure, (2) certain numbers to which a mystic value was attached, (3) certain simple proportions in the main lines of a plan or design of a building which were repeated in its smaller component parts. The human figure has been taken as a basis, especially in all sacred buildings. So our digits represent the fingers held up for counting, and the V is the shape of the whole hand of five fingers. We use the palm, hand, foot span and cubit as standards of measurement, while the square is a man with extended arms.

Vitruvius based his book on authors whose works have unfortunately been lost, but both he and Alberti lay stress on the fact that all sacred buildings should be based on the proportions of the human body. These have been laid down from the earliest times as being, for a man's breadth to height, as 1 to 6, and depth, from chest to back, compared to height as 1 to 10.

Now the earliest structure of which we have any record is

Noah's Ark,

and if we refer to the account (Genesis vi. 15) we find "the length shall be 300 cubits, the breadth 50 cubits, and the height 30 cubits," or the breadth and length as 1 to 6 and the height to length as 1 to 10—that is to say, the precise proportions of a human body floating in the water. This is an interesting point, and one which the writer has never seen referred to before.

Again, the human figure is a column, and we find it used as such in Egyptian temples and in the Greek caryatides. Now, the earliest columns were in breadth to height as 1 to 6, or six diameters high, which is probable for the same reason as set out above: it might also be that a man stands upright and is 6ft. high.

The descriptive Biblical account both of

The Tabernacle and Solomon's Temple

contain many points of interest. All the instructions laid down were so definite as to clearly point to a prearranged scheme. The main length was usually 100 cubits, subdivided into units of 10 for the spacing of columns, &c. The orientation was east and west. In Exodus xxxviii. 10-19 we find the dimensions of the hangings and pillars all in the proportion of 1 to 5 and a unit of 5 cubits, which is interesting, as Alberti tells us that "ancient philosophers regarded 5 as a mystic number." On the north and south sides the hangings were 100 cubits and the pillars 20, or 1 to 5; while on the east and west sides the hangings were 50 cubits and pillars 10, or 1 to 5. The hangings on both sides of the gate were 15 cubits and pillars 3, or 1 to 5, and around the gate of the court the hangings were 20 cubits and the pillars 4, or 1 to 5. Then, again, in Solomon's temple (1 Kings vi. 31) we read "the lintol and side posts of the Oracle were a fifth part of the wall." Solomon's house of the forest of Lebanon (1 Kings vii. 2) was of the same dimensions as the Tabernacle of Moses, 100 cubits long by 50 broad, or 1 to 2, the breadth of 50 cubits being divided into five spaces or aisles by four rows of columns, or, again, 1 to 5: all working to a unit of 10 cubits. It is interesting here to compare Brunelleschi's Church of San Spirito at Florence, which is cruciform on plan, the proportion of breadth and length being as 1 to 2 and the breadth of the nave to its length as 1 to 6, or the proportion of the human body in this respect.

Certain numbers have in the earliest times been regarded as having a mystic value, especially the numbers 6 and 28 and the cube of 6, namely, 216, as these are the only two numbers which equal the sum of their divisors, 1, 2, 3 = 6 and 1, 2, 4, 7, 14 = 28. Is it a coincidence that, though all the dimensions of the Tabernacle and Solomon's temple are in multiples of 10 or 5, yet the curtains enclosing the Tabernacle—the main vertical dimension—were 28 cubits high (Exodus xxvi. 2 and xxxvi. 9); and in Bramante's design for St. Peter's at Rome (Guymuller, R.I.B.A. Trans., 1891) the main similar dimension for the nave and arcade supporting the cupola was 216 palms, which, after careful consideration, he believed was adopted for the same reason—as being the cube of 6.

Solomon's temple (1 Kings vi. and vii.) and the house of the forest of Lebanon were of different proportions. The temple was 60 cubits by 20, or 1 to 3, and 30 cubits high, or 1 to 2, the porch being 20 by 10 cubits, or 1 to 2. The house of Lebanon was 100 by 50 cubits, or 1 to 2, and 30 cubits high, as in the former case, the porch being 50 by 30 cubits. It should be noticed that the porch was in each case the whole width of the temple, which was usual in all Classic work, both Greek and Roman, and entirely different to Gothic cathedral porches. The chambers around the temple were of increasing size, being 5, 6 and 7 cubits broad, the Oracle itself (1 Kings vi. 20) being a perfect cube of 20 cubits each way—the same breadth as the temple. The cube has always been regarded as having special virtue in its perfect equality of dimensions. The cherubims in the Oracle were both 10 cubits broad, with two wings of 5 cubits each, or 20 cubits in all, and so stretched from wall to wall across the chamber.

All the minor dimensions for these two buildings and their fittings were according to a careful plan, usually of 10 or 5 cubits or proportionate sub-divisions; even the stones for the foundations were 10 cubits long. The whole Biblical account is found on examination to be that of a scheme of proportion in plan, and in squares or cubes in design.

The Proportions of Greek Architecture

have been already considered by so many writers as hardly to require repetition. From Greece, architecture was transplanted to Rome, but in the change from Biblical times to Roman an entirely new set of factors came in, altering the previous simplicity of proportion. The "Orders" of architecture, Doric, Ionic, Corinthian, &c., with their complicated proportions for height of columns, intercolumniation and minor details, altered the simplicity of earlier times, but it is interesting to find that these rules were based on certain simple principles; for instance, that the weight supported by a column should be only the weight of that column, or that the areas of the two should be equal, which at once regulates the spaces between the columns for the different "Orders." Again, when one "Order" is over another the upper diameter of the lower column should equal the lower diameter of the upper column, and so give a gradual diminution.

Mediæval and Renaissance Methods.

Coming now to the Renaissance, Vasari tells us how Brunelleschi, Bramante and Leonardo da Vinci used to work on paper ruled in squares, describing it as "a truly ingenious thing, and of great utility in the work of design," and by this they set out proportions on plan, &c., to a definite scheme—in reality similar to the method adopted in Biblical times.

As an illustration of the importance attached to the principles of proportion in a sacred building in mediæval times, we find, from a letter of Delle Valle, that on February 14th, 1321, a commission of five persons was appointed to enquire into the building of Siena Cathedral, which was then just begun, but which did not appear to be based on a proper system of proportion in length, breadth, height, &c., though the previous building did possess a careful scheme.

It is a question how far symbolism or any value in certain numbers held its ground in later times, but a system of proportion certainly did.

With Renaissance architecture a further set of factors was introduced, which again complicated the plans of buildings. Alberti in his book (vol. 2, p. 60) gives a design for a tower showing his ideas for its general proportions. It consists of six storeys, in a sequence of "Orders." The lowest storey is a perfect cube and each of the other storeys is $\frac{1}{2}$ of the storey below, or diminishing practically in the proportion of 8, 7, 6, 5, 4, 3, allowing in each case for the amount hidden by the projection of the cornice below; each "Order" to the storey being accurate as regards column entablature, &c. It is of interest to compare this with Ruskin's idea in his "Seven Lamps" where he takes the case of a plant called *Alisma Plantago*, in which the various branches diminish in the proportion of 7, 6, 5, 4, 3 respectively, and so carry out the same idea; on which Ruskin observes that the diminution in a building should be after the same lines as Nature. The idea of diminishing all the upper storeys is only a natural one. Every tree and plant divides from a main stem to its branches. A column diminishes for the same reason, to give the idea of mass at the base to support the weight. The walls of an Egyptian temple often taper for the same reason. A campanile, which has parallel sides, carries out the same idea, by almost always having the lower windows in single lights, with two, three, four or more lights in the storeys above. In Giotto's campanile and many other towers the upper windows are much larger and longer than the lower ones, to give the idea of lightness in the upper part. For the same reason the quoins or angle stones in the Farnese Palace at Rome diminish in size in the upper part.

The façades of Renaissance palaces do not

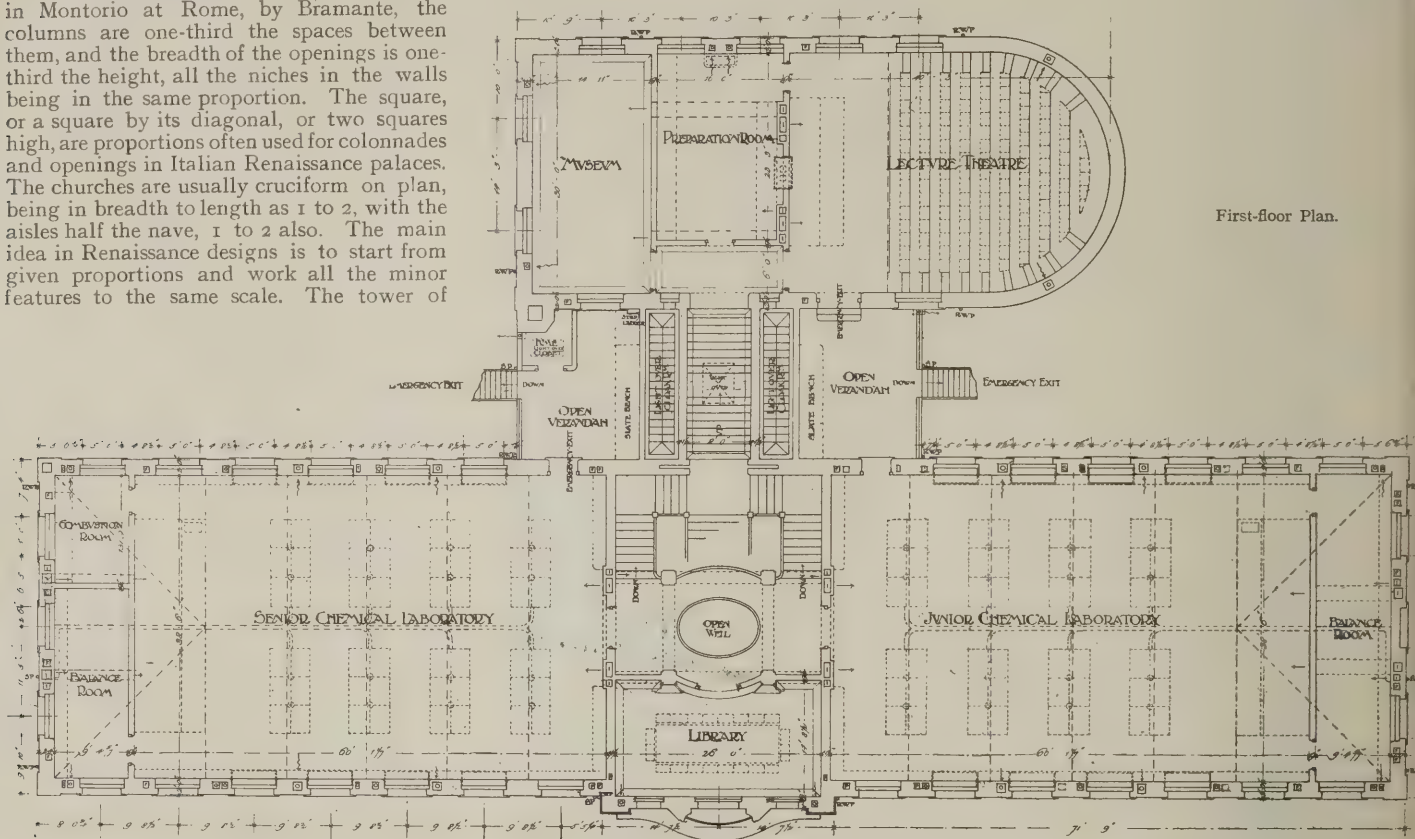
follow any invariable rule. The Rucellai Palace at Florence, by Alberti, has three storeys of equal height, raised on a base, the same height as the entablature. The Riccardi Palace at Florence, by Michaelozzi, like many others, has three storeys diminishing in the proportion of 5 to 3. Sometimes we find a lofty lower storey and the two upper ones equal.

At the beautiful little chapel of S. Pietro in Montorio at Rome, by Bramante, the columns are one-third the spaces between them, and the breadth of the openings is one-third the height, all the niches in the walls being in the same proportion. The square, or a square by its diagonal, or two squares high, are proportions often used for colonnades and openings in Italian Renaissance palaces. The churches are usually cruciform on plan, being in breadth to length as 1 to 2, with the aisles half the nave, 1 to 2 also. The main idea in Renaissance designs is to start from given proportions and work all the minor features to the same scale. The tower of

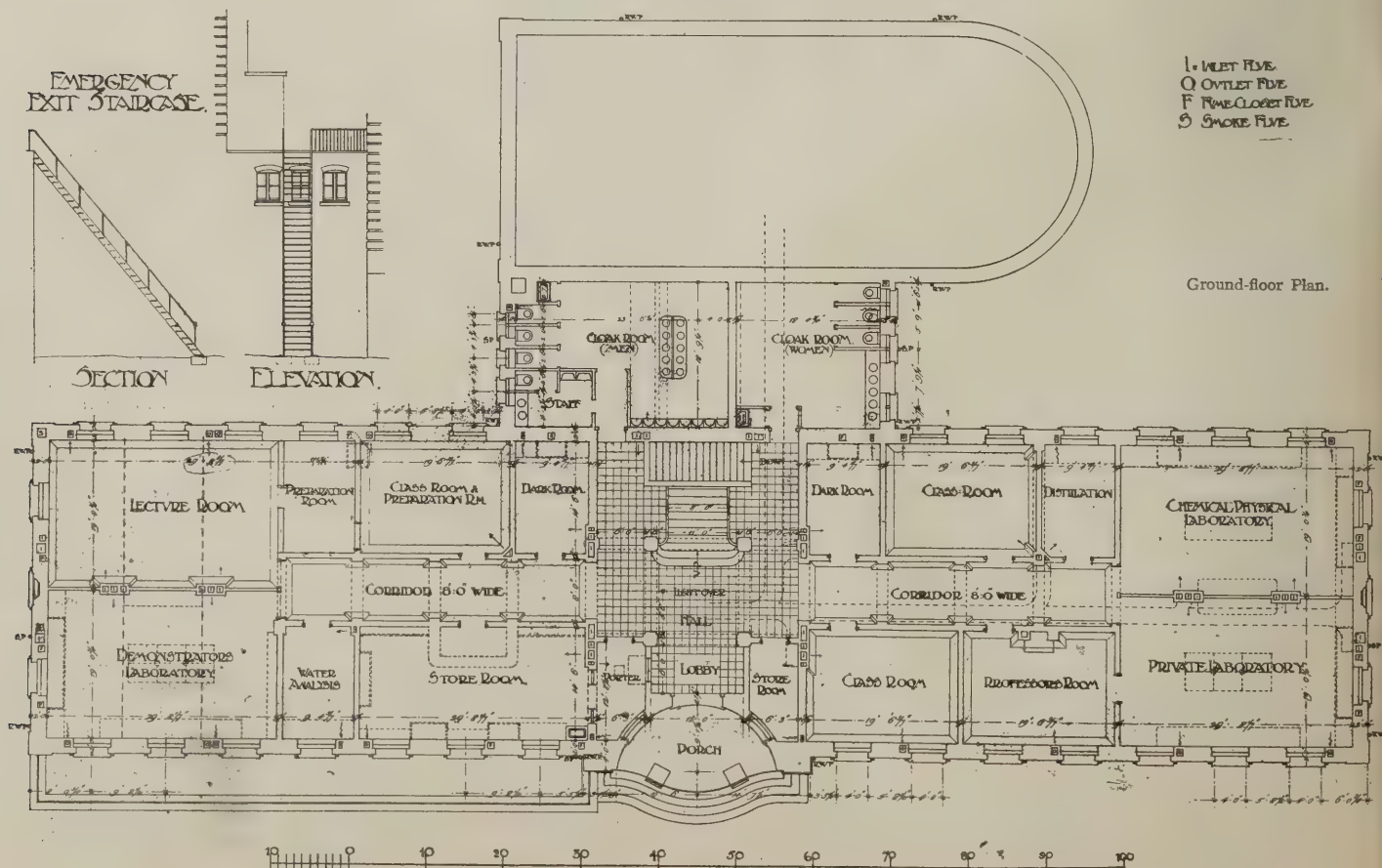
S. Spirito at Rome (c. 1490) is a good instance, the proportion of 5 to 9 being the keynote. The lower storey is in breadth to height as 5 to 9; the window opening in that storey is as 5 to 9 to correspond; and the lower storey is as 5 to 9 of the first two; the upper one being a repetition of the middle one. In all the pure Italian Renaissance designs there is a carefully arranged sequence and repetition of proportion in the main

outline, a crowning cornice being often proportioned to an imaginary "Order" the height of the whole building, as Palladio so often adopted.

These are just a few notes on a subject which deserves careful analysis. In the earlier times symbolism and mysticism may have taken a large share in guiding the lines of a building, but throughout all the beauty of good proportion has been always recognized.

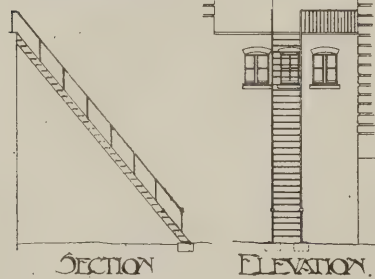


First-floor Plan.



Ground-floor Plan.

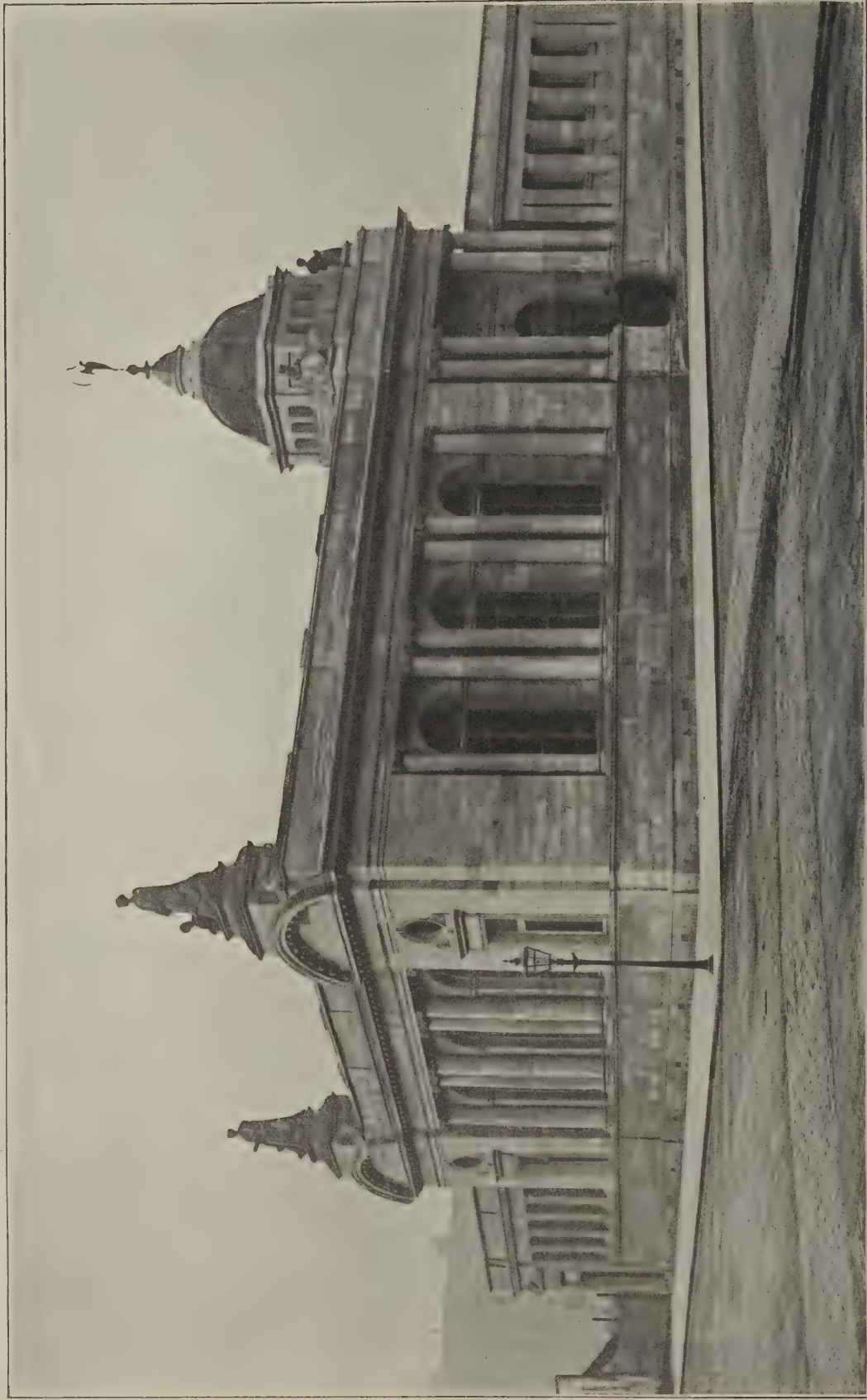
EMERGENCY
EXIT STAIRCASE.



- I. INLET PIPE
- O. OUTLET PIPE
- F. FINE CLOSET PIPE
- S. SMOKE PIPE

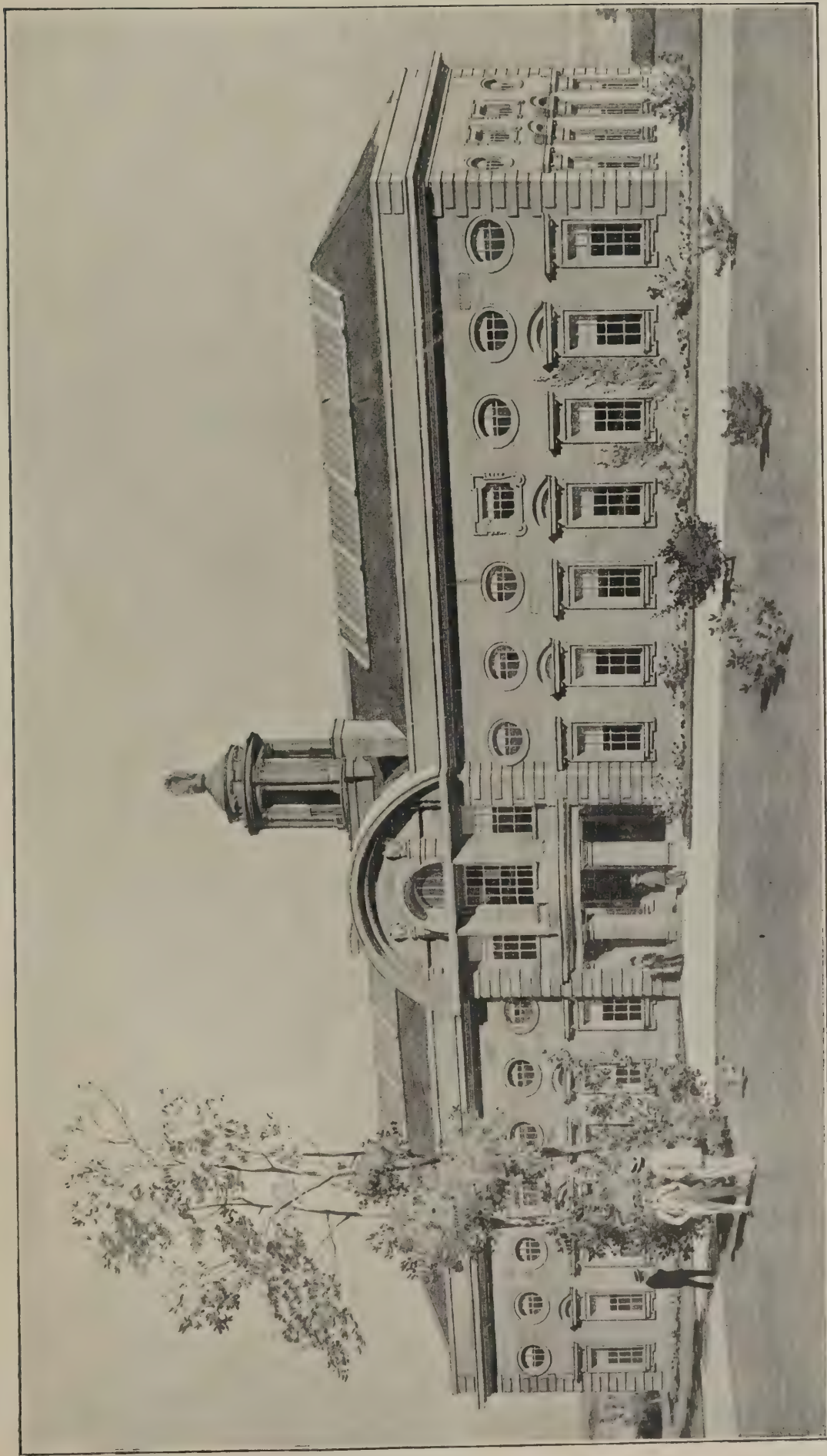
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UNIVERSITY OF ILLINOIS

Supplement to
THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD,
Wednesday, January 17th, 1906.



CROSSHILL AND GOVANHILL DISTRICT LIBRARY, GLASGOW. JAMES R. RHIND, ARCHITECT.

Photo: T. M. IV. Organ.



DAVIES' MEMORIAL LABORATORIES. UNIVERSITY COLLEGE, ABERYSTWYTH. ALFRED W. S. CROSS, F.R.I.B.A., ARCHITECT.

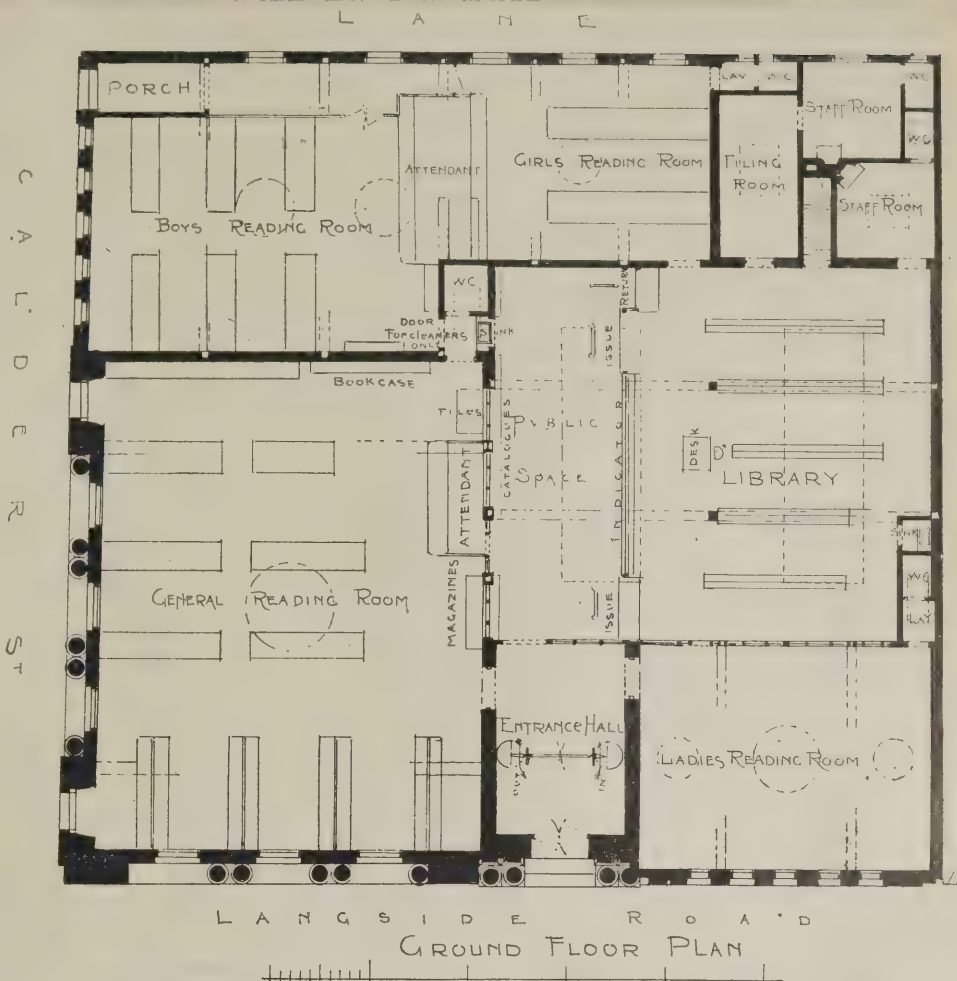
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Law Cases.

Employers' Liability. — In the City of London Court last week a labourer named Bunce sued his late employers, Messrs. Turnbull & Son, builders, for £30 damages for personal injuries sustained by him while pulling down a warehouse at Dockhead. A piece of concrete weighing 2 tons fell and carried with it a large chisel which the plaintiff held, and his thumb was torn to the root. For twelve weeks he was unable to work. The plaintiff said that the arches on which he worked should have been shored, and his counsel said he had been offered the "very meagre pittance" of half his wages of 30s. a week under the Workmen's Compensation Act. He now claimed "something like commensurate compensation" under the Employers' Liability Act. The defendants said no accident of the kind had ever occurred before, and the plaintiff had no claim under the Employers' Liability Act. Judge Lumley Smith, K.C., deprecated needless actions under the Employers' Liability Act, as he felt these were often brought, it being thought that the employer would sooner pay than fight, knowing that if the workmen lost they would put the employers to costs. The jury found for the defendants, and the plaintiff was then awarded £8 under the Workmen's Compensation Act, less £3 towards the defendants' costs of the action under the Employers' Liability Act.

OUR PLATES.

SIX years ago Glasgow decided to erect and maintain public libraries in the different districts of the city, and had prepared and was carrying out this scheme when in 1902 Mr. Carnegie came forward and offered £100,000 to build libraries. This handsome gift was accepted, and enabled Glasgow to still further elaborate its scheme, which, when completed, will make the city one of the best equipped with libraries in the kingdom. One of these libraries is that for the district of Govanhill and Crosshill, illustrated as a centre plate this week. The design, by Mr. James R. Rhind, architect, of Glasgow, was selected in public competition. There was space on the ground available, and consequently all the rooms required were planned on the ground floor only. This is found by librarians to be the most advantageous arrangement, because better work can be done and at less cost. The general reading-room, ladies' reading-room and



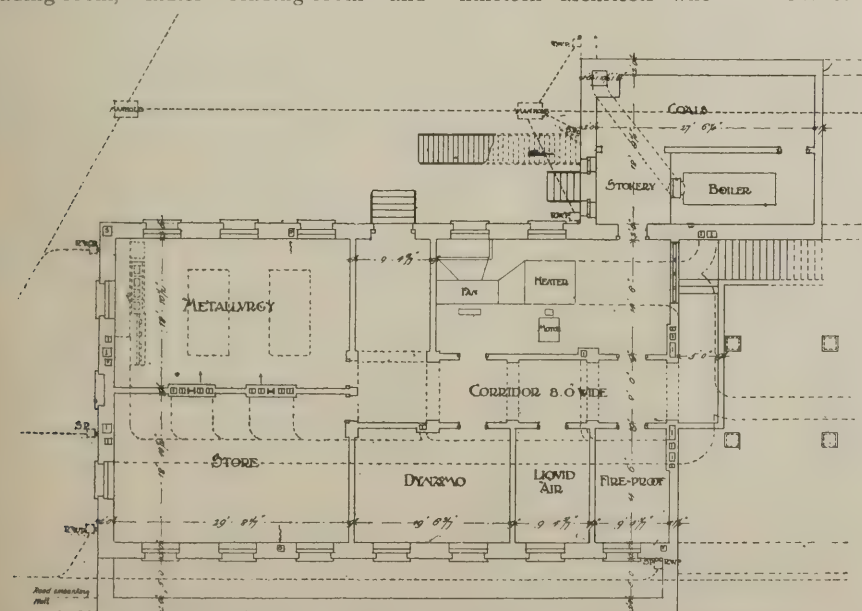
library all enter off the entrance hall. The children's reading-room is entered from a separate porch and doorway. The building is heated by hot-water radiators, and the foul air is extracted by electric fans conveniently placed. The fittings are of polished mahogany.

The design for the Davies' Memorial Laboratories at University College, Aberystwyth, by Mr. Alfred W. S. Cross, F.R.I.B.A., of London, was selected in competition (for which there was no professional assessor, the selection having been made by the council of the college). In the first instance nineteen architects who had carried out

collegiate or technical school work were invited to submit drawings of their past work of this description to the council. From these nineteen applicants, two architects were asked to compete for the Aberystwyth building on the understanding that the successful man was to be entrusted with the work and the unsuccessful one was to be paid an honorarium of 100 guineas. The disposition of the rooms in Mr. Cross's building is shown by the accompanying plans. The contractor for the work is Mr. Henry Willcock, of Wolverhampton, whose tender is for £25,000. Local stone is to be used for the general walling, with stone dressings from Grinshill Quarry near Shrewsbury, and Westmorland green ton slating for the roofs.

COLONIAL HOUSE, LIVERPOOL.

THIS building, illustrated on p. 30 of the present issue, was completed towards the end of last year for the well-known firm of Elder, Dempster & Co. It occupies a rectangular piece of ground at the corner of Water Street and Tower Gardens, the frontage to the former being 81ft. 6ins. in length and to the latter 203ft. 6ins. The façade to Tower Gardens is of white enamelled bricks and the main frontage to Water Street of Cefn stone, the base of the building and the columns being of red granite. The main office of the company on the ground floor measures 140ft. by 70ft., extending the entire width of the building. It is lighted from both sides and also by seven domes. The furnishing throughout is of mahogany and the floor rubber-covered. Two principal staircases, of stone, give access to commodious offices on the upper storeys. The architects of the building were Messrs. Briggs & Wolstenholme, F. B. Hobbs and Arnold Thornely, of Liverpool.



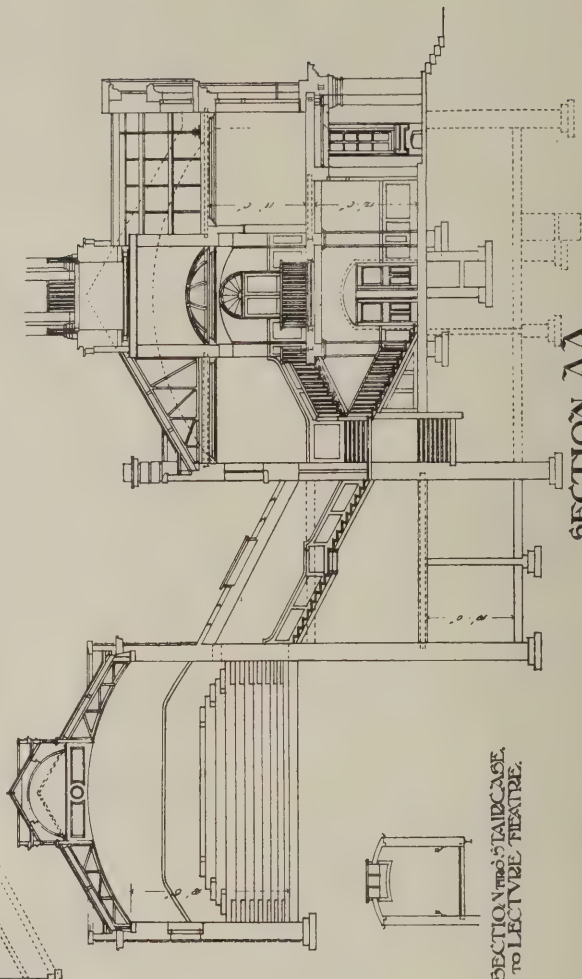
DAVIES' MEMORIAL LABORATORIES, UNIVERSITY COLLEGE, ABERYSTWYTH: BASEMENT PLAN.

DAVIES MEMORIAL LABORATORIES

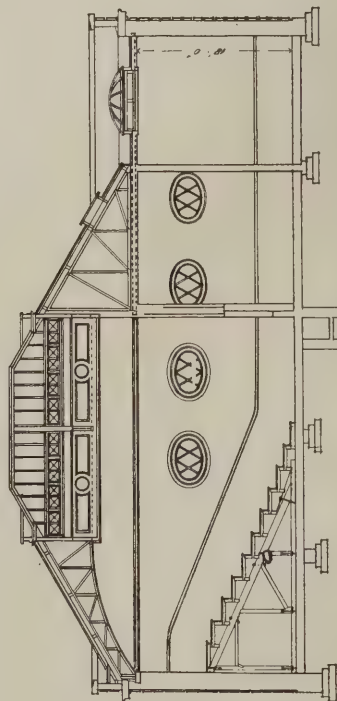
UNIVERSITY COLLEGE ABERYSTWYTH.



SECTION BB.



SECTION AA.



SECTION CC.

SECTION THROUGH STAIRCASE
TO LECTURE THEATRE.

10' 0" 20' 30' 40' 50' 60' 70' 80' 90' 100'

Notes and News.

"One and All Gardening for 1906" has just been issued from 92, Long Acre, W.C., price 2d.

Mr. F. W. Pomeroy, the well-known sculptor, was elected an A.R.A. last week. Mr. Pomeroy is at present engaged on the four large panels for the new Lambeth bridge.

White Sandstone in Canada.—What is said to be the only deposit of white sandstone in Canada is now being quarried at Simpson Island, in the Nepigon Bay. Before the discovery of this deposit all white sandstone was shipped to Canada from Ohio or imported from Scotland.

The Southport Foreshore is to be improved by the development of the Corporation estate on the north, at a cost of £1,000. A number of new roads are also being constructed, and the Winter Gardens pavilion is to be extended to accommodate 3,000 persons.

A new Bridge across the Ganges has been constructed. It is named the Curzon Bridge (in accordance with the custom by which the name of the Viceroy is bestowed upon the most important bridge constructed during his term of office) and has fifteen spans of 200ft. each. The cost was £250,000.

Secondary Schools, Aylesbury.—In the list of contracts open given on p. xiii of our issue for last week Messrs. W. T. Farthing & Son, of London, W.C., were mentioned as the architects of these schools. This is not so. Mr. Fred Taylor, A.R.I.B.A., of Aylesbury, is the architect, Messrs. Farthing being the quantity surveyors only.

A Carnegie Library at Bideford has been built from designs by Mr. A. J. Dunn, of Birmingham (selected in competition). The contractor was Mr. Henry Glover, his tender amounting to £5,492. The frontage of the building is in Bridge Street and facing East-the-Water and bridge. The formal opening will take place on February 6th, when the Kingsley Memorial is also to be unveiled.

M. Auguste Saint-Gaudens, elected an Honorary Foreign Academician last week, is an Irishman by birth, but was taken to America when quite young, and has since become one of the most notable sculptors in the United States. He is at present engaged on the statue of Parnell which is to be erected at the head of Sackville Street, Dublin, the foundation-stone having been already laid.

Tenders for Liverpool Cathedral.—Good progress is being made with Liverpool Cathedral, and it is expected that the foundations will be complete by the end of next month. The Executive Committee are now making arrangements for obtaining tenders for the erection of the main fabric. The subscription fund for the cathedral now totals £250,000. The amount required for the completion of the present portion of the building is about £340,000, so that £90,000 is still required.

"Architects and the General Election."—The following is a list of architects, contractors, &c., contesting Parliamentary seats:—

	Seat.
J. E. Sears (L. and F.T.), architect, chairman of L.C.C. Housing Committee	Cheltenham.
Philip E. Pilditch (U. and Bal.), architect and surveyor, London	St. Ives.
William Hunt (T.R.), architect, London	S. Islington.
T. B. Silcock (L. and F.T.), architect, Bath	Wells.
Sir Edward Boyle (C. and Bal.), "architect and barrister"	Taunton.
Sir Weetman Pearson (L. and F.T.), head of the well-known contracting firm of S. Pearson & Son	Colchester.
Sir John Jackson (C. and Bal.), civil engineer and Government contractor	Devonport.
John Aird (C.), son of Sir John Aird, the well-known contractor	Southampton.
J. J. Glover (U.), painter and decorator, and provost of Dumfries	Dumfries.

A Lock-out in the Building Trade at Limerick is announced. Some time ago a conference took place between the masters and masons on matters affecting the trade, at which the masters urged employment at a wage hour instead of per day as heretofore. The men declined to accept this latter condition, with the result that about seventy masons were locked out last week.

Rodin's "Le Baiser" is the centre of interest at the "International" at the New Gallery. It has been lent by Mr. E. P. Warren, the well-known architect, and was brought from Lewes on a trolley. "Le Baiser" is probably the heaviest block of marble that has ever been placed in the New Gallery. The moving of it from the street to the Central Hall and the putting of it in its present position occupied eight hours.

A new Hospital at Waltham Abbey has been erected at a cost (including site) of about £10,000. The buildings comprise entrance lodge, administrative building, an isolation block with four beds, diphtheria block with eight beds, scarlet-fever block with twelve beds, and laundry and mortuary block. The joint architects were Mr. Walter Stair, of Chingford, and Mr. Herbert Tooley, of Buckhurst Hill. The contractor was Mr. J. Bentley, of Waltham Abbey.

Glasgow Technical College Architectural Craftsmen's Society.—At last Friday's meeting of this Society Prof. F. O. Bower, M.A., Sc.D., F.R.S., delivered a lecture on "Dry Rot." The nature of the fungus, its growth in dead wood under favourable atmospheric and chemical conditions, the germination of the spores (which are extremely minute and produced in vast numbers), the process of ferment and the characteristics of timber attacked by the disease were described in detail and illustrated by lantern views. The professor thereafter explained the most likely causes of growth, and precautions to be observed to ensure its prevention and elimination.

Architectural Association of Ireland.—At last week's meeting of this Association, held in Dublin, Sir Charles Cameron delivered a lecture on "The ventilation of workshops and dwellings." He stated that in order to properly purify the air used by each adult nearly 40,000 cub. ft. of fresh air per day was required. He referred to the working-out in Lancashire cotton works of the Acts regulating the ventilation of factories, and said that in some cases it was found possible to keep the proportion of carbonic acid gas down to .08. He stated that one gas (Argand) burner would vitiate the air as much as four persons, and said that this ought to be taken into account in calculating the amount of fresh air-supply necessary.

District Surveyors and the L.C.C.—The District Surveyors' Association, on behalf of the district surveyors of London, has addressed a letter to the London County Council in regard to the latter's proposals to reduce the number of districts from fifty-seven to thirty-three and to adopt a dual system of payment for district surveyors, the one by salary and the other by fees. "The district surveyors respectfully submit that the supervision of building operations has been carried out by highly-trained men—many of whom have occupied the highest positions in their profession—that the public has grown accustomed to pay professional fees for professional services, thus adequately rendered, and it is at least doubtful whether the suggested payment by salary will attract educated men of the first ability; from a professional point of view therefore the reflection suggests itself that changes in the direction indicated above may not be in the interests of the best and most efficient administration of the building laws."

A Stick of India-rubber, bound round at the middle with a band of celluloid on which is printed the advertisement of "Bitumastic" solution and enamels, is offered by Messrs. Wailes, Dove & Co., of 5, St. Nicholas Buildings, Newcastle-on-Tyne, to any architect or surveyor who is interested in "Bitumastic" and its special preservative qualities for valuable iron and steel plant or structures.

The Royal Gold Medallist.—The person whose name is to be submitted to His Majesty the King as the fit recipient of the Royal Gold Medal this year will be announced at the meeting of the Royal Institute of British Architects to be held on Monday, February 5th. Members of the Institute wishing to suggest names for consideration by the council should do so in writing before next Monday, January 22nd.

The new Town Hall at Woolwich, which has taken four years to erect, was opened on Saturday last. The building, designed in the Renaissance style, stands at the corner of Wellington and Upper Market Streets. Its façade measures 114ft. by 230ft., and a belfried tower 130ft. high surmounts the roof. In the great entrance hall is a statue of Queen Victoria. The council-chamber is designed in the form of a Greek cross, surmounted by a dome at the crossing. It provides seating accommodation for fifty-six members, and has a large public gallery. The architect of the building (which has cost £95,000) is Mr. A. Brumwell Thomas.

Correspondence.

The Painting of Uralite.

To the Editor of THE BUILDERS' JOURNAL.

SIR,—Subjoined is a copy of a letter which we have received from Mr. A. Alban H. Scott in reference to his statement that "Uralite requires constant painting," made "in the course of the paper on factory buildings which he read before the Institute of Sanitary Engineers recently, which paper was published in your issues for December 20th and 27th last.—Yours truly,
For THE BRITISH URALITE CO., LTD.,
T. H. Armstrong, Manager.

LONDON, E.C.

[Copy.]

A. Alban H. Scott, M.S.A., F.I.S.E.
S. Charles Hanson, M.I.S.E.
Percival M. Fraser, F.I.S.E.

Architects and Surveyors, 10, Basinghall Street,
Messrs. The British Uralite Co., Ltd., London, E.C.
50, Cannon Street, E.C. Jan. 5th, 1906.

Dear Sirs,—With reference to Mr. Armstrong's interview with me on the 1st January on the subject of my paper on factory buildings read before the Institute of Sanitary Engineers, I have pleasure in stating herewith the exact meaning which I intended should be put upon my statement that "Uralite requires constant painting."

I am aware the expression "constant painting" may be loosely taken to mean that painting should be applied at unusually short intervals of time, but this meaning is not justified by the word, and it was not my intention that this interpretation should be put upon this expression of my opinion.

I used the word "constant" in its strict sense, i.e., unalterable continuance, which suggests nothing further than a coat of paint should be applied periodically, the intervals being determined by the endurance of the paint used, which is, of course, governed by the quality of the paint and extraneous circumstances.

My remark particularly applied to factory roofs, for which I have largely used Uralite, and which, having view to the peculiarly severe conditions which they are subjected to, I consider should be painted regularly every three years.

The sentence above referred to should be read in conjunction with the various other references to Uralite in my paper.

As you are doubtless aware, I have used Uralite for many purposes, and am satisfied that it is an excellent material.—Yours faithfully,

(Signed) A. ALBAN H. SCOTT.

[The British Uralite Co. inform us that they can refer to roofs four and five years old which have never been painted, and so far as experts are able to judge, at the present time, they will not require painting for five years more, Uralite being a material which hardens on exposure to the weather.—Ed. B.J.]

THE STABILITY OF IRON STRUCTURES.

Sir Benjamin Baker's Evidence at the Charing Cross Enquiry.

AT the enquiry into the collapse of the roof over Charing Cross Station some interesting evidence was given by Sir Benjamin Baker last week. The roof, which was constructed of malleable iron, was designed and carried out under Sir John Hawkshaw. Messrs. Cockrane & Grove, the manufacturers, were one of the best firms in the country at the time, and the iron came from Lord Dudley's works, which was a guarantee of its quality. The width between the walls was 164ft., the length 510ft. The roof was carried by fourteen main principals 35ft. apart, and there were nine panels in each. The tie-rods consisted of wrought-iron round bars, and their diameter varied in each panel. The minimum diameter was 4 $\frac{3}{8}$ ins. and the maximum 5ins. The tie-rod broke in the third panel. It was 4 $\frac{1}{2}$ ins. in diameter. In between the principals were fixed purlin girders, rafters and glazing bars. There were signs of rust appearing on the underside of the glazing bars and on the intermediate rafters. That was the only ironwork which had rust on it. The evidence at the enquiry, however, proved that the collapse was not due to any eating away by rust, but purely to a flaw in the tie-bar—a hidden flaw not discoverable on the exterior. Sir Benjamin Baker said the tie-bars of the roof were made up of a number of flat bars welded together, and in

the Particular Bar that failed

there were eight flat bars on top of one another. Sometimes in making up a pile there would be perhaps two short bars interposed, and occasionally the ends of these short bars did not make a good metallic union, the result being a flaw in the bar quite independent of the weld.

Modern Practice.

At the present day, when steel had superseded iron, all these things would be made out of a solid ingot of steel without any weld. Forty-two years ago, when this roof was made, structural steel was not in existence, and all these structures were made of bars rolled from piles of similar bars. Steel was generally accepted in or about 1880.

A flaw would have a tendency to extend under stress, which would be a pull on the tie-rod, varying with the temperature. He had noticed

The Effect of Variation of Temperature on the Forth Bridge,

where he had seen the effect of a cloud passing over the sun. The bridge would begin to contract, and as soon as the cloud had passed away it would expand again. This in the case of the Charing Cross roof would cause a little "fidgeting," and after a lapse of forty years the flaw had snapped through. The question as to the tie-rod being painted made no more difference than it would in the case of a chain cable. There was

No Mystery about this Failure.

at all; it was a simple thing. If this tie-rod had been intact they might have loaded one of the principals with railway carriages and they would not have brought it down; they could have put one of the District trains on one of the principals without causing it to give way. But the bar was only one-third its proper strength owing to the flaw.

At this point Sir Benjamin Baker said he would like to add that 42 years ago the ideas of engineers on the subject of the strength of roofs were different to what they were now; to-day they were making them stronger.

He thought the Charing Cross roof would be about quite the strength some architects and engineers would consider necessary; yet at the present day they would make it even a little stronger, but it was



FLATS AND PREMISES, UNION STREET AND CANDOVER STREET, LONDON, W.
H. FULLER-CLARK, ARCHITECT.

quite up to the highest engineering standard when built. Witness had advised the rebuilding of the roof, his principal reason being that he did not know whether there was not another flaw there. But for the flaw the bridge would have been good for another twenty years or more.

Double Tie-rods.

The practice of the present day would not be to trust a roof like this to a single tie-rod; they would have two, so that if there was an invisible flaw in one they would have another to fall back on. The prototype of this roof was one erected at Birmingham five years before the Charing Cross one was put up, and it was still standing. It had been perfectly successful in every way, and was a much admired roof. No doubt Sir John Hawkshaw modelled the Charing Cross roof, and made it stronger. In his large experience witness had seen other roofs constructed on similar lines with a single tie-rod, and this was the first failure he had ever known.

Experience at the Menai Bridge.

Sir Benjamin Baker went on to refer to the Menai Suspension Bridge, built eighty years ago. The Government got rather alarmed about the condition of the bridge owing to some of the minor suspension rods having rusted through, and they talked about renewing the whole thing. Witness was instructed to examine and report, and he naturally thought that the anchorage chains which went into the rock would be oxidized, but on scraping off the point he found the original blue scale and marks of the blacksmith's hammer that had been in existence for fifty or sixty years, and subjected to the atmosphere, showing that an indefinite life could be given to iron. The difficulty in railway stations was the gases from the engines and being unable to get paint to stick on. There had never yet been invented a material to preserve iron and make it endure the atmosphere, &c.

Sir Benjamin Baker added that the tie-rod measured 4 $\frac{1}{2}$ ins. at the point of fracture, and it had been affected by rust to the extent of $\frac{1}{16}$ in. On close inspection he could count the eight bars of metal of which it was composed.

He should say that in forty years the roof had lost only about 6 per cent. of its strength.

A full report of the evidence at the enquiry is given in the "Times" for January 9th, from which the foregoing extracts are taken.

A NEW LONDON BUILDING.

THE building which is illustrated above consists of twenty-four flats containing entrance lobby, sitting-room, bedroom, kitchen, larder and w.c.; and four flats, with entrance hall, sitting-room, two bedrooms, kitchen, bathroom, w.c. and larder. Offices are arranged on the ground floor of the corner block, workshops in the basement beneath, and two additional workshops are provided in the rear. An endeavour has been made to obtain effect by means of colour for the exterior, which is of red Chorley, blue Staffordshire and brown salt-glazed and Luton bricks, Portland stone, green granite, buff-coloured cement, mosaic of green, buff-colour and gold, green slates, beaten lead devices, oak and copper-covered flèches and white joinery. The builder's work has been carried out by Messrs. Smith & Co., of 6, Grays Street, Manchester Square, W.; steel construction by Messrs. Drew-Bear, Perks & Co.; granite by Messrs. Fenning & Co.; sanitary work, ranges, gas, hot-water, electrical work and railings by Messrs. Thomas J. Boulting & Sons (who now occupy the offices referred to); lead glazing by Messrs. William Morris & Co.; carving by Mr. Nathaniel Hitch, of Kennington; mosaic by the Rust Vitreous Mosaic Co.; marble-work and wood-block flooring by the Art Pavements Co.; pavement lights by the St. Pancras Ironwork Co.; wallpapers by Messrs. Line & Sons; steel casements by the Crittall Manufacturing Co., of Braintree; artificial stone staircases and granolithic pavings by Messrs. F. Bradford & Co.; partitions by the Fireproof Co., of Adelphi, W.C.; ironmongery by Messrs. Lockerbie & Wilkinson; goods lift by Messrs. Waygood & Co.; folding gates by the Bostwick Gate Co. The architect was Mr. H. Fuller-Clark, of 30, John Street, Bedford Row, London, W.C.

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Correspondents are particularly requested to be as brief as possible.

The querist's name and address must always be given, not necessarily for publication.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

Aesthetic Design of a Façade.

CHEETHAM.—STUDENT writes: "In what way should the aspect of a façade govern its aesthetic design?"

This question is really so vague that it is difficult to frame a reply to it. Perhaps section 1, chapter I, book III. of Gwilt's "Encyclopædia of Architecture" may be referred to for the governing principles. Two extracts may be given. "There has lately grown into use in the arts a silly pedantic term under the name of æsthetics, founded on the Greek word *αισθητικὸς*, one which means having the power of perception by means of the senses; said to be the science whereby the first principles in all the arts are derived, from the effect which certain combinations have on the mind as connected with nature and reason; it is, however, one of the metaphysical and useless additions to nomenclature in the arts, in which the German writers abound, and in its application to architecture of least value; because in that art form is from construction so limited by necessity that sentiment can scarcely be said to be further connected with the art than is necessary for keeping the subordinate parts of the same character as the greater ones under which they are combined; and, further, for thereby avoiding incongruities." The end to keep in view is summed up in the one word "fitness," and the directions to a student for testing his design in this respect are stated as follows: "Let that which is the stronger part always bear the weaker. Let solidity be always real, and not brought to appear so by artifice. Let nothing be introduced into a composition whose presence is not justified by necessity. Let unity and variety be so used as not to destroy each other. Let nothing be introduced that is not subordinate to the whole. Let symmetry and regularity so reign as to combine with order and solidity. Let the proportions be of the simplest sort. Let him recollect that nothing is beautiful which has not some good and useful end."

HENRY ADAMS.

Work carried out not according to Contract.

X. writes: "Is owner obliged to pay for inferior and unsound work contrary to agreement? Can he insist on necessary alteration to render work sound without incurring extra expense and reduction of price to correspond to inferior work, or can he reject the work entirely? Agreement signed but not stamped. Is blue pencil legal?"

Unless you have done something in the way of acceptance of the building, and have waived your right to object to the unauthorized deviations from the contract, you possess the right to require its proper fulfilment. The offer of a compromise should, I think, come from the builder's side, and should not, primarily, be made by you. The following extract from "Specification No. 6," page 141, deals with the case: "If the deviation from the terms of the contract arises from an act of the architect not within the scope of his authority . . . the building owner will not be responsible for it, and, of course, if the contractor chooses, of his own accord, to depart from his contract, the building owner is neither bound to accept the work as

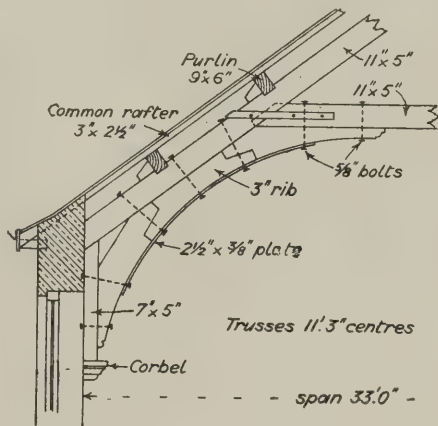
executed, if the contract has not been complied with, nor to pay for any extra expense that has been incurred. The building owner may indeed elect to adopt the unauthorized deviations and accept responsibility to pay for the work as actually executed; but it is to be born in mind that the mere fact of taking and retaining possession of the work as it stands is not, by itself, evidence of adoption so as to render the building owner liable, because he cannot return a structure as he could a movable article not made according to contract, and he is not bound to undergo the expense and inconvenience of having it removed."

F. S. I.

Strength of Open Truss.

B. F. writes: "Is the truss shown by the accompanying sketch (not reproduced) strong enough without tie-rods, and are the purlins too heavy? The builder has expressed an opinion on them which does not agree with mine."

The truss does not need tie-rods; but a $2\frac{1}{2}$ in. by $\frac{3}{8}$ in. plate and an altered position of bolts and joints, as shown by the drawing below, will make it quite safe. The principal



rafter might be reduced to roins. by 5 ins. or possibly even to gins. by 5 ins. if the plate named above is added.

HENRY ADAMS.

Relation of Window Area to Floor Area.

CHEETHAM.—STUDENT writes: "What relation should the window space bear to the floor space in the following rooms:—Living-rooms and bedrooms of a residence, a public hall for lectures and entertainments, offices for business purposes, hospital, school? Please state whether your answer refers to the nett glass surface or to the clear opening between the brick or stone jambs."

There are many rules for proportioning window area to floor area, but every case must be considered on its own merits, as dependent upon the aspect and surroundings, as well as the purpose for which the rooms will be used. One-eighth of the floor area may in general be taken as a suitable proportion for the gross area of window space in the walls, or one-tenth as the nett area of glass, but the proportions of the room and position of the windows will affect the result. In the Pantheon at Rome each superficial foot of area of the eye in the dome lights nearly 3,380 cubic feet of interior space, while the ball-room at Windsor Castle, 60 ft. long, 34 ft. wide and 33 ft. high, is abundantly lighted by a single window occupying nearly the width of one end; had the same amount of window area been given in the long walls the lighting would have been very inadequate. Robert Morris gave the rule that the window area in square feet should be equal to the square root of the contents of the room in cubic feet. A room which is not lofty is more conveniently lighted by windows in one of the longer sides. In rooms for teaching, the area of window glass

must not be less than one-fifth of the floor area, and in other rooms in a school one-eighth.

HENRY ADAMS.

Architectural Societies.

BELFAST.—P. B. G. writes: "I am an architect's pupil, and will shortly finish my apprenticeship. I am very anxious to join some society. In your issue for October 18th, 1905, you published a reply to 'H. J.' with regard to the passing of examinations for the degrees of M.A. and B.A., also the Society of Arts. Is there any degree in connection with the Society of Arts? I have seen various men styled 'M.S.A.' Does this refer to the Society's degree?"

There is no architectural degree in connection with the Society of Arts. The letters "M.S.A." mean "member of the Society of Architects." This Society holds examinations for which you would be eligible. Full particulars can be obtained from the secretary at Staple Inn Buildings, Holborn, London. There is also, of course, the Royal Institute of British Architects, of which you might qualify as probationer (particulars from secretary, 9, Conduit Street, London, W.).

Modern Architectural Work.

BROMYARD.—D. G. M. writes: "In which back number of your journal can I find illustrations of work by Messrs. Woolfall & Eccles, of Liverpool?"

December 28th, 1904.

House Building in India.

STREATHAM.—J. S. M. writes: "Where could I obtain information respecting the life of house property in India (North Central), having regard to the effect of climate, insect life, &c.?"

We do not know of any book dealing with the subject. Woodwork needs protection against the ravages of ants, but apart from this there is very little difference in construction, and if proper precautions are taken the life of buildings in India is as long as in this country.

Examination Questions.

WARRINGTON.—SUBSCRIBER writes: "Kindly give the solutions to the following examination questions of the Society of Architects." (Here follow the questions.)

We have stated many times that these "Enquired Answered" are primarily intended to help readers who find difficulties in actual practice: not difficulties at examinations. While we endeavour to aid the student in every possible way, we must decline to answer purely examination questions such as those "Subscriber" sends.

Book on Hospital Design.

MARGATE.—STUDENT writes: "What book do you recommend on hospital design and construction? My funds are limited to one guinea."

"Small Hospitals," by A. Worcester and W. Atkinson (price 5s. 6d. post free from our offices).

Widening Princes Street, Edinburgh.—

The question of widening Edinburgh's notable thoroughfare—Princes Street—was considered recently by a sub-committee of the Town Council. The proposal is to take in part of the Princes Street Gardens in order to erect a promenade on the street level, making it, together with the existing pavement, about 25 ft. wide. The present sloping bank from the street to the pathway in the gardens would be filled up, and a retaining wall about 18 ft. high built, with a stone parapet. The sub-committee remitted to the city architect (Mr. Morham) to take borings, with a view to finding suitable foundations and to obtain an estimate of the cost.

NOTES ON COMPETITIONS.

Hove Library.

The new conditions have been issued to the ten competitors who were selected to submit fresh designs for the proposed free library at Hove. They are in most respects the same as the old ones, except that the first clause announces the appointment of Mr. John Belcher, A.R.A., to act as assessor, and a requirement has been added for a side entrance to give access to the space at the rear of the building. The harassing condition that the building was to accord in elevation with the town hall has been removed. Whatever admiration one may possess for the works of the late Mr. Alfred Waterhouse, one could not but feel that the requirement that this building should be imitated was most inadvisable. It might be imagined that the ten selected competitors did at least comply with this condition as well as with all the others, for the premiums of £50, £30 and £20 are now to fall as prizes to them alone. This is not the case, however, for it is known that more than one out of the chosen few ignored this requirement altogether. The modifications in the conditions, although few, are sufficient to constitute the competition an absolutely new one—that is to say, the original designs are of little use, for it is unlikely that many of them will admit of the introduction of a side passage without entailing a rearrangement of the plan. These circumstances only add to the regret felt that the premiums were not awarded in the original competition, and that other means were not found to induce a selected few to compete. The promoters through their assessor have, by the revision of the conditions, admitted the imperfections of them as originally issued, and, such being the case, the sixty-one rejected competitors have solid grounds for complaint. The advisability of a double competition is at all times open to doubt, but when announced as such competitors have at least the knowledge of what they are to expect. In this case a double competition has been sprung upon them without warning, and in addition to sixty-one designs being summarily rejected, the authors of ten others have to do double work before they are able to obtain even a premium.

Greenwich Branch Library.

It is a surprise to learn that the designs submitted many weeks ago for the Greenwich Branch Library have not yet been assessed. When the deposits for conditions were returned to competitors it was reasonably inferred by them that the awards had been made, although indignation was felt that no announcement to that effect accompanied the cheque. To have obtained the addresses of depositors it must have been necessary to open the envelopes which contained the competitors' reports upon their respective designs. The assessor is thus in the position of having to adjudge works of which all the authors' names are known to the promoters. Thus the very object for which designs were sent in, unsigned, and free from *non de plume* or motto, has been defeated. The promoters or their officials are guilty of an unprecedented and unfair act. It is only the confidence felt in the assessor which enables the proceeding to be viewed with composure.

Norwich Shirehouse.

In May last the Competition Reform Society disapproved of a competition for the extension of the shirehouse at Norwich upon the grounds that it was an unreasonable requirement that a tender from a reliable contractor should accompany the design of each competitor, such a course involving the preparation of bills of quantities, for by no

other means could a contractor's estimate be relied upon. Likewise no site plan or plans of existing buildings were furnished. The result of this competition has lately been announced. The author of the first-premiated design estimates the cost of the building at £8,850, and the author of the design placed third estimates his at £9,500, while the assessor puts the costs respectively at £13,820 and £13,400. It would be interesting to know whether these designs were considered to have complied with the conditions; also who were the reliable contractors who prepared the estimates. No doubt they would have been quite willing to carry out the work for the sums named, and had the assessor been wise he might have earned praise from Norwich ratepayers by abstaining from a mention of larger sums. The author of the second-premiated design estimates his building at £13,210, against the assessor's £13,640; he is Mr. William Widdington, of Cheapside, E.C. The first premium belongs to Mr. E. J. Tench, of Norwich and Cambridge, and the third to Mr. W. J. Dunham, also of Norwich. The assessor was Mr. A. J. Wood, of Surrey Street, W.C.

Holborn Borough Offices.

A proposal to invite six architects to compete for the new offices to be erected for the Holborn Borough Council, at an honorarium of twenty guineas each, came up for consideration last week, but was referred back. If the Council wished to limit the competition in any way, it might have confined it to architects practising in the borough who are ratepayers. This would seem a more reasonable course, especially as the proposed building is a public one and is to be erected at public cost. Holborn is rich in architects, and the adoption of such a course should have been productive of a building worthy of the borough.

Slaughter-houses for Edinburgh.

At a recent meeting of a committee of the Edinburgh Town Council the proposal to hold an open competition for the new slaughter-houses to be erected in the city was considered. A sub-committee reported in favour of the proposal, but by 9 votes to 6 the full committee decided against it, holding that the special requirements of the building were rather those of convenient planning than architectural effect, and this work could be done just as well in the office of the city architect (Mr. R. Morham) as by outside men.

Pleasley Library.

The assessor appointed in the competition for a new Carnegie library at Pleasley, Notts, is Mr. Ernest R. Sutton, F.R.I.B.A., of Nottingham. The conditions will be issued soon.

Obituary.

Mr. Henry John Young, junr., eldest son of Mr. H. Young, of Messrs. H. Young & Co., Nine Elms, with whom he served his apprenticeship, and on whose staff he was occupied in the design and execution of constructional engineering work, died recently, aged 36. At the time of his death he was engaged as consulting engineer for the new Piccadilly Hotel, now in progress, and a distinguished professional career seemed to lie before him. He leaves a widow and three children. Being a past-chairman of the Junior Institution of Engineers, a number of the members were present at the funeral, bearing testimony to the esteem in which he was held. To perpetuate his memory a fund has been opened with the object of placing a bronze medallion portrait in the reading-room of the Institution.

MECHANICAL VENTILATION.

By Dr. H. Scurfield.

AT the last meeting of the Sheffield Society of Architects and Surveyors Dr. H. Scurfield, medical officer of health for Sheffield, delivered a lecture on "The Advantages and Disadvantages of Mechanical Ventilation." He stated that air ordinarily contained about 4 parts per 10,000 of carbonic acid, and it had been found that when the air of a room contained as much as 6 parts per 10,000 of carbonic acid it began to smell. An average person gave off 6 cub. ft. of carbonic acid per hour; and would therefore load 1,000 cub. ft. of air to the extent of 6 parts per 10,000 in an hour and 3,000 cub. ft. to the extent of 2 parts per 10,000. As 4 parts per 10,000 was the amount normally present in the atmosphere, and 6 parts per 10,000 was the limit of good ventilation, it followed that 3,000 cub. ft. of fresh air per hour must be supplied for each occupant in order to maintain the ventilation of a room efficiently.*

If each individual has a cubic space of 1,000 cub. ft. the air must be changed three times in the hour; if 150ft. only the air must be changed twenty times in the hour. It was generally agreed that in this country during the colder months a change of air more frequently than about three times in the hour could not be borne unless the incoming air were warmed.

Mechanical ventilation had been introduced on account of the difficulty of changing the air of a building sufficiently often to maintain good ventilation without intolerable draughts, by ordinary means, such as open fires, and the provision of inlet and outlet shafts and openings through which the air is moved by differences in temperature, the aspirating action of the wind, and the law of the diffusion of gases. Extraction fans also answered satisfactorily for single rooms, such as restaurants, hotel dining-rooms, &c.

Where the cubic space allowance was small, as in our elementary schools with 120 to 150 cub. ft., mechanical ventilation was the only system which was capable of giving really good results as regards the purity of the air, but where the cubic space allowance was large, as in hospitals, with 2,000 cub. ft., its introduction was probably undesirable.

In the second place he thought that if mechanical ventilation was decided upon for a building, the fact ought to be realized that by its means the air of the building could be changed at least twice as frequently as by other methods, and that its introduction was equivalent to doubling the cubic space of the building, and that it was therefore well worth while to pay for as perfect an installation as could be obtained.

In the third place the contract as to what air changes were to be accomplished by the method should be carefully drawn, and after the work was completed careful tests by chemical analysis of the air and the anemometer should be made in order to ascertain that the terms of the contract had been fulfilled.

In the fourth place the person responsible for the management of the building should thoroughly understand what were the capabilities of the system, so that it might not be expected to perform impossibilities. For example, mechanical ventilation would keep the air in the class-rooms of an elementary school good for a matter of eighty minutes, but if the class-rooms were not emptied and filled with fresh air at the breaks, the air in them would be just as bad at the end of the morning or afternoon school as the air in the class-rooms of a naturally ventilated school just before the break.

* We have dealt critically with this in a review on p. 39 of this issue.—Ed. B.J.

Views and Reviews.

The Newsagents' Diary.

The Newsagents', Booksellers' and Stationers' Diary for 1906 should be in the hands of every member of the trade. In fact it is well-nigh indispensable. Beside the usual space for daily entries, there are a number of valuable trade tables, a newsagents' delivery book, standing order books for daily, weekly and monthly publications, and space to record returns.

"The Newsagents', Booksellers' and Stationers' Diary for 1906." Glasgow: William Holmes & Co., Ltd., price 2s. 6d.

By-Laws in regard to Floors and Roofs.

This little book has been compiled with the object of explaining the Model By-laws for the construction of roofs and floors in new buildings, issued by the Local Government Board. The official regulations require quite excessive sizes for joists, rafters, purlins and trimmer joists, as Mr. Essex shows by a series of comparative tables indicating the distances between supports with the approximate size to give safe strength, as calculated from the formula he adopts, compared with the sizes required by the Model By-laws. The formula he uses is

$$w^{12} = bd^2.$$

He assumes w with a load of $\frac{1}{2}$ cwt. per sq. ft. super. on the roof to equal $\frac{5}{8}$ cwt. in the case of common rafters 15 ins. apart and $\frac{1}{4}$ cwt., $\frac{1}{8}$ cwt. or $\frac{3}{8}$ cwt. for purlins where placed respectively 6ft., 7ft. 6ins. or 9ft. apart. In the case of floor joists 15ins. apart with a load of 1 cwt. per ft. super., he assumes $w = \frac{1}{10}$ cwt. for domestic buildings, whereas for warehouses with a load of $2\frac{1}{2}$ cwt. per ft. super. $w = \frac{1}{4}$ cwt. In the case of floor beams placed 10ft. apart $w = \frac{5}{8}$ cwt. in domestic buildings and $2\frac{1}{2}$ cwt. in warehouse buildings. For trimmer joists Mr. Essex uses the formula

$$B D^2 = bd^2 + (\frac{1}{3}bd^2 \text{ for each joist carried}).$$

It will be apparent that these assumptions are fairly reasonable, and we may hope will be conclusive enough to lead the Local Government Board to revise their Model code, but we do not see why the by-laws need specify minimum sizes. This has been the bugbear of the building trades far too long. What we want is by-laws indicating the theoretical rules to be used in the calculation of structural members and the loads which shall be assumed in various classes of buildings, and the allowable safe fibre stress to be adopted. As regards this last, Mr. Essex adopts the factor of safety of 5 and assumes that good fir timber has a breaking strength of 60 cwts. per sq. inch. As of course other timber may be used in special circumstances, the opportunity of variation in this direction should be given. A very useful table at the end of the book compares the values of the different sections of iron and steel beams with those for fir beams.

"Roofs and Floors of New Buildings: Their Structure and Stability," by Ernest H. Essex. London: The St. Bride's Press, Ltd., price 2s. 6d.

Mechanics.

Of the making of books on mechanics there seems no end, but this latest one by Mr. Mansfield Merriman, the well-known author of engineering works, is certainly a very good one for the student of engineering and building construction. Dealing as it does with the fundamental principles, it does not carry us very far, but it will undoubtedly be found to be very useful as constant appeals are made to experience, by which alone the laws of mechanics can be established. Numerous illustrations are given and many queries and problems stated as exercises. The student is not required to possess advanced mathematical knowledge, only being asked to have a knowledge of plane

geometry, elementary algebra and plane trigonometry.

"Elements of Mechanics," by Mansfield Merriman. London: Chapman & Hall, Ltd., price 4s. 6d.

Duties of a Clerk of Works.

This useful little book by the late John Leaning, now in its second edition, has been enlarged somewhat by the addition of some items, the instructions to clerks of works by the late School Board for London, synopsis of the regulations adopted by various other public bodies, and the rules for the examination of the Incorporated Clerks of Works Association of Great Britain. The book is undoubtedly the handiest work on the subject, and should be in the possession of every clerk of works.

"The Conduct of Building Work and the Duties of a Clerk of Works," by J. Leaning, F.S.I. London: B. T. Batsford, price 2s. 6d. nett.

Brickwork.

There are many books which deal with the craft of brickwork, and this book, although intended to serve for the practical bricklayer, gives very little beyond what is to be found in good works on building construction. The information on bonding is very clearly given with serviceable illustrations, while special kinds of work, such as hollow walls, chimneys and fireplaces, are also dealt with. All this may be passed over, as it has already been done many times before. In the latter part of the book, dealing with the setting-out and cutting of bricks for gauged work, arches and niches, domes and oriel windows, the information is sufficiently good to enable us to recommend the work for purchase by students. The price is small and the book is well got up.

"Practical Brickwork," by Paul N. Hasluck. London: Cassell & Co., Ltd., price 2s.

Electrical Engineering.

Handbooks on the subject of electrical engineering are not numerous, and therefore this serves a very useful purpose. It is, of course, only intended for elementary students, but it goes a good way, and will serve as an introduction to more advanced works on specialized branches of the subject, of which there are many published.

"Electrical Engineering," by T. Sewell. London: Crosby, Lockwood & Son, price 7s. 6d. nett.

Gilding, Bronzing and Lacquering.

This is a very useful addition to the "Decorator" series of practical handbooks, edited by Mr. A. S. Jennings. The subject of gilding, bronzing and lacquering have been to a great extent overlooked in works on the practical side of decorating and painting, though, considering how often these come into work of this description, it is surprising that it should be so. The omission is well repaired in this book, which is thoroughly practical and contains a large amount of information. The illustrations are clear and to the point.

"Practical Gilding, Bronzing and Lacquering," by F. Scott-Mitchell. London: The Trade Papers Publishing Co., Ltd., price 3s.

A Phase of Moslem Architecture.

There are many important and interesting remains of architecture existing which have never been investigated and recorded in any way. We are therefore always glad to welcome any original investigation that places on record for reference by architectural historians buildings fast falling into decay. There are very few official scientific investigations in any direction, but the Danish Government is one of the foremost in this respect, and it is noteworthy that several volumes have been published by Danish authors, not in their national tongue but in English, apparently because the latter language is more widely known. Lieut. Olufsen, of the first and second Pamir expeditions in 1896-99, had an opportunity of investigating the architecture of Transcaspia, Khiva,

Bokhara and Turkestan, and he has recorded in this work some of the early Moslem buildings which are falling into ruin. A large number of photographs are provided, which show that these buildings belong to the best period of Turkish architecture, the decoration being extremely rich yet delicate. The country now belongs to Russia, and until its conquest was practically inaccessible. Lieut. Olufsen suggests that probably it would be possible to obtain from excavations in the oases some knowledge of the architecture and culture of the pre-Islamic age in Central Asia, namely, the Avesta age, about the time of the dynasties of the Parthians and of the Sassanids. It is to be hoped that we may have this investigation in the near future. The glazed-tile work is the most important portion of these buildings, and will repay study.

"Old and New Architecture in Khiva; Bokhara and Turkestan," by O. Olufsen. London: Thomas Tofts, 17, Old Queen Street, S.W., price 15s.

Hygiene.

The admirable way in which this work was originally compiled (it has since been extended and revised) led to its considerable success, the fact of which is proved by this present sixth edition. Hygiene embraces so many subjects that it is not surprising most authors have been somewhat at sea in dealing with sanitation and ventilation and other specialized branches of the subject. In this respect the book now under review is still somewhat old-fashioned and inadequate. The long familiar discussion on the chemical composition of air is gone through, winding up with descriptions of early forms of natural ventilation. The fact that a textbook should still support the old ideas is regrettable, because the authors of works on hygiene have had far too much to say up to the present in the drawing-up of by-laws as to the cubical space to be given in dwellings, schools, asylums and other buildings. De Chaumont's old standard of 3,000 cub. ft. of air per hour per person is still advocated, although the authors do think that such a standard is possible to obtain, while they also state that a change of air three times an hour is all that can be obtained. From this reasoning they advocate 1,000 cub. ft. per person. This is based upon the assumption that 1,000 cub. ft. of air should not contain more than '6 cub. ft. of carbon-dioxide. When we examine this statement, however, we see that this amount of adulteration of pure air is only the point at which the impurity can be detected by the sense of smell by anyone coming fresh from the open air. As, however, an occupant of a room quickly becomes oblivious to this, and as anything below 10 parts of carbon-dioxide appears to produce no immediate effect on health, it is clear that the proportion of '6 can be very considerably increased without any danger. The following scale has been proposed for increasing the quantity of carbon-dioxide, namely, '8, rather close; 1, close; 1'2, very close. Carnelly, Haldane and Anderson, however, give a much better way of judging the allowable quantity of carbon-dioxide in rooms. They judge by the number of micro-organisms, and they place the standard at 1 for dwellings and 1'3 for schools. This would mean that a person only required 1,000 cub. ft. of air per hour, and it would appear from this that no harm would arise. As by the natural system air can be comfortably changed four times an hour without draughts we need only provide 250 cub. ft. of air-space per person. If, however, a mechanical system of ventilation were adopted this could even be still further reduced. This shows that any regulation as regards the size of rooms in dwelling-houses is not needed because the amount of floor area and height of rooms that must be provided will always ensure a sufficiency of air space.

Overcrowding of rooms should be regulated against. This point is most important in regard to small dwellings, because the by-laws are against the construction of small rooms, and so materially increase the cost of building—so much so as almost to prevent the erection of a cottage costing £100, which is the only thing which will solve the housing problem as regards the very poor. In large buildings, however, where mechanical ventilation is adopted, it is apparent that much greater latitude should be given. There are many points in this book which are open to question in regard to sanitation, and in such subjects as the selection of building sites, the construction of walls, roofs, floors, &c. For instance, the height of rooms, the authors think, should not be less than 9ft. and rarely need exceed 12ft. Such a statement needs no comment. The book, however, on the whole is one of the best works on the subject, but we recommend that any future edition be revised by an architect and sanitary engineer.

"Hygiene," by J. Lane Nutter, M.A., M.D., and R. H. Firth. London: Longmans, Green & Co., price 4s. 6d.

A Building Note-book.

Building construction is now a recognized subject in almost all technical schools, where it is taught mostly by blackboard demonstration and the reading of elementary books, most of which are not particularly well written. This of course is well enough in its way, but students would do better if, for instance, in studying brickwork, masonry and joinery they were given practical demonstration and allowed to try their hands also. They should also be constantly making sketches and careful scale drawings of every detail of construction, and in this latter respect this series of diagrams, interleaved with squared paper, is extremely useful. This only deals with brickwork and masonry, but the system might be extended. The diagrams would have been better if reproduced larger and more space so given for careful drawing on the squared paper. However, we can only welcome this class note-book, which, we feel sure, will be of considerable assistance in the teaching of the subject.

"Building Construction: Class Note-book with Diagrams," No. 1, by A. Buchanan. London: Battersea Polytechnic.

Somerset House.

Although this book is more particularly concerned with the history of Somerset House and records many notable events and curious anecdotes connected with the former palace of the Duke of Somerset and with the present building, it is, nevertheless, of considerable value from an architectural standpoint. Not only do the authors give a very clear account of the erection of the existing building, explaining many points in the plan, but they also give numerous illustrations by which we can gather the character of the former buildings on this site, and they collect much information regarding its architectural history. Apparently, whom Somerset employed to design and erect his new palace must for ever remain in doubt. Many attempts have been made to fix the architect's identity. The clerk of works, it has been ascertained, was named Robert Lawes. Among those living in touch with Somerset who might have been the architect, the two most likely are John Thorpe and Sir John Thynne. The accepted period of Thorpe's activity, 1570 to 1610, is, however, too late to support his claim. The chief evidence of his work is found in the folio of his drawings in the Soane Museum, among which is a ground plan and elevation of Somerset House towards the Strand. Tradition has constantly favoured an individual called John of Padua as the architect. This name is here and there encountered, but not in association with a particular design. As far

as can be discovered he lived in England between 1542 and 1549 and was the recipient of two royal grants, one in 1544 and the second in 1549. John Thorpe has been confused with him, and efforts have also been made to identify this individual with Sir John Thynne. Whether he was one or the other, or an entirely different personage, has not been determined. Even John Caius, the founder of Gonville and Caius College, who is reputed to be the architect of that building, was confused with John of Padua, but a manuscript in the Gough collection stated that there was in the Combination Room at Caius College "a portrait of John of Padua, who built the college and Somerset House, on the old front of which next the Strand were some Doric columns like those at Caius College." Sir John Thynne was the steward of the Duke of Somerset, and during 1548 and 1549, according to papers preserved at Longleat, carried on negotiations for the building of a new mansion for the Protector at Bedwyn Brail End in Wiltshire. The chief reason for counting Thynne a possible architect of Somerset House is that apart from his close interest in the Duke's affairs he is known to have been a capable designer, evidence of which is given by his own mansion, Longleat, in Wiltshire, built during the years 1567 and 1579, which was more probably designed by Thynne himself than by John Thorpe or John of Padua. As he was a most careful steward, his supervision of such an important project as Somerset House must have been of the closest, and there is great probability that he was the architect. The old palace was a typical example of Elizabethan Renaissance work, and its history is carefully traced out up to the time when alterations were carried out by Henrietta Maria, who had been given Somerset House as a residence. Inigo Jones made the designs for these alterations, and he seems to have had to prepare several sketch plans before one was accepted, in much the same way as modern architects find difficulty with their clients. He had prepared a design to rebuild the whole of the river front, but this was not carried out. Eventually the palace fell into decay, and arrangements were made for its rebuilding. Sir William Chambers was appointed architect on December 25th, 1775, and the first stone of the present building was laid in 1776. Sir William Chambers, it may be mentioned, was born at Stockholm

in 1726. He began life as a supercargo in the service of the Swedish East India Co., and so visited China, where he made a study of Chinese architecture and costume, the result of which we know. When 18, after only two years in such service, he resolved to devote himself to architecture, and made a prolonged study in Italy of the buildings and writings of Palladio, Michelangelo, Vignola, Scamozzi, Sangallo, Bernini and other Italian masters. His first commission was given by Augusta, Princess Dowager of Wales, for work in connection with her villa at Kew, of which the Chinese pagoda and small Roman temples in Kew Gardens remain. In a report to the House of Commons Sir William Chambers gives some particulars of Somerset House. The Strand front is 135ft. wide, 61ft. deep, with two wings each 46ft. wide and 42ft. in depth. It is faced with Portland stone, backed with hard greystock bricks, and the timber used was Russian. The quadrangle is 210ft. wide and 296ft. deep. It is surrounded with buildings 54ft. deep. The river front is 600ft long. The foundations are of brick, a great part of them laid in the bed of the river, special precautions having been taken for stability, while others are sunk through loose-made ground 10, 12 and even 16ft. In addition to these extensive works there was a granite basement 13ft. 7ins. high, with a range of arched stone galleries and apartments thereon, raised in parts 18ft. high and others to 28ft., all on foundations built into the river, 438ft. long by 46ft. wide. Although Chambers estimated the building not to exceed £250,000, its probable cost was about £500,000, and this without King's College and the Inland Revenue Offices in Lancaster Place. The appearance of the river front has of course been much altered by the construction of Waterloo Bridge and the Victoria Embankment. We publish an engraving showing the building before these were constructed. It was not till 1830, more than thirty years after Chambers's death, that the design was fulfilled by the building of King's College. The building to Lancaster Place was erected by Sir James Pennethorne, surveyor and architect to the Government. He was born at Worcester in 1801, and came to London in 1820 as a pupil of John Nash, afterwards studying Gothic from 1822 to 1824 in Augustus Pugin's office, and then visiting France, Italy and Sicily, returning to London to carry out many important



SOMERSET HOUSE: RIVER FRONT FROM EAST (1806), SHOWING SITE OF KING'S COLLEGE.

buildings. He died in 1871. His new wing to Somerset House was begun in 1851. It is 350ft. long, and it did not need to wait for later generations to appreciate it as a fine design, for we find a letter of congratulation addressed to the architect by seventy-five fellow-architects dated July 1st, 1856. Among the signatories to it are Phillip Hardwick, C. R. Cockerell, Charles Barry, Decimus Burton and Sydney Smirke. This letter was as follows: "Dear Sir,—Your professional brethren are anxious to congratulate you on the successful completion of your design for the western wing of Somerset House, in which at the time you have adhered to the taste and style of the original edifice, and have done full justice to the genius of Chambers, you have adapted these additions to a difficult site with great propriety, and thereby produced a striking architectural feature in the entrance to London by Waterloo Bridge." King's College, which completed Sir William Chambers's conception, was designed by Robert Smirke, and has a frontage of 304ft. towards the west, with a depth of 120ft. in the central section. These are only a few of the particulars which are given in this admirable book. The many notable personages connected with the old and modern Somerset House, the history of the Royal Academy, which once held its exhibitions and schools there, with the other bodies now located in Burlington House, render this book most interesting reading. The authors have performed their task well, while the publisher has not stinted the illustrations and general production of the book.

"Somerset House Past and Present," by Raymond Needham and Alexander Webster. London: T. Fisher Unwin, price 21s.

R.I.B.A. PRIZES AND STUDENTSHIPS.

THE following have been received for the prizes and studentships of the Royal Institute of British Architects:—

Essay Silver Medal and 25 Guineas, for the biography of a British architect (deceased) practising in the nineteenth century: Six essays.

Measured Drawings, Silver Medal and 10 Guineas—Fifteen sets of drawings.

Soane Medallion and £100—subject, The realization of the ideal mansion described in Bacon's essay "On Building": Ten designs.

Owen Jones Studentship (£100): Five sets of drawings.

Pugin Studentship (Silver Medal and £40): Twelve sets of drawings.

Godwin Bursary (Silver Medal and £65): Five sets of drawings.

Tite Prize (£30)—subject, An open-air swimming bath with an arcaded or colonnaded enclosure: Twenty-one designs.

Arthur Cates Prize (£42): One entry.

Grissell Gold Medal and 10 Guineas—subject, A stone skew bridge: Six designs.

The deed of award of the prizes and studentships will be made known at the meeting of the Institute to be held on Monday next, January 22nd.

The annual exhibition will be held as usual in the gallery of the Alpine Club (entrance in Mill Street, Conduit Street, W.) from January 23rd to February 3rd, from 10 to 8.

The Second Annual Smoker of the A.A. Students will be held on Friday, February 2nd, at the Gaiety Restaurant, commencing at 8 p.m. Tickets, price 2s. 6d. each, can be obtained from the offices of the Architectural Association at 18, Tufton Street, Westminster. The number is limited to 400. Any surplus of funds will be given to the Architects' Benevolent Society and for the foundation of an A.A. musical and dramatic society.

HOT-WATER SUPPLY BY INDIRECT HEATING.*

By George Chasser.

THE ordinary system of heating water for domestic supply from a range boiler or from an independent one is undoubtedly the most direct method of transmitting the heat from the fire to the water. But although this may be an advantage, there are certain conditions in which the direct method is not the best for the purpose. The conditions referred to are where incrustation is caused by excessive deposit from the water.

This difficulty is not common to all installations, but principally in those where the water contains a considerable quantity of solid matter, i.e., in "hard water." The defects due to this cause are that the boiler and portions of the mains and service pipes become partially, and in extreme cases wholly, stopped up by the incrustation that is precipitated from the water.

"Hard" Waters.

Some hard waters when heated precipitate the solid matter, and the water becomes soft. The cause of this "temporary hardness," as it is called, is said to be due to carbonates of lime (chalk) and other salts which are precipitated when the water reaches a temperature varying from 176 to 248 degs. Fahr.

Other "hard" waters do not become soft upon boiling. This "permanent hardness," as it is called, is said to be due to the sulphates of lime (gypsum or plaster-of-Paris) and other salts that are held in solution not becoming precipitated at the boiling temperature. These salts are said to be precipitated at a temperature varying from 284 to 302 degs. Fahr., but as these temperatures are not usual in low-pressure heating we need not consider them. Water of this class would not cause much trouble in direct heating, and it is probably due to this fact that a water known to be very hard is used in an apparatus that is often boiling, yet no difficulties are experienced with incrustation.

The hardness of the water is usually brought forcibly to the notice of the household by the frequency with which the boiler and pipes have to be cleaned or replaced.

Quantity of Water a Factor in the Question.

The quantity of water passed through the boiler has an important bearing on the question. We will suppose that a house uses an average of 60 gallons of water that has boiled per day, and that the water contains a temporary hardness of 30 grains of solid matter in solution in 70,000 grains (for 1 gallon) of water; $60 \times 30 = 1,800 \times 7$ days = 12,600 grains, or 18 lbs. of sediment deposited per week. In such conditions it will readily be seen that the incrustation would soon cause trouble, and although every facility is arranged for cleaning, the time comes when a fracture occurs or stopped-up pipes have to be replaced, because it is an impossibility to ensure that every part shall be free from deposit.

Heating Surface of Boiler.

The effective heating surface of the boiler has a considerable bearing on the amount of sediment deposited. This is especially the case where the boiler is too large for the quantity of water that is required. In such cases the fire is not regulated as it should be, and the water is continually boiling in the system. If it were possible to keep the average temperature of the water at all times about 160 degs. Fahr. and to provide for more storage, a good many of the incrustation difficulties would disappear.

* Extracts from a competition paper in connection with the Institution of Heating and Ventilating Engineers (Incorporated).

Boiling Water at the Taps

is not necessary, in fact, should be avoided where it has to be used in baths, lavatories or any other earthenware or fireclay vessels. Many baths and lavatory basins have been fractured by turning on very hot water from the taps.

In sculleries hotter water may be necessary, in which case arrangements should be made to draw the water from a point as near as possible to the boiler. It may be thought that it is all a question of management of the apparatus; this may be so, but with some water, and the usual scullery maid, it is impossible to prevent the incrustation difficulties. It is to make the apparatus less dependent upon the attendant, so far as incrustation is concerned, that the indirect system is recommended. Its

Principal Advantages

are—

(1) A practical remedy for incrustation difficulties.

(2) The water in the boiler and primary heater is not changed but is heated over and over again; therefore the boiler keeps free from deposit.

(3) Boilers with extra large waterways or waterway bottoms are not necessary. Mud-lids or cleaning-out plugs are not absolutely necessary.

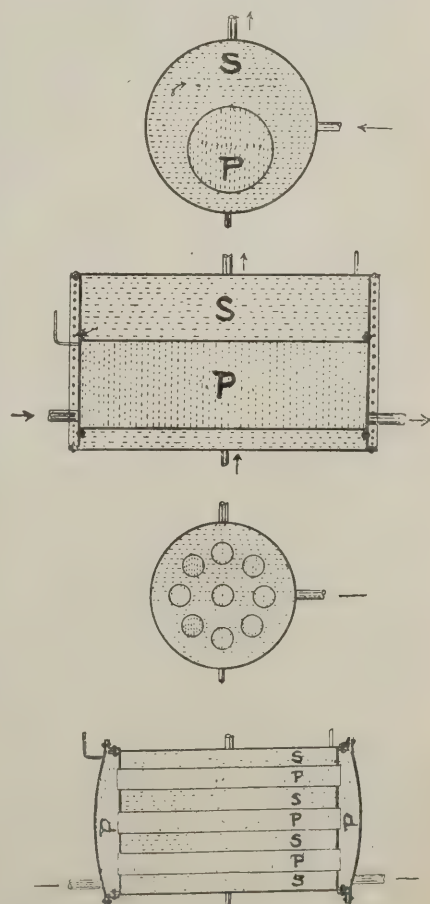
(4) The risks of fractured boilers or explosions are reduced to a minimum.

(5) There is no waste of fuel due to the non-conducting nature of the deposit.

(6) The cost for renewals or overhauling is small.

Working of the System.

The system of indirect heating I propose to describe is the one in which hot water is the heating medium. The water that does the heating is never changed, excepting the little that is lost by evaporation, and is confined to the boiler and primary heater. The latter is placed inside another cylinder (for



INDIRECT HEATING CYLINDERS, SHOWING PRIMARY AND SECONDARY PARTS.

preference), called the secondary one, which contains the water for the draw-off service. This secondary cylinder is analogous to the ordinary circulating one of the direct system, and contains the heated storage water. The water in the secondary cylinder receives its heat by transmission from the heated water in the primary heater (see Fig. 1, preceding page).

Good Results

are obtained by enclosing the primary cylinder, which contains the hottest water, within the secondary one, because the primary cylinder has the whole of its heat enclosed to give to the secondary water on the outside, whereas if the primary heat were on the outside greater losses by radiation would take place because of the higher temperature. The primary cylinder being fixed within the other, as recommended, affords greater facilities for connecting up the flow and return to both cylinders.

Determining Proportion of Heating Surface.

To arrive at the proportion of heating surface in the primary cylinder to take up the heat from the boiler requires some investigation.

It may be taken that the heat passed through the primary cylinder surface in a given time is simply proportional to the difference in temperature between the secondary heated water and the primary heated water.

We will first consider the transmission in heat-units per hour through the boiler-heating surface, and we may assume that it is equal to the number of square feet of surface it could supply in an ordinary radiating system multiplied by the number of heat-units emitted per square foot of that radiating surface.

An Example.

As an illustration we will assume that with an ordinary hot-water boiler each square foot of fire surface will heat 30 sq. ft. of radiating surface, and that the average temperature of the water is 170 degs. Fahr.

Taking the radiating surface to emit 18 units per square foot per degree difference between the temperature of the room, say 60 degs., and the water 170 degs., $170 - 60 = 110 \times 18 = 198$ heat-units emitted per square foot of the radiator per hour. Then $30 \times 198 = 5,940$ heat-units transmitted per hour through 1 ft. of fire-heated surface in the boiler. This quantity represents the maximum for large boilers with a good body of fire, but with small boilers of, say, 3 to 12 sq. ft. (such as would be used for domestic supply) 5,500 heat-units is nearer the quantity transmitted; also, this amount being based upon the heat given off from the radiating surface, the heat-units required to raise the metal itself to the temperature of the water are not considered.

When heating the water in the secondary cylinder by the heat that is transmitted through the primary cylinder surface it cannot be expected that the same heat-units will be transmitted per square foot as in the fire-heated surface. In the latter case the radiant heat from the fire is impinging against the surface, whilst in the primary water heated surface the maximum temperature is about 212 degs. Fahr., so that it will be seen that much more heating surface is required in the primary heater to transmit the heat-units than is the case with the boiler surface.

A Comparison between Direct and Indirect Heating.

To heat 10 gallons per hour by direct heating would take 2 sq. ft. of fire surface, while an additional $1\frac{1}{2}$ sq. ft. in the indirect method is necessary to heat the primary cylinder water. As the latter is never drawn off for supply, this represents the proportion of stored-up heat-units that has to be provided for, the compensation for which is freedom from incrustation troubles and expenses.

Of course the extra cost of the indirect cylinder feed cistern and connecting pipes over an ordinary plain cylinder has to be taken into consideration, but this will be amply repaid by the saving in cost of renewals.

Arrangement of System.

The cylinder should be as near as possible to the boiler, and the latter should be an independent one for preference, because of the greater facility for banking up and giving the minimum amount of trouble and inconvenience. Any good pattern of independent boiler in wrought or cast-iron is suitable. In small installations a boiler with an extended fuel magazine and small heating surface should be used.

The flow and return mains should be large so as to carry the heated water from the boiler into the primary cylinder in good volume, and to assist the little head pressure of the primary feed cistern. The latter should be fixed about 2 ft. above the indirect cylinder, so as to keep the head pressure as low as possible in the primary heater. This will prevent a higher temperature boiling-point due to the head of water (a head of 5 lbs., or about 12 ft., increases the temperature of the boiling-point to 225 degs. Fahr.) and assist in keeping the water in the secondary cylinder at a maximum of 180 degs. Fahr., and so reduce the risks of deposit from the worst possible water.

Care should be taken that the key to the emptying tap in the boiler is removed, because on no account should it be used for hot-water supply purposes, but only for emptying the system when required.

For large indirect cylinders, which may be fixed vertically or horizontally, the primary portion could be in two or more cylinders, or a number of lap-welded tubes of large size.

An ordinary tubular coil for the primary surface does not give satisfactory results. The water contained appears to be too little for the surface, and steam is easily made. For small indirect cylinders radiator sections, if of large waterway, may be fixed as primary

surface inside an ordinary galvanized cylinder or rectangular tank.

Sizes of Boiler and Primary Heater.

To illustrate how the sizes of the boiler and primary heater may be obtained we will assume that the apparatus has to heat 65 gallons of water from 45 to 160 degs. Fahr. in two hours.

65 gallons = 650 lbs. in secondary cylinder.
36 per cent. of 650 lbs. = 234 lbs. in primary cylinder.
14 per cent. of 650 lbs. = 91 lbs. in boiler and mains.
Total 975 lbs.

Of this quantity 650 lbs. in the secondary cylinder have to be raised 115 degs. Then $650 \times 115 = 74,750$ heat-units required. The remaining 325 lbs. in the primary cylinder and boiler have to be raised 160 degs. Then $325 \times 160 = 52,000$ heat-units, making a total of $126,750 \div 5,500 = 23$ sq. ft. required in the boiler to heat in one hour. But as we wish to do the work in two hours, then $11\frac{1}{2}$ sq. ft. is required in the boiler, and according to test $11\frac{1}{2} \times 3 = 34\frac{1}{2}$ sq. ft. required in the primary cylinder surface.

A suitable heater would be 45 ins. long overall by 27 ins. diameter, the primary surface consisting of nine 4 in. lap-welded tubes expanded into the ends. The primary water in the tubes and ends would be about 240 lbs., and the secondary heated water around the indirect surface would be about 650 lbs. The suggested arrangement is shown by Fig. 2.

The indirect system affords the convenience of being able to heat one or two radiators off the primary circuit without the disadvantages of the direct system where the radiators are heated with the draw-off water and are subject to fluctuations in temperature and air difficulties.

Where this is done additional heating power should be provided in the boiler, unless the draw-off requirements are such that the maximum quantity per hour is very intermittent, when by firing to suit the conditions the extra heat will go to the radiators. If the circulating service pipes are extensive, allowance should be made in the heating surface for the extra water that has to be treated.

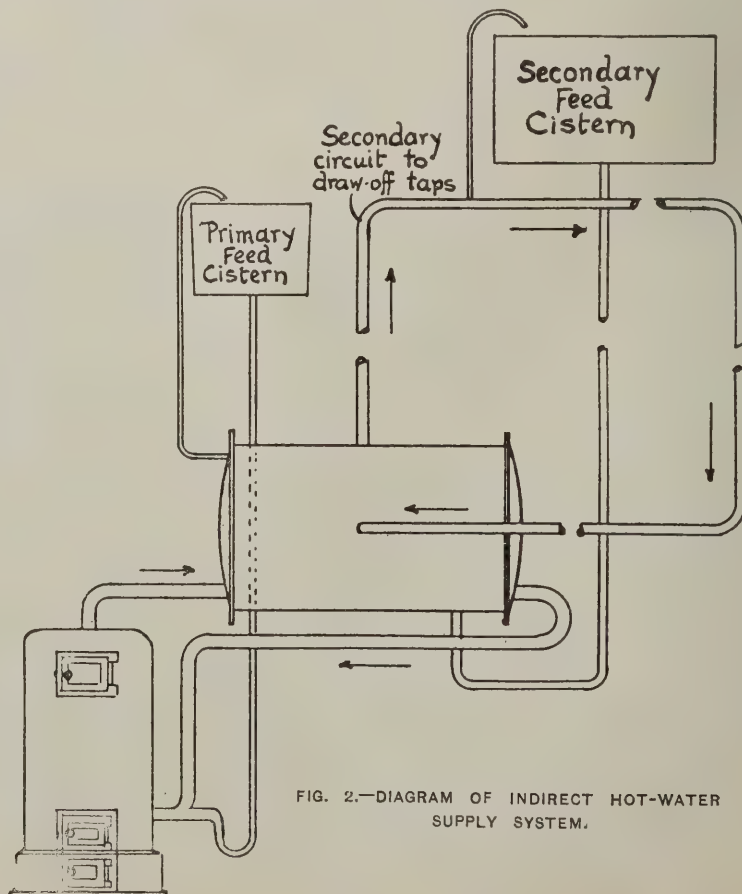


FIG. 2.—DIAGRAM OF INDIRECT HOT-WATER SUPPLY SYSTEM.

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Clover, best per load	3	12	0	4	0	0
Hay, good do.	3	5	0	3	17	0
Sainfoin mixture do.	3	5	0	3	15	0
Straw do.	1	8	0	1	14	0

OILS AND PAINTS.

Castor Oil, French per cwt.	1	1	10	1	2	15
Colza Oil, English do.	1	6	6	—	—	—
Copperas per ton	2	0	0	—	—	—
Lard Oil per cwt.	2	15	0	2	17	0
Lead, white, ground, carbonate per ton	16	0	0	—	—	—
Do, red do.	15	0	0	0	19	0
Linseed Oil, barrels per cwt.	1	3	0	—	—	—
Petroleum, American per gal.	0	0	6½	0	0	6½
Do, Russian do.	0	0	5½	0	0	5½
Pitch per barrel	0	8	0	—	—	—
Shellac, orange per cwt.	9	1	0	9	2	0
Soda, crystals per ton	3	2	6	3	5	0
Tallow, Town per cwt.	1	5	6	1	6	6
Tar, Stockholm per barrel	1	5	0	—	—	—
Turpentine per cwt.	2	7	10½	—	—	—

METALS.

Copper, sheet, strong per ton	95	0	0	—	—	—
Iron, Staffs., bar do.	7	5	0	8	10	0
Do, Galvanized Corrugated sheet do.	12	2	6	12	10	0
Lead, pig, Soft Foreign do.	16	16	3	16	17	6
Do, do, English common brands do.	17	5	0	—	—	—
Do, sheet English, 3lb. per sq. ft. and upwards do.	18	0	0	—	—	—
Do, pipe do.	18	10	0	—	—	—
Nails, cut clasp, 3in. to 6in. do.	9	5	0	—	—	—
Do, floor brads do.	9	0	0	—	—	—
Steel, Staffs., Girders and Angles do.	7	0	0	7	5	0
Do, do, Mild bars do.	7	5	0	7	10	0
Tin, Foreign do.	167	15	0	168	5	0
Do, English ingots do.	170	0	0	172	0	0
Zinc, sheets, Silesian do.	31	7	6	—	—	—
Do, do, Vieille Montaigne do.	31	10	0	—	—	—
Do, Spelter do.	29	5	0	29	10	0

TIMBER.

Sort Woods.

Fir, Dantzic and Memel per load	2	15	0	5	0	0
Pine, Quebec, Yellow do.	4	2	6	7	10	0
Do, Pitch, American do.	2	19	0	5	0	0
Laths, log, Dantzic per cu. fath.	4	0	0	6	0	0
Deals, Archangel, White, 1st, 3 x 11 per std.	14	10	0	—	—	—
Do, do, do, 1st, 3 x 9 do.	12	15	0	—	—	—
Do, do, do, 1st, 3 x 9 do.	12	15	0	—	—	—
Do, do, do, 2nd, 3 x 11 do.	11	10	0	—	—	—
Do, do, do, 2nd, 3 x 9 do.	10	10	0	—	—	—
Do, do, do, 2nd, 3 x 9 do.	10	10	0	—	—	—
Do, do, do, 2nd, 3 x 9 do.	10	10	0	—	—	—
Do, do, do, 3rd, 3 x 9 do.	9	10	0	—	—	—
Do, Quebec, Yellow Pine, 1st, 3 x 10 do.	24	15	0	—	—	—
Do, do, do, 1st, 3 x 9 do.	24	5	0	—	—	—
Do, do, do, do, 1st, 3 x 8 do.	22	10	0	—	—	—
Do, do, do, do, 1st, 3 x 7 do.	22	10	0	—	—	—
Do, do, Spruce, Unsorted, 3 x 7 do.	8	10	0	—	—	—
Do, Rāfso, Yellow, 1st, 3 x 9 do.	14	5	0	—	—	—
Do, do, do, 2nd, 3 x 9 do.	12	5	0	—	—	—
Do, St. Petersburg, Yellow, 1st, 3 x 9 do.	11	0	0	—	—	—
Do, do, do, 2nd, 3 x 9 do.	9	10	0	—	—	—
Do, Wasa, White, Unsorted, 2½ x 7 do.	8	10	0	—	—	—
Do, Attu, Yellow, Unsorted, 2½ x 7 do.	8	15	0	—	—	—
Do, Ramvik, Yellow, 1st, 2½ x 7 do.	10	5	0	—	—	—
Battens, all kinds do.	6	10	0	9	10	0
Flooring Boards 1in. prepared, 1st per square	0	10	0	0	11	0
Do, 2nd do.	0	9	0	0	10	3
Do, 3rd, &c. do.	0	7	6	0	10	0

HARD WOODS.

Ash, Quebec per load	4	0	0	7	15	0
Birch, New Brunswick do.	2	7	6	4	10	0
Do, Quebec do. do.	2	12	6	5	0	0
Box, Turkey per ton	7	0	0	20	0	0
Cedar, Cuba per ft. sup.	0	0	3	0	0	4
Do, Honduras do.	0	0	5½	—	—	—
Do, Tobasco do.	0	0	3½	—	—	—
Elm, Quebec per load	4	5	0	8	10	0
Jarrah, plank per ft. cu.	0	2	6	0	3	0
Mahogany, Average Price for Cargo, Honduras per ft. sup.	0	0	4½	—	—	—
Do, Tobasco do.	0	0	5½	—	—	—
Do, Cuba do.	0	0	4½	—	—	—
Do, African do.	0	0	4½	—	—	—
Do, Lagos do.	0	0	3½	—	—	—
Oak, Wainscot per log.	3	15	0	7	5	0
Teak, Indian, logs per load	10	0	0	19	0	0
Do, do, planks do.	13	0	0	20	0	0
Whitewood, American, logs per ft. cu.	0	1	3	0	1	6
Do, do, planks and boards do.	0	1	3	0	3	0

Tenders.

Addressed postcards on which lists of tenders may be stated will be sent post free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Fetter Lane, E.C. Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Bedfordshire.—Accepted for alteration to stables forming new motor garage, &c., at Bromham House, Bedfordshire, for Mr. H. W. Allen. Mr. George P. Allen, M.S.A., architect, Dacre House, Arundel Street, Strand, London, W.C. —

S. Foster, Kempston £150

Bedford.—For the erection of a new block of offices for W. H. Allen, Son & Co., Ltd., engineers. Mr. George P. Allen, M.S.A., architect, Dacre House, Arundel Street, Strand, W.C. —

Mr. S. Foster, Kempston £2,549

Marton & Dunstall, Bedford 2,304

* Accepted.

Bedford.—Accepted for the erection of a new institute and library in Hurst Grove Road, for Mr. W. H. Allen. Mr. George P. Allen, M.S.A., architect, Dacre House, Arundel Street, Strand, W.C. —

S. Foster, Kempston £2,653

Bedford.—Accepted for the erection of a new block of lavatories for the Queen's Engineering Works. Mr. George P. Allen, M.S.A., architect, Dacre House, Arundel Street, Strand, W.C. —

S. Foster, Kempston £490

Blackley.—Accepted for the erection of an infirmary to contain about 400 beds and a nurses' home to accommodate thirty-five nurses, on their estate, Charlestown Road, Blackley, for the Guardians of Prestwich Union. Messrs. Thomas Worthington & Son, engineers, 46, Brown Street, Manchester —

R. Neill & Sons, Srangeways, Manchester £62,000

Bridlington.—For the erection of a Congregational church and schoolroom in St. John Street, for the Trustees of Zion Chapel. Mr. Joseph Shepherdson, architect, 15, Manor Street, Bridlington —

A. A. Booth £1,450 0 0

J. H. Fenwick, Hull 1,410 0 0

A. Gardham 1,380 8 2

T. Gray 1,355 12 4

Carr & Creaser, Scarborough 1,337 17 0

W. H. Fell, Scarborough 1,299 15 0

J. Kneeshaw 1,277 2 1

Smallwood & Shaw 1,273 13 1

E. E. Wilson 1,245 8 0

J. R. Stork 1,238 1 0

E. E. Yeomans 1,200 0 0

R. Musk 1,194 9 3

J. Sawden 1,166 0 0

* Accepted. [Rest of Bridlington.]

Bristol.—For the erection of a new cold-storage warehouse, offices, stables and caretaker's house, Jervis Street, Bartonhill, for Messrs. Eastmans, Ltd. Mr. F. F. Bligh Bond, F.R.I.B.A., architect, Bristol —

J. James £8,489

W. Foster 8,240

T. R. Lewis 8,075

Neale Brothers 8,023

R. F. Ridd 7,893

H. Wilcock & Co., Wolverhampton 7,860

E. Love 7,779

R. Wilkins & Son 7,679

C. A. Hayes 7,599

Stephens, Bastow & Co. 7,597

Cowlin & Son 7,599

F. Chown 7,398

J. Browning 7,250

J. Perkins & Son 7,250

E. Walters & Son 7,177

T. Lovell & Son* 6,808

* Accepted. [Rest of Bristol.]

Burgh-next-Aylsham.—For the erection of a new school, for the Norfolk Education Committee. Mr. A. F. Scott, architect, Castle Meadow, Norwich —

R. Chapman £1,560 0 0

Baker, Ltd. 1,511 2 10

Atherton 1,488 0 0

W. S. Smith 1,469 0 0

J. & F. Appleton 1,431 0 0

Spencer, Santo & Co. 1,430 0 0

Batchelor 1,428 12 0

J. Evans 1,399 0 0

Downing Brothers 1,397 0 0

Scaries Brothers 1,395 0 0

* Accepted.

Taunton.—For the erection of new elementary schools for 600 children in three departments, including science, cookery, laundry, manual instruction, and caretaker's cottage, at North Town, for the Taunton Borough Education Committee. Messrs. H. Dare Bryan, F.R.I.B.A., and F. W. Roberts, M.S.A., joint architects, 2, Hammet Street, Taunton. Quantities by Bernard & Son, Baldwin Street, Bristol —

Bennet, Plymouth £14,039 0 0

Perkins & Sons, Bristol 14,000 0 0

Stephens & Bastow, Bristol 14,000 0 0

Wakeham Brothers, Plymouth 13,422 0 0

Pittard & Son, Langport 13,300 0 0

Roberts, Plymouth 12,994 0 0

Stephens & Sons, Exeter 12,803 0 0

Stanbury, Devonport 12,609 17 3

Pethick, Plymouth 12,444 0 0

Moggridge 12,430 5 0

Lang, Bath 12,397 0 0

Pollard, Bridgwater 12,030 0 0

Pollard & Co.* 12,000 0 0

Coles, Plymouth 11,875 0 0

Colborne, Swindon 11,870 0 0

Small 11,663 0 0

Blake, Plymouth 11,650 0 0

Wilkins, Bristol 11,630 0 0

A. J. Spiller 11,621 16 0

* Revised tenders recommended for acceptance.

[Rest of Taunton.]

W. Mace	£1,388	0	0
G. Lines	1,388	0	0
W. Hannant	1,387	0	0
A. D. Boddy & Son	1,377	0	0
J. Youngs & Son	1,358	0	0
W. Neale	1,350	0	0
W. Porter	1,340	0	0
T. H. Blyth	1,270	0	0
R. C. Warts, Buxton	1,250	0	0
Kemp	1,123	17	8

* Accepted.

Godalming.—For the erection of a new country house, for Mr. R. T. Bridge. Mr. George P. Allen, architect, Dacre House, Arundel Street, Strand, W.C. —

Mitchell Brothers, Shalford £1,749

F. Milton & Co., Whitley 1,745

M. Bunning & Co., Godalming 1,650

Fry, Godalming 1,625

Heal & Jackson, Puttenham 1,615

Goddard & Sons, Farnham 1,590

Creaton & Co., Lancaster Gate, London, W. 1,582

* Accepted.

London, W.C.—For alterations, painting, decorations, &c., at 24, Bloomsbury Square, W.C., for Mr. L. Weatherly. Mr. George P. Allen, M.S.A., architect, Dacre House, Arundel Street, Strand, W.C. —

Army and Navy Stores, London £157

Messrs. Creaton & Co., Lancaster Gate, W. 130

* Accepted.

Mablethorpe.—For the erection of a new children's wing to the convalescent home at Mablethorpe, for the Committee. Mr. R. H. Fowler, architect, Louth —

Boyman & Sons, Stamford £2,465 0 0

A. T. Elmes, Gainsborough 2,187 0 11

F. Moore, Sutton-on-Sea 1,993 0 0

A. Wood, Alford, Lincs. 1,979 0 0

T. Kime, Candlesby, Burgh, Lincs. 1,960 0 0

Thomson & Sons, Louth 1,933 10 0

Cooper & Son, Nottingham 1,900 0 0

G. H. Vickers, Louth 1,900 0 0

Mawer Brothers, Louth 1,888 0 0

* Accepted conditionally.

Northfield.—For the erection of a public library, for the King's Norton and Northfield Urban District Council. Messrs. Bateman & Bateman and A. Hale, architects, 81A, Edmund Street, Birmingham. Quantities by Mr. C. Silk, 33, Newhall Street, Birmingham —

R. M. Hughes £1,390

G. Huins & Sons 1,326

G. Foster, junior

Complete List of Contracts Open.

DATE OF DELIVERY.		WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:				
Jan.	18	Bristol—School Works	Education Committee	H. J. Jones & Son, Architects, 12 Bridge Street, Bristol.
"	18	London, W.—Quarters	Guardians	E. J. Mott, Clerk, Guardians' Offices, Fulham Palace Road, W.
"	18	Pantygwr—Chapel	Baptist Church	C. T. Ruthen, Bank Chambers, Heathfield Street, Swansea.
"	18	Bristol—Alterations and Additions	Education Committee	Peter Addie, Council House, Bristol.
"	19	Swindon—Schools	Guardians	Halliday & Roger, Architects, 14 High Street, Cardiff.
"	19	Cardiff—Schoolroom	Corporation	Nicholls & Stockwell, Architects, 25 Regent Circus, Swindon.
"	19	Dewsbury—Villa	Rev. H. A. Coe	St. Dyfrig's Clergy House, Plantagenet Street, Cardiff.
"	19	Elgin—Villa		J. Kirk & Sons, Architects, Dewsbury.
"	19	Guisborough—Chapel, &c.	Primitive Methodists	C. C. Doig, Architect, Elgin.
"	19	Leeds—Demolition, &c.	Trustees	E. Wilson, 10 Westgate, Guisborough.
"	20	Consett—House	Gas Co.	Barr, Nelson & Co., 4 South Parade, Leeds.
"	20	Belfast—Shops, &c.		T. H. Murray, Architect, Consett, Durham.
"	20	Marpas—Cottages	Rural District Council	T. Houston, Architect, Kingscourt, Wellington Place, Belfast.
"	20	Wigan—Convenience	Corporation	T. M. Lockwood & Sons, Architects, Foregate Street, Chester.
"	20	Ely—Houses	Mr. Miller	Borough Engineer, King Street West, Wigan.
"	22	Folkestone—Shelters, &c.	Corporation	W. H. Dashwood-Caple, Architect, Church Street Chambers, Cardiff.
"	22	Beckenham—School, &c.	Urban District Council	A. E. Nichols, Borough Engineer, Folkestone.
"	22	Croydon—Boiler and Engine-houses, &c.	Borough Council	J. A. Angell, Surveyor, Beckenham.
"	22	Great Hale—Chapel	Primitive Methodists	G. F. Carter, Engineer, Town Hall, Croydon.
"	22	River—School	Town Council	Rev. J. McKinney, 35 Northgate, Sleaford, Lincs.
"	22	Great Bentley—Alterations and Additions to School	Managers	H. E. Sulgoe, Surveyor, Maison Dieu House, Biggin Street, Dover.
"	22	Banor—Workmen's Dwellings	Council	Headmaster, School House, Great Bentley, Essex.
"	23	London, N.W.—Brick Wall	District Council	Owen Roberts, Architect, The Temple, Dale Street Liverpool.
"	24	Halifax—Residence		Claude Robson, Engineer to the Council, Public Offices, Dyne Road, Kilburn, N.W.
"	25	Fressingfield—School	Managers	T. Kershaw, Lanes and Yorks Bank Chambers, Halifax.
"	25	Marsden—Houses		Rev. Canon Raven, The Vicarage, Fressingfield.
"	25	Kingstown—Technical School	Instruction Committee	J. Kirk & Sons, Architects, Huddersfield.
"	29	Ipswich—School	Education Committee	G. T. Moore, Architect, 1 and 2 Foster Place, College Green, Dublin.
"	29	Levenshulme—School	Education Committee	J. A. Scheuermann, Architect, 23 High Street, Ipswich.
"	29	Beanworth—School and House	County Council	H. Littler, Architect, 16 Ribblesdale Place, Preston.
"	30	Nelson—Free Library	Corporation	W. J. Taylor, County Surveyor, The Castle, Winchester.
"	30	Belfast—Villa		J. K. Poyser and W. B. Savidge, Architects, Queen's Chambers, King Street, Nottingham.
"	31	Thirsk—Extension	Hospital Committee	Hobart & Heron, Architects, 124 Scottish Provident Buildings, Belfast.
"	31	Ayr—Post-office Enlargement	H.M. Office of Works	T. Stoes, Architect, Westgate, Thirsk, Yorks.
Feb.	1	London, S.E.—Waiting-room	Borough Council	W. T. Oldrieve, Architect, H.M. Office of Works, Parliament Square, Edinburgh.
"	2	Portslade-by-the-Sea—School	Education Committee	H. C. J. Edwards, Borough Engineer, 346 Kennington Road, S.E.
"	2	Cheshunt—Hospital	Urban District Council	F. J. Wood, County Surveyor, County Hall, Lewes.
"	2	Chiddingfold—School	Education Committee	A. C. Lee, Clerk to Council, Manor House, Cheshunt.
"	2	Plumpton—Additions, &c.	Education Committee	F. J. Wood, County Surveyor, County Hall, Lewes.
"	12	Bedford—Extension	County Council	F. J. Wood, County Surveyor, County Hall, Lewes.
No date		London, S.W.—Enlargements, &c.	Education Committee	W. H. Leete, County Architect, Shire Hall, Bedford.
"		Oswaldtwistle—Hall, &c.	Weavers, Winders and Warpers Association.	B. S. Gott, Secretary, Education Committee, Middlesex Guildhall, Westminster, S.W.
No date		Shortlands—Shops		G. Riley, Architect, 24 Albert Street, Oswaldtwistle.
ENGINEERING:				
Jan.	18	Swansea—Pier Extension	Harbour Trustees	A. C. Schenk, Engineer, Harbour Offices, Swansea.
"	18	Bristol—Heating	Education Committee	H. J. Jones & Son, Architects, 12 Bridge Street, Bristol.
"	19	Glasgow—Precipitation Tanks	Corporation	City Engineer, City Chambers, Glasgow.
"	22	Stratford-upon-Avon—Pumping Machinery	Corporation	Willcox & Raikes, Engineers, Union Chambers, 63 Temple Row, Birmingham.
"	22	Wimbledon—Air Compressors	Corporation	C. H. Cooper, Borough Engineer, Town Hall, Wimbledon.
"	22	Coonagh—Sluice	Col. W. T. White	Brian E. F. Sheehy, Engineer, 57 George Street, Limerick.
"	23	London, E.—Swingbridge	County Council	Maurice Fitzmaurice, Engineer, County Hall, Spring Gardens, S.W.
"	23	Rotterdam—Repairing Stage		P. van Waesberge & Zoon, Rotterdam.
"	24	Salford—Raking Machinery	Corporation	J. Corbett, Borough Engineer, Town Hall, Salford.
"	24	Pendlebury—Sprinklers	Urban District Council	H. Entwistle, Surveyor, Council Offices, Swinton.
"	26	Blackburn—Heating Apparatus	Guardians	F. C. Ruddle, Architect, 4 King Street, Blackburn.
"	27	Huddersfield—Sewage-disposal Works	Corporation	K. F. Campbell, Engineer, Town Hall, Huddersfield.
Feb.	2	Arkley—Reservoir	Gas and Water Co.	T. H. Martin, Engineer and Manager, Station Road, New Banet.
Mar.	15	Pretoria—Refuse-destructor	Municipality	Mosenthal, Sons & Co., 72 Basinghall Street, London, E.C.
May	1	Talcahuano, Chili—Dock		Direccion de Material, Valparaiso.
IRON AND STEEL:				
Jan.	22	Dublin—Rails, &c.	Great Northern Railway Co.	T. Morrison, Secretary, Amiens Street Terminus, Dublin.
"	22	King's Norton—Railing	Urban District Council	A. W. Cross, Engineer, 23 Valentine Road, King's Heath, Birmingham.
"	22	London, W.C.—Pipes	Water Board	Metropolitan Water Board, Savoy Court, Strand, W.C.
PAINTING AND PLUMBING:				
Jan.	22	Lancaster—Painting	Properties Committee	Borough Surveyor, Town Hall, Lancaster.
Feb.	5	Manchester—Painting	Lancashire and Yorkshire Railway Co.	Engineer's Office, Hunt's Bank, Manchester.
ROADS AND CARTAGE:				
Jan.	18	Spilsby—Road Material	Rural District Council	T. A. Busbridge, District Surveyor, Spilsby, Lincs.
"	18	Merton—Street Works	Rural District Council	R. M. Chart, Surveyor, Town Hall, Croydon.
"	18	Leytonstone—Granite	Guardians	F. E. Hilleary, Workhouse, Leytonstone, E.
"	20	Birmingham—Materials	Public Works Committee	City Surveyor, Council House, Birmingham.
"	20	Dewsbury—Paving, &c.	Corporation	Borough Surveyor, Town Hall, Dewsbury.
"	20	Milford Haven—Materials	Urban District Council	T. H. Lewis, Council Offices, Milford Haven.
"	22	Sleaford—Granite and Slag	Rural District Council	E. Clements, Clerk, 74 Southgate, Sleaford.
"	22	Croydon—Granite	Guardians	H. List, Clerk, Union Offices, Mayday Road, Thornton Heath.
"	23	London, S.E.—Roadwork, &c.	County Council	Maurice Fitzmaurice, Chief Engineer, County Hall, Spring Gardens.
"	26	Chipping Norton—Granite	Rural District Council	R. Entwistle, Surveyor, Charlbury, Oxon.
"	27	Camelsdale—Road	Education Committee	J. H. Howard, Architect, Lower Street, Haslemere, Sussex.
"	27	Norwich—Granite	County Council	F. H. B. Heslop, County Surveyor, Norwich.
SANITARY:				
Jan.	18	Maidstone—Sewage-disposal Works	Corporation	G. R. Strachan, M.I.C.E., 9 Victoria Street, S.W.
"	19	Barnstable—Sewer, &c.	Urban District Council	A. Thorne, Borough Surveyor, Barnstable.
"	20	Tyldesley—Stoneware Pipes	Urban District Council	J. Brooke Smith, Surveyor, Council Offices, Tyldesley.
"	20	Shelf—Sewage Works	Urban District Council	J. Drake & Son, Engineer, Queensbury, near Bradford.
"	24	Ashchurch—Sewage-disposal Works	Rural District Council	H. A. Badham, Clerk, Tewkesbury.
"	24	Twickenham—Sewage-disposal Works	Urban District Council	F. W. Pearce, Surveyor, Town Hall, Twickenham.
"	25	Burnham—Sewerage and Sewage-disposal Works	Urban District Council	Engineer, Eton Rural District Council, Eton.
"	26	Macroom—Sewerage Works	Urban District Council	T. Murphy, Clerk, District Council, Macroom, Ireland.
"	30	Hillingdon—Drainage Works	Rural District Council	Engineer, Corn Exchange, Uxbridge.
Feb.	3	Wilton—Drainage Works	Corporation	J. Taylor, Sons & Santo Crimp, Engineers, 27 Great George Street, Westminster, S.W.

List of Competitions Open.

DATE OF DELIVERY.	DESIGNS REQUIRED.	AMOUNT OF PREMIUM.	DEPOSIT REQUIRED FOR CONDITIONS, &c.	FROM WHOM PARTICULARS MAY BE OBTAINED.
Jan. 31	Hackney—Library	50, 30 and 20 guineas	£1 1s.	W. A. Williams, Town Clerk, Town Hall, Hackney.
Jan. 31	Crompton—Library	£30, £20 and £10	10s. 6d.	F. F. Gartside, Clerk, Town Hall, Shaw, near Oldham.
Feb. 15	Wrexham—Schools (W. E. Willink, Assessor) ...	£50, £30	—	Clerk to Education Committee, Wrexham.
Mar. 20	Bangor—Free Library	£25 and £15	—	W. H. Worrall, Municipal Offices, Bangor, North Wales.
" 31	Birmingham—Council House Extension (Sketch Plans).	—	£1 1s.	Town Clerk, Council House, Birmingham.
No date	Coventry—Municipal Offices and Shops (Local Architects only)	£50	—	G. Sutton, Town Clerk, 10 Hay Lane, Coventry.
"	Bangor—New College Buildings (Names only) ...	—	—	Plans Committee, North Wales University College, Bangor.
"	King's Norton—School (Preliminary Competition)	—	—	J. F. Moore, Education Offices, King's Norton, near Birmingham.

TENDERS - cont. from p. xx.

South Shields.—For the erection of baths and wash-houses in Derby Street, for the Town Council. Mr. J. H. Morton, F.R.I.B.A., architect, 50, King Street, South Shields:—

R. M. Storey, West Bolden, R.S.O.	£19,981	0	0
J. L. Dunn, Sunderland	19,937	0	0
J. Arundel, Bradford	19,600	0	0
W. D. Allison, Whitburn	19,533	14	11
G. Thornton & Co.	19,300	0	0
Middlemiss Brothers, Newcastle-on-Tyne	19,050	8	3
J. Moore	18,900	0	0
J. L. Miller, North Shields	18,869	13	5
J. B. Stott, Sunderland	18,753	19	10
W. J. Robertson & Sons	18,700	0	0
Wart Brothers, West Hartlepool	18,659	7	9
D. & J. Ranken, Sunderland	18,650	0	0
R. Neill & Sons, Manchester	18,600	0	0
J. W. White, Sunderland	18,595	0	0
W. Kennedy, Jarrow-on-Tyne	18,450	0	0
J. & W. Simpson, North Shields	18,420	0	0
W. Foster, Pelaw-on-Tyne	18,357	0	0
W. T. Weir, Howden-on-Tyne	18,300	0	0
Laing & Sons, Carlisle	18,250	0	0
Nicholls, Telford & Co., Newcastle-on-Tyne	18,227	0	0
E. T. George, Newcastle-on-Tyne... ..	18,100	0	0
T. Lumsden, Jarrow-on-Tyne... ..	18,000	0	0
J. White, Newcastle-on-Tyne	17,995	5	1
S. F. Davidson, Newcastle-on-Tyne	17,995	0	0
H. & S. Watson, Newcastle-on-Tyne	17,976	11	2
Glen & Moffett, Jarrow-on-Tyne	17,941	0	0
S. Sheriff & Sons... ..	17,687	17	0
A. Arnold & Sons,* Doncaster	16,969	0	0

* Reduced to £14,100 and accepted. [Rest of South Shields.]

Thetford.—For the enlargement of Thetford School, for Norfolk Education Committee. Mr. A. F. Scott, architect, Castle Meadow, Norwich:—

E. J. Smith	£2,270	0	0
Holden	2,155	14	7
Atherton	2,138	10	0
Scales Brothers	2,128	0	0
Boughton & Son	2,123	3	0
J. S. Smith	2,118	0	0
J. Youngs & Son	2,075	0	7
Wilmot & Son	2,037	0	0
T. H. Blyth	2,000	4	6
Scales & Robins	1,998	0	0
Downing Brothers... ..	1,989	0	0
T. Gill	1,932	0	0
A. D. Boddy & Son	1,873	0	0
R. Shanks,* Chatteris... ..	1,820	0	0

* Accepted.

Trade and Craft.

Cavity Concrete Building Blocks.

The concrete block industry has reached very large dimensions in the United States and Germany, while it is extending to Canada and other Colonies. The possibilities in this direction are apparent, cartage of materials being saved, as any aggregate found on the site can be used with the cement. All that is necessary is a machine to turn the blocks out well and quickly. There are many forms of concrete blocks that have been invented, but all that we have seen have been open to the objection of being too large to handle or manufacture with ease. The Cavity Ventilating Building Block Syndicate,

of 16, Percy Street, Tottenham Court Road, W., have removed this difficulty by arranging the blocks as thin slabs with joints at the back into which a key drops. This key ties the blocks securely together when grouted in with cement-mortar, and holds the blocks apart so as to give a cavity throughout the wall by which ventilation is made easy and damp, cold and heat kept out. Thus a block, instead of being the whole thickness of the wall, is only half the thickness, or less, and can easily be handled without scaffolding or lifting tackle. The moulding is of course made easier, and the machinery used by the company is able to put very great pressure upon the blocks, which allows a large number to be turned out quickly and ready to be stood about to harden, so saving the labour and cost of moulds where blocks are moulded wet. The company, in addition to making blocks and carrying out the erection of buildings, intends to hire out the plant, and we should think there is a very great field for their work. They estimate walls built of their blocks to be 30 per cent. cheaper than brickwork and to possess very considerable merits over the latter material. They also publish several designs for cheap cottages and terrace houses which are estimated to cost less than £150, and as the estimate seems to be based on reasonable

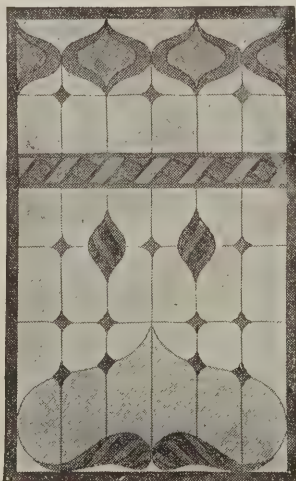
assumptions we shall be very interested to see the outcome of this innovation in building construction.

Simplex Fittings.—The Simplex Steel Conduit Co., Ltd., of Westinghouse Building, Norfolk Street, Strand, W.C., have just issued a small pocket list giving details of the latest additions to their system for electric wiring, as well as the prices of their ordinary and screwed material.

At the United Service Club in Pall Mall, some particulars of the re-decoration and improvement of which were given on p. 19 of our issue for last week, Mr. George Johnson, of 227, St. John's Hill, New Wandsworth, S.W., supplied and erected the new hand-power dinner, coal and wine lifts.

The Marble Mosaic Paving for the new sub-stations at Battersea, Streatham and Wandsworth now being completed in connection with the South London tramway system has been entrusted to the Atlas Stone Co., Ltd., of Cambridge, who carried out similar paving at the New Cross and Camberwell sub-stations for the London County Council, and had the satisfaction of having their work mentioned to the trade by the Works Department as examples of what was required for the new sub-stations above mentioned.

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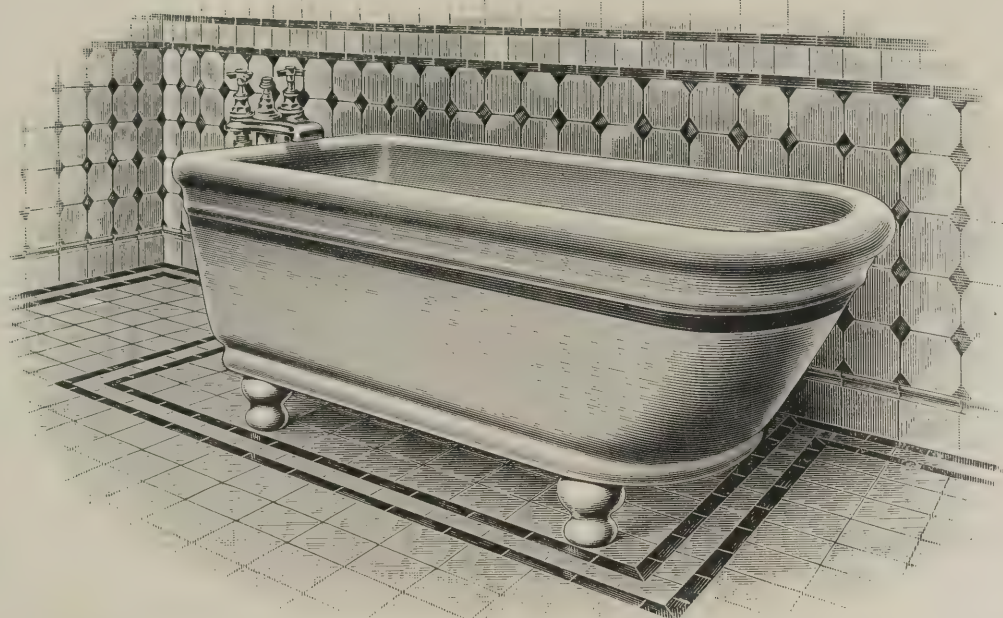
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Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

DURING THE WEEK ending January 12th seventeen failures in the building and timber trades in England and Wales were gazetted.

G. E. WREN, builder, Gillingham. Adj. Jan. 5th.
GREGG & SONS, builders, Formby. R.O. Jan. 6th.
J. W. HILL, architect, Bridgewater. Adj. Jan. 6th.
T. S. BRAMHAM, builder and contractor, Leeds. Adj. Jan. 2nd.
W. H. LISTER, builder's manager (late builder), Headingley (late Leeds). Adj. Jan. 1st.
W. BUTT, builder, London, E.C. Liabilities £20,713; expected to rank £680, estimated surplus in assets £6,981.
W. W. COOZE, painter and decorator, Newmarket. R.O. Jan. 3rd.
HARDMAN & Co., decorators' merchants, Blackburn. Adj. Jan. 3rd.
H. W. RAMSDEN & Co., decorators, Manchester. R.O. Jan. 3rd.
C. SEWELL, plumber and gasfitter, Abertillery. R.O. Jan. 3rd.
A. H. SLOCUMBE, builder, Teignmouth. First meeting, O.R.'s, Exeter, Feb. 1st, at 10.30. P.E., The Castle, Exeter, Feb. 1st, at 11.30.
W. J. FEEBEN, builder, Deane. First meeting, O.R.'s, Portsmouth, Jan. 18th, at 3. P.E., Portsmouth C.C., Jan. 29th, at 11.
F. J. FRENCH, builder, Bexley. First meeting, 115, High Street, Rochester, Jan. 22nd, at 11.30. P.E., Rochester C.C., Jan. 22nd, at 2.30.
T. B. LAMB, builder and contractor, Preston. First meeting, O.R.'s, Preston, Jan. 17th, at 11. P.E., Sessions Hall, Preston, Feb. 9th, at 11.
A. H. GOODALL, architect and surveyor, Nottingham. First meeting, O.R.'s, Nottingham, Jan. 17th, at 11. P.E., Nottingham C.C., Feb. 2nd, at 10.30.
F. H. CLARKSON, junr., plumber, Ipswich. First meeting, O.R.'s, Ipswich, Jan. 19th, at 2.15. P.E., Ipswich Town Hall, Jan. 19th, at 10.30.

New Companies.

BURYTHORPE SILICA LAND CO., LTD. Capital: £2,000.
DORSET CEMENT CO., LTD. Capital: £5,000.
DOREY BROTHERS, LTD., builders and contractors, Brentford. Capital: £55,000.
J. F. KEATINGE & SON, LTD., to acquire and carry on the business of J. F. Keatinge & Sons, Dublin, painters, decorators, glaziers, carpenters, &c. Capital: £14,000.

Coming Events.

Wednesday, January 17.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Mr. W. T. Oldrieve on "What H.M. Office of Works is doing for Historic Buildings in Scotland," at 8 p.m.

NORTHERN ARCHITECTURAL ASSOCIATION.—Mr. R. G. Hutton on "Jacobean Floral Patterns," at 7.30 p.m.

QUANTITY SURVEYORS' ASSOCIATION.—Adjourned Discussion on Mr. F. B. Hollis's paper, "Some Thoughts on the Quantity Surveyor, and his relation to the Building Owner, the Architect and the Builder," at 7 p.m.

INSTITUTION OF CIVIL ENGINEERS.—Students' Visit to South Metropolitan Gas Co.'s Works, at 2.30 p.m. Annual General Meeting at 7.45 p.m.

AUCTIONEERS' INSTITUTE.—Mr. E. J. Vaughan on "Taxation of Land Values," at 7.45 p.m.

Thursday, January 18.

SOCIETY OF ARTS.—Mr. C. E. Buckland on "The City of Calcutta," at 4.30 p.m.

SOCIETY OF ARCHITECTS.—Mr. Albert C. Freeman on "Planning of Crematoria and Columbaria," at 8 p.m.

Friday, January 19.

INSTITUTION OF MECHANICAL ENGINEERS.—Meeting at 8 p.m.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—Address by Mr. E. C. Middleton.

ARCHITECTURAL ASSOCIATION.—Mr. F. Lynn Jenkins on "The Consideration of Sculpture by Architects," at 7.30 p.m.

Monday, January 22.

LIVERPOOL ARCHITECTURAL SOCIETY.—Mr. T. T. Rees on "Architects and the Improvement of Cities," at 8 p.m.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.—Award of Prizes and Studentships. Messrs. J. M. Swan, R.A., Montague Fordham and Walter Gilbert on "Metalwork," at 8 p.m.

SURVEYORS' INSTITUTION.—Junior Meeting at 7 p.m.

Tuesday, January 23.

ARCHITECTURAL ASSOCIATION OF IRELAND.—Address by Mr. R. M. Butler, at 8 p.m.

Wednesday, January 24.

EDINBURGH ARCHITECTURAL ASSOCIATION (Associates' Section).—Mr. J. M'Kessack on "Architectural Photography," at 8 p.m.

Friday, January 26.

JUNIOR INSTITUTION OF ENGINEERS.—Prof. J. D. Cormack on "Notes on Boiler Trials," at 8 p.m.

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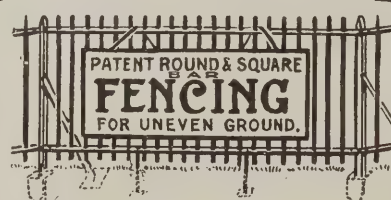
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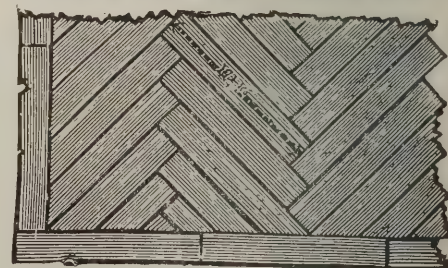
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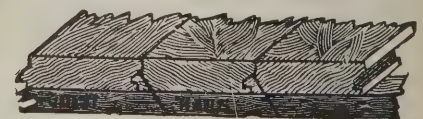
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MONTHLY

FIRE SUPPLEMENT

TO THE

BUILDERS' JOURNAL AND ARCHITECTURAL RECORD.

[Number 16. January, 1906.]

CEMENT-CONCRETE FOR THE PROTECTION OF STEEL IN BUILDINGS.

OF the extensive correspondence in the daily and technical press which has resulted from the Charing Cross Station catastrophe, the question of cement and cement-concrete as an anti-corrosive has been the subject of several writers. We allude to the matter in this supplement because cement-concrete plays such an important rôle in questions of fire-protection for modern buildings.

There can be no doubt, speaking generally, that cement-concrete of a suitable aggregate, carefully applied, forms an excellent fire-resisting covering for steel constructional work, both vertical and horizontal; and whilst it has long been advocated as one of the most suitable and economical forms of affording such protection, its advocates have, however, omitted to claim its consideration at the same time as an anti-corrosive. To put it more pointedly, cement-concrete has the advantage of meeting two of the most important disadvantages of steel frame construction—namely, its liability, if unprotected, to corrosion, and its liability, if unprotected, to failure under fire.

Both as a protection against fire and as an anti-corrosive it is naturally essential that concrete aggregates should be suitable ones, and that good materials only should be used, but given such good aggregates reliance may be safely placed in cement-concrete to meet both the points raised.

In another part of this supplement we deal with a fire test where a porous brick of a well-known English maker was tested as an encasement for steel stanchions, and very excellent results were obtained in three out of the four encasements under examination. A hollow air-space, however, was left between the stanchions and the encasements. It would have been wiser, both from the fire-resistive and from the anti-corrosive point of view, for this space to have been filled in with cement-concrete; for, given concrete and a porous brick facing of this kind, we could safely say that the highest grade of fire-resistance and protection against corrosion would be afforded, for the concrete would be an excellent protective in itself and would be supplemented (i.e. itself protected against damage) by an outer face of porous brick covering of the nature referred to.

When legislative measures are again drafted it would be well if the question of anti-corrosion received attention simultaneously with that of fire-protection, for the two safeguards should be dealt with together and under one scheme. For the present, however, seeing that legislation does not compel such protection, architects and building owners would do well to incur the extra expense of always protecting their steelwork at least with cement-concrete, and thereby assist both in the preservation of their property from the effects of our damp climate as well as from those of the possible fire risk.

FIRE-PROTECTION AND THE GENERAL ELECTION.

THE executive officers of the National Fire Brigades' Union, after consulting with the officers of the other institutions primarily concerned in matters of fire-protection, have decided to enquire of all candidates for Parliament whether they will support the introduction of a Bill in the House of Commons embodying the recommendations of the select committee on fire service matters of 1900, the idea being that it would be of the utmost importance to obtain the support of candidates to this Bill, at the present stage, so that the number of supporters would be known when Parliament meets.

The select committee in question was the outcome of a private Bill presented by Mr. Guy Pym, M.P., a member of the Council of the British Fire Prevention Committee, at the instance of the National Fire Brigades' Union; and as Mr. Guy Pym also happens to be a director of one of the old insurance companies, his advocacy was representative of quite a number of important interests. The recommendations of the select committee of primary importance to architects and surveyors, and more particularly surveyors who hold borough appointments, are the following:—

Some of the Recommendations:

"That an Act of Parliament should be passed repealing all previous Acts so far as they relate to fire, and conferring on fire authorities well-defined powers to provide fire brigades, and to make such other arrangements for protection against fire as they may deem necessary.

"That the local authorities of cities, county and non-county boroughs, and urban districts (defined in the report as 'populous places') should be the constituted fire authorities for those places, and that rural district councils should be constituted fire authorities for dealing with fire in villages, hamlets, and in all other parts of the country except 'populous places,' but that provision should be made to enable any parish council, having regard to the size and population of the parish, to be constituted a separate fire authority.

"That no licence should be granted to any theatre, music-hall or other place of public resort until the local authorities have satisfied themselves that suitable fire appliances and means of escape for the persons frequenting the same have been provided, and that those in charge of such appliances should be qualified men with no other work to perform whilst on duty as firemen.

"That in order to ascertain the extent of the loss of life and property occasioned by fire, fire authorities should be required to send to a Government department full particulars of all fires as they occur, and that annual reports should be published containing the information so obtained."

FIRE-INSURANCE OPINION ON FIRE-PREVENTION.

IN the Fire Supplement of November we dealt with the excellent annual review of fire and fire-insurance matters presented by the "Post Magazine" for 1904, and we also commented therein on the absence of reference under this editorial heading to any matters appertaining to fire-prevention. We suggested at that date that the time had come when the "Post Magazine," even if not seeing eye to eye with some of its older supporters, could quietly but energetically guide fire-insurance opinion in the direction of systematic fire-prevention, to the benefit of the community and of the fire-insurance world in particular. We are now pleased to observe in the record for the year 1905, published on the 6th of this month—a record which in its excellence even surpasses that of the previous year—the following reference to fire-preventive matters:—

"In recent years various local authorities and the public have begun to evince some interest in the question of fire-prevention, and we are encouraged to hope that results of the greatest benefit to the community will ultimately ensue. The necessity for efficient fire-extinguishing appliances and good available water-supply is now more generally recognized, thanks to the increasing efforts of insurance officials. The recent modifications in sprinkler rules, whereby allowances are now made where only one effective water-supply is available, should give an impetus to the use of sprinklers, of which something like a dozen varieties are in the market. The efforts of inventors are at last seriously directed towards the production of fire-resisting materials in construction, and we believe that such devices as wired glass, electro-copper glazing, and the various combinations of iron and cement in floors are rapidly coming into general use. It is not to be supposed that these contrivances can render any building 'fireproof.' Recent experience in America has rudely dispelled that conceit. But it is unquestionable that they afford a sound and reliable means of resisting the spread of fire, thus allowing the brigade to reach the scene of the outbreak before it has obtained complete mastery. This service is invaluable, and we do not doubt that if fire-resisting materials were more commonly employed, the rates would speedily be reduced. Fire-insurance will never be dispensed with, but it lies well within the power of the public to make it vastly less expensive."

The Board of Fire Underwriters, U.S.A.
—The Committee of Twenty of the Board of Fire Underwriters has been compiling a most valuable and independent report on the various cities of the United States from the fire point of view. These are now being issued seriatim and, speaking generally, they are not very complimentary.

BUDAPESTH FIRE CONGRESS REPORT.

WE have in an earlier Fire Supplement dealt with the excellent work done at the International Fire Congress held at Budapest. We have now received the official Congress Report, printed in four languages, which does every credit to its organizers, namely, the International Fire Service Council and the local executive of the Hungarian Fire Service Federation. The trouble taken to print the report in four languages is in itself creditable.

The report comprises a volume of about 400 pages, of which 100 are in the English language. Of the papers, some of which we have already presented and some of which we shall have occasion to reproduce, we would specially mention those on the great Baltimore fire of 1904; the modern theatre; the protection of flour mills from fire; and the impregnation of wood—all of which were read and discussed.

The attention accorded to theatre safety was considerable at this congress; and we would again call particular attention to the following resolution on this point which was unanimously carried: "That it is absolutely essential that all stage scenery and properties be rendered non-flammable in a reliable and permanent manner, and that all the constructional parts of a stage be of a fire-resisting character."

It is certainly interesting in a resolution of this kind, supported by men of eminence of many nationalities, to see the close discrimination between what is considered necessary for stage scenery and what is considered necessary for the constructional parts of a stage. The resolution states clearly that stage scenery and properties should be rendered non-flammable—i.e., what the Americans call "flame-proof"—that is, so treated that they will not catch, sustain nor spread fire, but simply carbonize if in contact with flame. On the other hand, for the constructional parts of a stage everything is to be of a fire-resisting character. This would mean the use of fire-resisting materials and systems of construction—that is, in other words, the metal-framed stage with incombustible flooring wherever possible, and where not possible at least with hardwood flooring 2 ins. thick.

The Chemistry of Fire-protection.

A second resolution in respect to theatres states "that the greatest attention should be accorded to the chemistry of fire-protection in the interests of fire-prevention." There cannot be the slightest doubt that chemistry has not yet been properly applied in the interests of fire-protection, and the sooner the chemists take up this subject the better for fire-prevention generally. There are chemicals in existence that it should be possible to apply practically and commercially to limit the risk of spread of fire, and this applies not only to the theatre but to many other classes of buildings where there are special risks of fire.

Turning to the debate on theatre safety and the use of flame-proof materials, we see one exceedingly valuable suggestion as to this question of the impregnation of materials and theatres, namely, that the chemicals used should be of such a character that the carbonizing of the treated material should be inodorous, or, in other words, that the smell of charring, which so often causes a panic, should be obviated. This indeed is a problem for chemists.

Generally the International Fire Service Council should be congratulated on the fact that its very valuable gatherings also result in some suitable reference book being issued regarding the latest results of the fire-preventive movement, and the latest effort of publishing one of these records in four languages is most laudable.

THEATRE SAFETY.

[We publish below some memoranda prepared by the late Chief Officer Giersberg, of the Berlin Fire Brigade, on the question of the protection of stage scenery from fire. These memoranda were prepared for the Budapest Fire Congress of 1904, but were not brought forward at the time owing to the Chief's ill-health. Herr Giersberg, one of the greatest authorities on theatre safety on the Continent, died shortly afterwards, and it is only now that these memoranda have become public property.]

The memoranda bring forward a feature not generally known in this country, namely, that as far as music-halls, assembly rooms, &c., are concerned, as distinct from theatres proper, there has been a regulation in force in Berlin since 1889 which requires establishments of this kind to have their scenery of incombustible materials, i.e., incombustible in the true sense of the word, such as asbestos board, asbestos cloth, metal and the like.

Herr Giersberg's argument is practically to the effect that asbestos cloth and incombustible material can be so woven and prepared so as to be suitable for scenery, the only disadvantage to his mind being the question of cost, which he puts down for Germany as double the cost of ordinary scenery. He, however, further argues that if incombustible materials are too expensive, it is quite possible to make theatre scenery thoroughly flame-proof by impregnation of existing scenery and the impregnation of the new materials required for future scenery.

At a time when we have but recently heard the chairman of the Licensing Committee of the London County Council point out the importance of rendering scenery flame-proof, and at a time when there has also been a circular letter issued to this effect by the Lord Chamberlain's department, the late Chief Officer Giersberg's contribution to the subject is certainly most interesting and valuable.

In the tenor of Herr Giersberg's memoranda it is also quite clear that he was not satisfied merely with the impregnation of the canvas used in scenery, but considered that the woodwork in and on the stage should be similarly impregnated, which includes a very considerable amount of thin scenery framing and profile work. As to the data he presented regarding the life of impregnated material, namely four to five years for old scenery impregnated and eight to ten years for new canvas impregnated, this is certainly something new. These figures are based, we believe, on certain private experiments which were made in the early 'nineties at Berlin. It would be indeed most valuable if the Fire Prevention Committee could be prevailed upon to undertake some tests in this direction, and would invite the public authorities to actively participate in their direction.—ED.]

FLAME-PROOF THEATRE SCENERY.

By Eric Giersberg, late C.O., Berlin
Fire Brigade.

(Free Translation from the German.)

In dealing with places of public entertainment generally the points which arise first and foremost in the mind of the fire expert are their construction, their fire-resisting qualities, their equipment, and the proper planning and arrangement of their exits. But in the case of the theatre there are also other essentials requiring the most careful attention from the fire point of view, and these are its arrangements for ventilation and the avoidance of all inflammable scenery or other decorative material.

As far as general places of public entertainment are concerned (such as variety theatres, music-halls, assembly rooms, &c.) the last-named point is already provided for under the Police Regulations of October 31st,

1889 (paragraph 74), which compel the use of incombustible materials, such as meta-sheeting, asbestos board, asbestos cloth, &c. This regulation has already proved very beneficial in many directions, and one cannot but wonder why it is not universally applied, both in the interests of the protection of human life and of property.

The stage manager and stage mechanist however, raise numerous objections to the adoption of the regulations in the playhouse. These objections are briefly as follows:—

- (1) That the same artistic effect in colouring cannot be obtained;
- (2) That there is an increase in cost by using tin, asbestos board, asbestos cloth or similar material;
- (3) That there is greater wear in such incombustible decorations; and
- (4) That the increased weight of incombustible scenery is impractical.

One might at first sight agree with the first objection had not time furnished proofs to the contrary in the use of lighting effects on the stage. Regarding the second point raised, a specially-prepared asbestos cloth should well answer the requirements, and any objections as to cost must, if necessary, be overcome. As to wear and tear, surely any scenery which has stood the wear and tear of a season may be deemed to have fulfilled its purpose, and no theatre worthy of the name would use old decorations without first renewing them. As regards the last objection, this should not be raised at all by the modern stage mechanist if his machinery is up to date.

As to the wood employed in the stage machinery, this should be rendered non-flammable by a process of impregnation. The wood loses none of its good qualities in the process, and its weight is only very slightly increased.

The use of hemp ropes should be prohibited, and wire ropes suitably protected should alone be employed, or, if at all necessary, the use of hemp should at least be cut down to a minimum. Thus it is almost possible to banish all inflammable material from the stage, and the stage mechanist is merely confronted with the question as to whether non-flammable materials are easily obtainable and what he is to do with the old material. Needless to say, such a change cannot be effected all at once, but wherever new plays are produced the scenic effects and decorations for same should be of non-flammable material only, and for the rest the old material might be rendered so in time.

The Berlin Police Regulations, dated October 12th, 1899, section 23, make it compulsory in all new buildings that the curtains, scenery and other stage effects be made of non-flammable material as far as this is possible. Since the above regulation has come into force, how much has been done to comply with it? We find but very little. Most of the theatres which should have rendered their scenic effects non-flammable as far as was possible have done nothing at all, and this either because the objections above raised have not been disproved, or owing to an apparent lack of funds for this form of improvement on the part of the various theatre managements.

As to what has been done in this direction of rendering scenery non-flammable outside Germany, we find that the Governor of Lower Austria, under a decree dated July 1st, 1882, ordered that all scenery and other stage effects (excepting furniture) must be rendered non-flammable before being used. These regulations have been in force with marked success in Austria for over twenty-five years, and, with slight modifications, they have also found adoption in the theatres of Leipzig and Dresden. In accordance with a regulation of the Vienna Town Council, under date April 19th, 1883, theatre managers have to make formal application for an official inspection

of all new scenery at least three days before it is intended to use the same on the stage.

What has been accomplished in Austria could easily be done in other countries. And the regulations, besides enforcing the use of non-flammable material for new scenery should also include a clause for the rendering "non-flammable" of old materials by a process of impregnation.

Cost of Impregnation.

Objections are raised against the costliness of impregnation, its bad effect on colouring and the bad effect of the dust arising out of same on the voices of the artists and the general health of the stage hands.

As to the cost of impregnation, the table below will give some information. As to the bad effect on the colours, this is easily remedied. The last-named objection falls to the ground if we take into regard the experience of the theatres before named.

The modern process of impregnation has attained such perfection that any objections to it are scarcely justified—in particular the one of colour, as, if the colouring is applied after impregnation, it loses none of its splendour or brilliancy. If the regulations do not enforce the use of absolutely fire-resisting decorations they should provide for the impregnation of all decorations by means of a recognized and well-tested process. In view of past experience and experiments the day may not be far distant when it will be possible to render hemp ropes non-flammable by special chemical process, and if it should not be possible to render them absolutely non-flammable the submission of them to a process of this kind will at least prevent their being the means of spreading a fire.

It goes without saying that the effect of such impregnation on materials, ropes, &c., which are handled very much and folded, will only be a temporary one, as the process does not change the material in any way, but merely provides it with a fire-resisting coating. From experience it has been found that supplementary impregnation will last some four or five years, whilst, on the other hand, materials treated before they have the colouring applied will retain their fire-resisting properties for as long as eight to ten years.

The table below furnishes some data regarding the cost of non-flammable decorations in a theatre of medium size.

The following would approximately be required for the equipment of the stage:—

- (a) Curtains, 120 sq. m.
- (b) Out-cloths, 120 "
- (c) Wings, 175 " (8, of about 22 sq. m. each).
- (d) "Borders," 175 " (8).

Total 590 sq. m.

The figures in the table below are based on a stage equipment requiring some 600 sq. m. of canvas per scene:—

Description of material.	Price per sq. m.	Total cost of 600 sq. m.	Total cost of equipping five scenes requiring 600 sq. m. each.
Canvas not specially treated - - -	marks. 2'50	marks. 1,500	marks. 7,500
Impregnated canvas - -	2'80	1,680	8,400
Cost of the supplementary impregnation of existing scenery - - -	0'30	180	900
Asbestos cloth - - -	5'00	3,000	15,000

NOTE.—1 mark equals approximately 1 shilling.

The above figures will show that the price of incombustible material (*i.e.*, asbestos cloth) is double that of ordinary materials, and thus these prices would need careful consideration, as otherwise many theatres would be quite unable to afford such material. If, however, the other expenses of the theatre are borne in mind, such as salaries paid, &c.,

one would feel inclined to think that it is possible to meet the demands imposed by regulations to render the theatre safe against fire by taking the necessary safeguards in providing incombustible scenery.

As to the difference of cost between ordinary canvas and treated canvas, it is infinitesimal. Even the cost of treating existing scenery is but small in Germany. Thus, for instance, the Schiller theatre in Berlin has about thirty-five plays on its repertoire with an average of five different scenes each, and it may be taken that to render all this scenery non-flammable an expenditure of something like 32,000 marks (£1,600) would have to be incurred. The scenery so treated would, however, be good for quite five years, and thus this sum of 32,000 marks could be distributed over that period and would only mean an annual expenditure of £320. The minor decorations and properties have not been taken into account in this estimate. Further, no account is taken of transparencies. These as a rule, however, only have small surfaces.

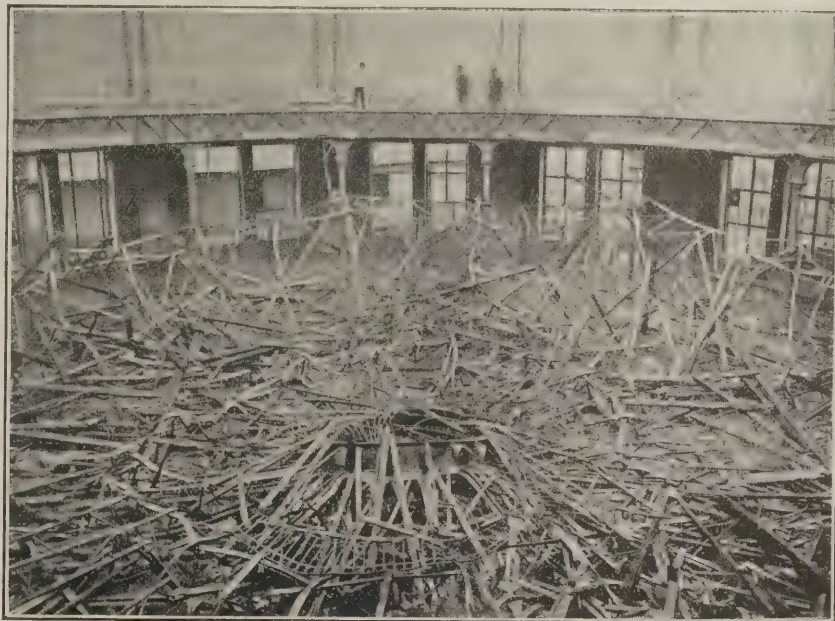
To sum up: It is of the greatest importance to do all that is possible to render the theatre safe as far as its scenery is concerned, and even to enforce the necessary regulations

to that effect, even if (what is highly improbable) the beauty of the scenery be slightly impaired. Otherwise the best of planning, the good arrangement of exits and careful construction would be of little assistance in the event of an outbreak of fire.

THE VIENNA PANORAMA FIRE.

THE accompanying illustrations relate to a fire which took place some years back, but it is so instructive as indicating the extraordinary effect of fire upon unprotected steelwork that we reproduce the photographs to serve as object-lessons of what even a small amount of inflammable material will do in wrecking a steel building where no suitable protection is provided.

The total amount of inflammable material in this building comprised the usual canvas panoramic view hung round the panorama walls, circular in plan; further, a platform and staging of woodwork from which the visitor viewed the panorama; and, lastly, a few properties of the usual canvas and wood type common to panorama effects. The fire immediately caused the collapse of the roof, and the wreckage resulting from this collapse is practically unique.



THE RUINS OF THE VIENNA PANORAMA FIRE.



FIRE AT CORBETT'S IRONWORKS SHREWSBURY, ON NOVEMBER 20TH, 1905.

RECENT FIRES AT SHREWSBURY.

SHREWSBURY has had some serious fires during November and December, namely, the fire at Corbett's ironworks and that at the well-known Shrewsbury school.

We reproduce herewith two photographs of each of these fires. Regarding the Shrewsbury school, it was the roof of the main building that became ignited, and for all practical purposes the roof was burnt up and much damage done to the building. A photograph of one of the large rooms in the roof shows, however, how the heavy timbering resisted the flames, and this photograph is an example of the often-told lesson that hardwood is an excellent fire-resistant.

As to the fire at Corbett's ironworks on November 20th, this example is presented as an instance of an entire "burn out" or gutting of important factory premises, owing mainly to lack of suitable construction.

It is of course argued by many that the factory owner is covered by his fire insurance policy, but a burning-out of this description, which means entire reconstruction of a factory and re-equipment, occupying a considerable period, cannot be discounted by any insurance premium, covering the actual values of the materials in stock and the time lost in the disarrangement of business, and generally also the trade loss during the interval.

EXISTING BUILDING REGULATIONS FOR PROTECTION FROM FIRE, WITH SUGGESTIONS.

By **JAMES SHEPPARD, A.Inst.E.E.,**
Insurance Surveyor.

(Concluded from p. 45, Supplement No. 14.)

MOST by-laws require the building of a parapet to any external wall of a new building that may be less than 15ft. distant from any other building. The London Building Act contains no provision of this nature, but requires the eaves to be of "fire-proof" material.

The large extent of window and other openings in external walls are responsible in crowded districts for many conflagrations. The London Building Act restricts the area of such openings in external walls above the ground storey to one-half the whole area of such part of the wall. This or a more stringent regulation has been in force for nearly fifty years, but buildings in many of the narrow streets of London bear evidence that it has been frequently evaded. The Glasgow Building Act, 1900, contains similar restrictions on the area of openings in external walls. Other by-laws simply state that where the area of openings in an external wall exceed one-half the whole area of the elevation of the wall, sufficient piers must be provided. In nearly all provincial

towns, therefore, the spread of fire is in no way checked by a limitation of the extent of openings in external walls.

Timber and Party-walls.

The ends of timbers in party-walls are required in most by-laws to be at least $4\frac{1}{2}$ ins. from the centre of the wall, but in Glasgow and some other places beams may be fixed in party-walls with $4\frac{1}{2}$ ins. only between their ends, and the Manchester by-laws allow a cast-iron beam box, if having a solid back, to be placed on the centre line of a party-wall. If two such boxes are placed back to back, as appears to be allowed, the distance between the ends of wood beams of different buildings would not be more than 2 ins., or at most 3 ins. This and $4\frac{1}{2}$ ins. only of brickwork between the ends of beams cannot be considered to be sufficient to prevent fire extending from one building to the other. It is desirable to provide that beams, whether of wood or iron, resting in party-walls should be so arranged that in falling during a fire they would not exert leverage on the wall which might displace a large portion and allow fire to pass.

Door and Window Frames.

The London Building Act, 1894, allows door and window frames to be fitted flush with the face of any external wall, but the regulations of most other cities and towns require such frames to be set back in reveals 4 ins. at least from the outer face of such wall. The fixing of hollow wooden sash frames flush with the wall, as now allowed in London, is likely to assist the spread of fire in narrow streets and light areas.

Hollow Partitions.

If combustible hollow partitions are allowed—which they are not in some by-laws—it is in every way desirable that the open space inside any such partition or between the joists in any wall should be stopped with brickwork or other incombustible material at every floor and ceiling. This is a valuable provision contained in the Model and many other by-laws for retarding the rapid spread of fire, but it has no place in the London Building Act, 1894.

The London Building Act, s. 62, however, contains provisions requiring that the storey constructed in the roof of any new domestic building, the floor of which is more than 60ft. above street-level, should be constructed of fire-resisting material, and suitable means of escape in case of fire provided for persons dwelling or employed therein; and s. 153 (3) of the Factory and Workshop Act, 1901, empowers the L.C.C. to make by-laws for means of escape in all factories and workshops, whether exceeding 60ft. in height or not.

Combined Trade and Domestic Buildings.

Buildings exceeding ten squares in area (s. 74) used partly for trade or manufacturing purposes, and partly as dwellings, are required to have the dwelling portion completely separated from other portions by fire-resisting floors and walls. Why this very necessary provision should only apply to buildings exceeding ten squares in area is not clear; experience has frequently shown that the danger to life in buildings having such double occupation is quite as great in small as in larger buildings.

Buildings exceeding twenty-five squares in area containing separate tenements must have the floors and principal staircases of fire-resisting material.

Public buildings and every building constructed or adapted to be used as dwellings for separate families exceeding in capacity 125,000 cub. ft. (s. 68) are required to have the floors of the lobbies, corridors, passages and landings, and also the flights of stairs, constructed of and supported by fire-resisting material. In such buildings it is as necessary to require that all floors be constructed of fire-resisting material as with buildings exceeding twenty-five squares in area.



INTERIOR OF CORBETT'S IRONWORKS, SHREWSBURY AFTER THE FIRE.

The foregoing rules, distributed over the London Building Act, would be much clearer if collected under one section.

A Bill ordered by the House of Commons to be printed July 15th, 1902, proposes to repeal the limit of forty persons contained in the Factory and Workshops Act, 1901, and also to give district councils power to regulate the position and nature of enclosing lift wells, holes or shafts—air shafts and any other shafts or flues by which flame or smoke may be drawn or induced to pass from one part to another part of a factory or workshop. This is a very necessary provision, otherwise a sudden rush of smoke from a fire on other floors to the floor on which persons are employed might prevent their access to escapes that may have been provided. It is to be hoped that the Bill will become an Act.

In Glasgow, if lifts are enclosed, such enclosures must be of fire-resisting material, protected at the top or carried through the roof.

Regulations for enclosing escape stairs in accordance with provisions in the Factory and Workshop Act, 1901, will assist in retarding the spread of fire, but no corresponding regulation can be made at present for trade and warehouse buildings which are outside the Factory and Workshop Act.

Aids to the Spread of Fire.

The rapid spread of fire is greatly facilitated by the following:—

Open stairs and lifts from floor to floor; shaft through floors; holes for pipes through floors.

Well-holes through floors.

Wood linings to walls and ceilings.

Concealed spaces behind linings and casings, between ceilings and floor boards, and about roofs.

Window and other openings opposing across narrow streets and passages or in lighting areas, or near each other in any direction.

Timber roofs having a steep pitch, covered only by slates, lead or zinc.

What can be done.

All the foregoing defects can be readily met, and should require to be so in all districts crowded with buildings of considerable size, stocked with inflammable goods.

Stairs, lifts and shafts can be enclosed with fire-resisting partitions and doors, and all holes through floors protected.

Well-holes and other openings through floors can be fitted with sliding shutters.

Wood linings to walls and ceilings can be replaced with plaster.

Dangers arising from concealed spaces between ceilings and floor-boards can be lessened by pugging.

Windows and openings opposing or near each other can be protected by revolving or other shutters or by metal frames and sashes glazed with wired glass.

Roofs can be covered with tiles, or, preferably, constructed entirely of incombustible material.

The Smoke Difficulty.

Practical firemen of the old school usually favour provision for the escape of smoke, and have even expressed preference for a light roof that will quickly burn off and allow smoke and heat free vent, but in crowded districts this allows of the rapid spread of fire to surrounding buildings. The smoke difficulty may be to a large extent overcome without assisting the spread of fire by the use of water spray for throwing down smoke, smoke helmets and searchlights.

Large old buildings filled with inflammable goods, surrounded by buildings erected in accordance with present regulations, may involve the destruction of a whole district; all such buildings should be required to conform to existing by-laws before the expiration of five years from the date of formal notice to carry out necessary improvements.

Owners and occupiers of buildings in-

volving serious danger to their neighbours should not be allowed indefinitely to jeopardize the safety of surrounding property. Throughout France the occupier of premises where a fire originates is liable for any damage that may result from such fire to the property of his neighbours, unless he can show that the fire was caused by some structural defect over which he had no control, in which case liability falls on the owner of the building. The application of a law of this nature places the burden on the right shoulders and encourages the erection of slow-burning buildings, with the result that conflagrations involving several separate buildings are very rare in Paris, if not altogether unknown, and the same may be said of other Continental cities.

(e) Administration of Building Regulations for Protection from Fire.

The settlement of questions that arise in the application of building regulations are usually referred in the first instance to police magistrates, and decisions are sometimes given which, if meeting the letter of the provisions, are strangely at variance with their general bearing and intention. A lamentable instance of this is shown in connection with the great Tooley Street fire of 1861. A building involved in that fire, which had been recently erected, considerably exceeded the limit of 216,000 cub. ft. applicable to such buildings. The case was taken by the district surveyor before the magistrate, who considered that the horizontal divisions formed with brick arches or cast-iron girders about 13ft. apart supported on iron posts constituted party-walls and met the requirements of the Act; notwithstanding the utter collapse of the above building under the action of fire, the magistrate's decision continued to be acted upon, resulting in the erection of many most dangerous buildings, until 1892, when a case was taken before the higher courts and a decision was given in 1894 that a so-called fireproof floor was not a party-wall within the meaning of the Act. The illegal building in Tooley Street may have contributed to the disaster which caused the death of James Braidwood, one of the most courageous and successful firemen of the nineteenth century. Mr. Braidwood in May, 1856, read a very valuable paper before the Society of Arts on "Fires, the best means of preventing and arresting them, with a few words on fireproof structures"; he then expressed the hope that the new Building Act (Metropolitan Building Act, 1855) which had come into force on the 1st January previously would repress some of the great evils that had arisen, but expressed the fear that the meaning would "be subverted by some such subterfuge as destroyed the efficiency of the previous Act." In this he was truly prophetic. The present London Building Act, 1894, is in many respects less satisfactory than the Act of 1855, and the tendency of magistrates' decisions has been to further weaken some of its more important provisions. A separate court assisted by assessors, similar to the practice adopted in marine cases, is needed for the consistent application of the London Building Act.

Builders' Support Needed.

To secure full compliance with the provisions of building regulations it is necessary to have the cordial support of the builder and his foreman, who have hourly control over the execution of the work. In Vienna, with the view of obtaining such assistance, all builders and their superintendents are required to obtain official certificates of efficiency for the building operations they undertake, and are held responsible for any work contrary to regulations.

In May, 1892, the United States Consul-General at Vienna, reporting to his Government on the subject of fire and building regulations, stated that "There is no case

known in Vienna where a conflagration has extended beyond the building in which it originated, and even hardly any cases are known where a fire extended beyond the floor on which it originated." "This is prevented by the solidity of the buildings, by strict fire regulations, and by a pretty-well-trained fire department." "The conflagrations at the Ring Theatre and the Stadt Theatre in 1882, and incendiary conflagrations amongst the timber yards near the Danube Canal, did not extend to adjoining property." The application of similar regulations to other cities may be expected to give corresponding results.

Fines.

It is admitted by those having the widest experience that the exercise of reasonable intelligence, care and forethought would prevent the occurrence of nearly all fires. This being an undoubted fact, it would be only just to require occupiers of premises where fires occur to pay a suitable fine adjusted on such scale that the total would meet at least half of the expenses of maintaining a brigade and appliances for extinguishing fires. If the occupier is able to prove that the fire originated from some defect in the construction of the building of which he could have no knowledge or control, the owner of the building should be liable for the fine payable in respect of the fire. In this way part at least of the burden caused by avoidable fires would be equitably distributed.

Reports.

It is necessary under the Factory and Workshops Act, 1901, for occupiers to report all accidents that may happen in connection with their premises to which the Act applies causing loss of life or bodily injury, preventing any person from being employed on their ordinary work for five hours on any one of three working days next after the occurrence of the accident.

Fires cause serious danger to life and limb, and it is desirable to require that the occurrence of all fires, however slight, should be included in the above reports, recording the date of fire, the use made of the portion of premises where fire originated, nature and extent of damage, cause or probable cause of the fire, and how extinguished. The simple fact that reports of this character must be made would have a beneficial influence over a great number of premises throughout the country, and tabulated statements of these fires would be of great value, while the additional expense would be nominal.

(2) *Regulations for the transit, storage and use of specially inflammable or dangerous substances, and the mode of warehousing merchandize and general goods.*

Regulations of this nature are chiefly, if not altogether, confined to the Explosives Act, 1875, and Explosive Substances Act, 1883, and the Petroleum Acts, 1871, 1879 and 1891. These Acts apply only to actual explosives, to petroleum, spirit, viz., any mineral oil having a flash point (Abel test) below 73 degs. Fahr., and since 1897, by Order in Council, under section 14 of the 1871 Act, to carbide of calcium; but many other substances, although comparatively harmless under normal conditions, lead to most disastrous explosions when burning with other materials. Experience has frequently shown this to be the case with nitrates, chlorates and substances containing an excess of or having a special affinity for oxygen; and it is certainly desirable to place the storage of all such substances under suitable control. Celluloid, extensively used for all kinds of purposes, is also a dangerous substance.

Petroleum oil having a flash point over 73 degs. Fahr., when stored in large quantities is a source of great danger, in the event of fire unless proper provisions are made to prevent outflow; and serious explosions have



SHREWSBURY SCHOOL FIRE.

occurred by the vapour slowly given off from petroleum having a flash point considerably over 100 degs. Fahr. mixing with air in the enclosed space of huge tanks, being fired by a lightning flash notwithstanding special precautions to guard against this danger. A case of this kind occurred at Harburgh in 1895, when the top of a steel tank 70ft. in diameter was torn into sections and scattered over a space within a radius of 300 yds. Many such tanks exist in different parts of the United Kingdom, some of them surrounded by numerous dwellings, and the country may yet have to regret the delay in passing the Inflammable Liquids Bill. Experience has shown that further regulations are needed for the control of the transit of mineral spirit.

Any inflammable liquid or substance that becomes liquid under a moderate heat, as tallow and wax, if stored in the upper part of a building, is a source of danger to life in case of fire.

Fibres and other goods which expand when soaked with water—and this occurs in case of fire—seriously endanger life if stored against walls.

Regulations should be made to guard against the foregoing and similar dangers, if only in the interest of the brave firemen, salvagers and others whose duty it may be to attend fires. This is a matter requiring serious attention.

- (3) *Provision of suitable water-supply, with appliances and organization for the early discovery and extinction of fire, and the saving of life and property, including the preparation of annual returns of the works of fire brigades.*

The question of water-supply and fire brigades covers a very wide field, needing a separate paper for full treatment.

Local authorities have powers to require the fixing of fire-plugs or hydrants (at their own expense) on the mains of most water companies, but very little, if any, power over the size of mains or the pressure of water. This difficulty is avoided where the local authority provide a public water-supply for their district.

Local authorities have power to maintain brigades and appliances for extinguishing fires, and parish councils may unite with other local authorities for this purpose.

It is an important part of fire-brigade work, especially in the crowded districts of great cities, to make suitable provision for the early discovery of fire, and the instant use of first-aid extinguishing appliances, at the same time calling the brigade. In the absence of such provision it frequently happens that the most efficient and powerful brigades are unable to prevent the destruction of extensive premises, and at times are powerless to prevent a fire extending to all surrounding properties.

- (4) *The preparation of annual returns clearly showing the work of the brigade, with the nature of successes and failures in different districts.*

Returns of this nature are needed for the maintenance of due efficiency. In this respect many of the provincial brigades are far in advance of the metropolitan brigade. The annual reports of the latter, although admirable as far as they go, fail to show whether the brigade is more or less successful now than in past years.

The tables comparing the percentage that so-called "serious fires" bear to the total number of fires in different years are misleading, because the totals include numerous fires extinguished without assistance from the brigade, and such small fires now amount to about half of the total number. The standard for a "serious fire" has also been gradually increased.

To afford a clear statement of results achieved by a fire brigade it is desirable to tabulate information on the following points:—

- Number of fires included in the total extinguished without assistance from the brigade -
- Number of fires extinguished by the use of brigade buckets only -
- Number of fires extinguished by the use of brigade buckets and hand pumps only -
- Number of fires at which it was necessary to use one stream from branch pipe only -
- Number of fires at which it was necessary to use two streams from branch pipes only -
- Number of fires at which it was necessary to use three streams from branch pipes only -
- Number of fires at which it was necessary to use four streams from branch pipes only -
- Number of fires at which it was necessary to use five streams from branch pipes only -
- Number of fires at which it was necessary to use more than five but under ten -
- Number of fires at which it was necessary to use more than ten but under twenty -
- Number of fires at which it was necessary to use more than twenty but under thirty -
- Number of fires at which it was necessary to use over thirty -

Fires should also be classed according to the quantity of water used and the time occupied in extinguishing them.

Information of this character given for different districts of large cities would be of great value, showing when alteration of existing arrangements may be needed.

- (5) *Provision for the discovery and punishment of persons causing fires wilfully or by gross negligence.*

The only law having a definite bearing on this subject is the City of London Fire Inquest Act, 1888, which gives powers to the coroner for the City of London to hold an inquest on any fire if either the Lord Mayor of London, the Lord Chief Justice of England, or one of His Majesty's Principal Secretaries of State, or the coroner, is of opinion that proper cause for such enquiry exists. Some important enquiries have been held under the powers of this Act, and valuable verdicts given, but there appears to be no power, other than public opinion, to secure the adoption of improvements shown to be necessary.

For daily application some enquiry far simpler than a formal coroner's inquest is needed. It is very desirable that the police supervision and powers in connection with fires should be considerably enlarged, and that in addition to simply reporting the occurrence of fires at which members of the force attend, as at present, the police should appoint suitable officers to make special examination and preliminary enquiry and report to the Police Commissioner, or chief constable of the district, who should have authority to order further enquiry or take such action as he considers desirable in the interest of justice. In this way the recurrence of fires on the same premises or on property held by the same persons would be recorded with other valuable information, and many fraudulent fire-raisers brought to justice. 8†

NOTE.—Since the above was written the Model By-laws referred to have been revised, but the provisions relating to protection from fire have not been in any way improved.



SHREWSBURY SCHOOL FIRE.

FIRE TESTS.

STANCHION ENCASEMENTS.

NO more important subject could come up for investigation at the present moment than that of suitable encasements for stanchions, for it is on the stanchions that so much of the weight of a building nowadays rests, and the slightest failing of these supports brings down a structure.

Up to the present the subject has not yet had the attention it should command, being obscured by questions appertaining to floors, partitions, doors, &c., but a commencement has been made with a test of four different column encasement put forward by Mr. Jabez Thompson, of Northwich. The principal object of a test with a column encasement must necessarily be its resistance against fire at high temperatures. Further, there is the question of conductivity of the material used for the encasement. As to the actual effect as to the temperatures which are reached in the metal of the stanchion so encased, it is of value to know the exact temperatures; for from these the decreasing strength under different loads and at different temperatures can be easily ascertained. The encasements under test and the results

upon each are best described by extracts from the official report (No. 104), followed by the summaries of the results.

The Encasements.

Stanchion No. 1 was encased with "Terrawode" bricks 9ins. by 4 $\frac{3}{8}$ ins. by 3ins. The outside measurements of the encasings were 13 $\frac{1}{2}$ ins. by 15 $\frac{3}{4}$ ins. This was a square encasement, unplastered, 4 $\frac{3}{8}$ ins. thick.

Stanchion No. 2 was encased with square "Terrawode" tiles 2 $\frac{1}{2}$ ins. thick, in four sections, having a continuous joggle at each vertical joint, the tiles as delivered measuring 9 $\frac{1}{2}$ ins. by 12ins. The outside measurements of the encasings were 12ins. by 12ins. This was a square encasement, unplastered, 2 $\frac{1}{2}$ ins. thick (0635 m.).

Stanchion No. 3 was encased with circular "Terrawode" tiles 3ins. thick, in two sections, having a continuous joggle at each vertical joint, the tiles measuring 14 $\frac{1}{2}$ ins. outside diameter, the height of the tiles being 12ins. This was a round encasement, unplastered, 3ins. thick.

Stanchion No. 4 was enclosed with circular "Terrawode" tiles 2 $\frac{1}{2}$ ins. thick, in two sections, having a continuous joggle at each vertical joint, the outer diameter of the tiles

measuring 13 $\frac{1}{2}$ ins., the height of the tiles being 12ins. Metal cramps were inserted in the beds at each joint. The outer face of the tiles was grooved for plaster and plastered with three coats of lime and hair-mortar. This was a round 2 $\frac{1}{2}$ ins. encasement, plastered, in all 3ins. thick.

The casing in each instance was bedded and jointed in mortar made with plaster-of-Paris, powdered fire-clay and sand, in equal proportions. The spaces between the stanchions and inner face of the casing was not filled in.

The height of the stanchions exposed to the fire was 8ft. 10ins.

Summary of Results.

Stanchion No. 1 (Square).—The angles of several of the bricks encasing this stanchion split off or cracked, and the face of some of the bricks were splintered. The maximum temperature recorded between encasement and stanchion was 310 degs. Fahr. after 150 minutes.

Stanchion No. 2 (Square).—The tiles encasing this stanchion commenced to split at the angle joints after 45 mins.; this increased during the test, and some of the tiles were displaced, partly exposing the stanchion. The maximum temperature recorded between encasement and stanchion was 1,100 degs. Fahr. after 150 mins.

Stanchion No. 3 (Round).—Four of the tiles cracked vertically during the test. The maximum temperature recorded between the encasement and the stanchion was 500 degs. Fahr. after 150 mins.

Stanchion No. 4 (Round).—Surface of plastering flaked off. A local bulge of about 1in. for a height of 18ins. appeared in the plastering of the encasement 2ft. above floor level. The maximum temperature recorded between the encasement and stanchion was 590 degs. Fahr. after 150 mins.

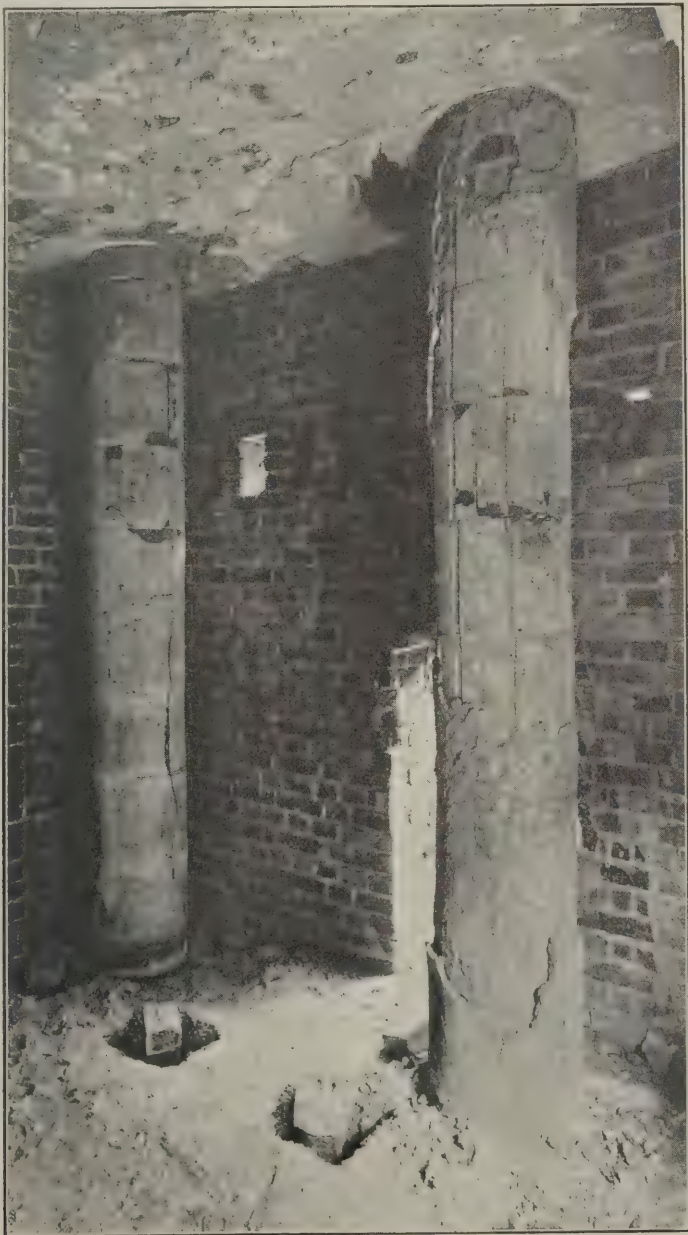
The application of water washed off much of the plaster remaining on the encasement to stanchion No. 4, but had no effect that could be seen on the encasements to stanchions Nos. 1, 2 and 3. The steel stanchions in each case remained in position apparently unaffected.

Comments by Mr. James Sheppard.

In the prefatory note to this report Mr. James Sheppard gives the following as his views on the test, and architects should note well the lessons of this test, which are so strongly in favour of encasements circular on plan:—The encasements under test for 2 $\frac{1}{2}$ hours were of similar material to that used in the partition under test for four hours (as recorded in the Committee's publication, No. 84), and demonstrated that materials encasing an independent metal stanchion are subjected under the action of fire to far greater strain than when used in other positions. The test also proved that circular forms offer greater resistance to heat and fire than that afforded by similar material having exposed angles.

CEILING TEST.

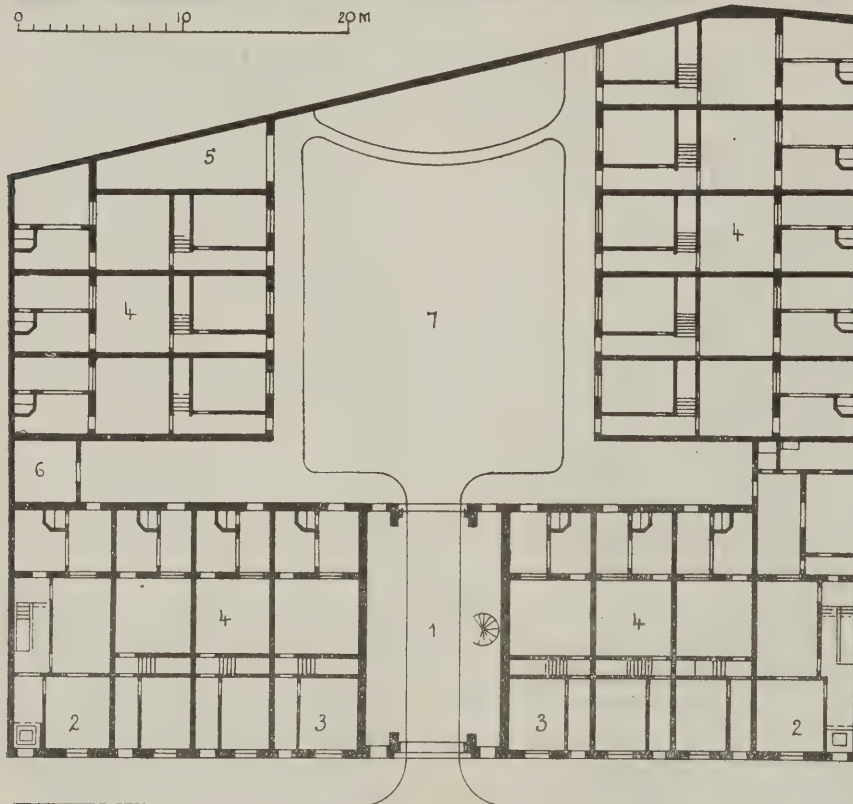
Report 105 issued by the Fire Prevention Committee deals with a test of "Kulm" pumice ceiling slabs intended to afford temporary protection against fire, the result of which was that the fire and water test was withstood for a period of three-quarters of an hour at temperatures ranging up to 1,600 degs. Fahr., whereby the classification temporary protection was attained. The idea of utilizing pumice slabs for ceiling protection is the provision of protection against fire from below in existing buildings which have wood joist floors, and where the entire removal of these and the substitution of solid fire-resisting floors would be impracticable. The test is certainly an important contribution to the subject of protection against fire in existing premises, a most important matter having regard to the legislative enactments as to the separation of different risks in existing buildings.



Stanchions Nos. 3 and 4 after Test.



0 10 20 m



RUE DE LONDRES

THE HARBOUR FIRE STATION AT GHENT.

PROGRESS DURING THE YEAR.

The British Fire Prevention Committee has made further progress during the year 1905, and the following are some par-

ticulars. The membership has increased during the year by 75 and the subscribers (non-members) by 35.

During the year the testing station was

removed to Regent's Park and equipped with additional testing chambers, &c., the removal and extensions involving a further capital expenditure of over £1,100.

The testing operations for the year have increased from 6 to 17. During these 17 testing operations, the following subjects have been under investigation:—4 floors, 1 ceiling, 4 partitions, 1 wall, 4 column encasements, 5 casements, and 4 skylights with special glazing, 2 doors, 1 shutter, 7 concrete aggregates and one fire-alarm.

The Committee rendered considerable assistance in matters appertaining to the amendment of the London Building Act, and has been in close touch with kindred societies at home and abroad for interchange of experience as to joint action on matters relating to fire-prevention.

A competition for the production of a useful fable for children, setting forth the dangers of fire, has been dealt with.

The Committee have suffered severely through the deaths of distinguished members and office-holders, the deaths during the year including:—Messrs. Thomas Blashill, F.R.I.B.A., H. H. Collins, F.R.I.B.A. (members of council); Mr. Ellis Pritchett, F.R.I.B.A. (member of executive); Dr. Edward Atkinson, LL.D., of Boston, U.S.A., and Chief Officer Giersberg, of Berlin (hon. members); Sir Henry Irving, LL.D., Mr. Ray, late manager, Hand in Hand Insurance Co., and Lieut.-Colonel Dixon, V.D. (members).

GHENT FIRE STATION.

THIS new fire station fulfils a somewhat different purpose to fire-stations generally, inasmuch as its primary object is to house a staff of men who can be brought into operation with portable appliances and those which are already in position. Thus the station is primarily a barracks rather than a fire appliance dépôt in the ordinary sense.

A special feature of the station is that instead of giving a fireman a few rooms in the form of a flat or tenement, each fireman has a miniature cottage or house, comprising two floors, very compact in itself and giving them a feeling of far greater comfort and independence than would be the case when he is housed in the ordinary way. These cottages are arranged so that some front the main thoroughfare and some front an open mutual courtyard. The central feature of this block comprises a kind of fire-appliance room on street level with a gymnasium above, the gymnasium being accessible from the appliance room.

As will be seen from the drawing, the engine-room is marked 1. The two larger of the cottages are given to the station officers or foremen, and these are marked on the drawing 2. The two senior firemen each have cottages slightly superior to the firemen's, and these are marked 3.

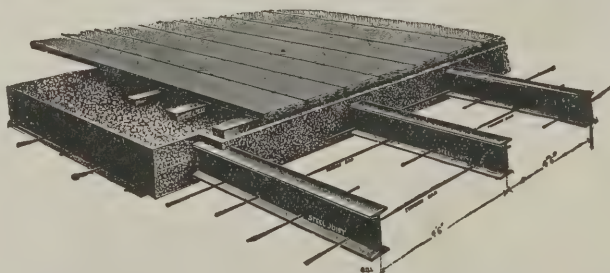
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THE BUILDERS' JOURNAL

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Park Architecture. In the Metropolis the various parks and open spaces are under the control of a separate department of the London County Council, but in the provinces the borough surveyor generally has charge of these necessary "lungs" of towns. Under either, however, they are not in the right hands. The distressing way in which formal features such as bandstands, shelters and ponds are placed in the midst of informal surroundings without any attempt to lead up to them by a formal garden treatment will occur to everyone; and when, indeed, a formal treatment is attempted the outlines are often ugly, while the architectural details supplied by borough surveyors are simply abominable. In a few towns the city architects happily have the designing of the open spaces, but where there is no architect's department the work of laying out parks, gardens or recreation grounds should be put into the hands of a local architect. The London County Council is, however, a special sinner in this respect. It has an architect's department possessing a good deal of talent, yet it does not seek its aid. A great deal of improvement has been effected, it is true, in the open spaces of London, but not in regard to beauty of laying-out. Now is the season when some needful alterations could be made. Such an

opportunity of enhancing the appearance of our public places ought not to be lost. The fact cannot be over-emphasized that it is a mistake to leave these matters to the tender mercy of the ordinary park gardener, because he is not trained sufficiently to know how the work should be carried out, his ideas being too limited and narrow to embrace the larger aspect of landscape gardening.

Building without a Builder. UNDER this heading a writer in the current issue of the "World's Work and Play" deals with the new school of architects whose work has excited a considerable amount of interest for many years past, namely, the school of Professor Lethaby, Mr. E. S. Prior, and others whose names will occur to our readers. The ideas of this school are not new. They were advocated by Pugin and the Gothic Revivalists, and not least by Ruskin. Briefly stated, their ideal may be said to be a return to the system of the master-builder and craft-guilds. It may be wondered that with all this eminent advocacy the principle of the architect being trained as a workman and acting as the contractor—indeed, almost as foreman—has not been largely adopted. As it is, we find that, apart from a number of houses and a small village church or two, there are no modern buildings to which we may point as proof that the system is possible of adoption for large structures. The principle has only been adopted by faddists. It can be followed in the case of some small houses and cottages for the agricultural labourer, where the intermediate profits of the builder can be saved; but upon a large job the client usually desires some definite idea as to what the cost is going to be, and this the very nature of the system of modifying, amending, and perhaps "improving" as one goes on renders impossible. Moreover, the system is not a speedy one, and rapidity of erection is essential for any building intended for business purposes. To retain any reasonable speed in the erection of a building of some size there must be a definite scheme to work upon, so as to enable the many trades engaged to co-operate without friction, otherwise one trade has to wait upon another and the cost is increased and the building in the meantime is delayed. The whole tendency of modern work is towards more and more elaboration of the working drawings, more exactness, and more preparation ahead. The natural advance of all constructional knowledge requires the architect to seek assistance in many directions from specialists, and so far as we can see he cannot occupy the position of a master-builder closely in touch with the crafts. This brings us to the second point of the argument of this particular school of architectural thought, namely, the education of the architect. It is easy to speak of architecture being a trade and to show how much assistance can be given by working at a craft, but life is

too short, and the architect cannot acquire knowledge of all the trades in the manner suggested. Moreover, he has to deal with other things than construction. He must possess business aptitude, a faculty for organization, a knowledge of modern commercial methods, a certain amount of literary ability, legal knowledge, and generally he must occupy an altogether higher plane of education to the ancient master-builder. We do not think it is at all necessary to return to former methods of education. We believe that our modern methods are an evolution from the old, and that they enable us in the same time, or in less time even than of old, to acquire a much greater amount of knowledge. The architect must know his own craft, which is the position of an organizer of building works. To occupy this position he does not need to be a skilled craftsman, a specialist in any trade, but he must know the general bearings of each branch of the subject. We think sufficient can be gained from visits to shops and actual buildings, and instruction from specialists in each field, grounded upon good scientific and commercial education, and we see no use in the return to the ancient building system which is advocated by some architects of note. We have every sympathy with their endeavours to educate the architect and make him more of a practical man, but their methods of education have limitations. We would not say anything regarding the talents or constructive ability of the leading lights of this school, but it must be recognized that the rank and file are distinctly behind those trained on the ordinary lines. Their planning is haphazard as a rule; it conforms to no accepted standard, and there is no rhyme or reason in it. While it is true that the constructive details are original, we prefer the more unimaginative construction which is efficient, rather than the attempts to abandon all precedent, without any effort to satisfy the conditions that brought the traditional forms of construction into being. We have seen a number of instances recently where the construction is novel, but apart from this it is downright bad and inefficient. The elevations too are self-conscious and fussy; there is no balance or reserve about them. The sole interest generally lies in the treatment of the materials, in which the practical craftsmanship which the school goes in for, leads them to delight in. This, it must be admitted, is a good thing, but it is not the most important. We do not say that it should be neglected, but there are many other matters that should be studied first. "Building without a builder" is a fine catch phrase, but you cannot have building without a builder. We are ready to admit that the exponents of this school are often not builders—their work is simply crude and amateurish; and sometimes we are inclined to think that they have no right to the title of architect.

DIFFICULTIES OF PRACTICE.*

By J. Archibald Lucas, F.S.I., A.R.I.B.A.

IN all occupations which are followed for the hope of reward, responsibility has to be borne with the many difficulties that beset its path. Law and medicine, however, the professions with which perhaps we as architects are mostly associated, seem especially fortunate in evading the difficulties that perplex our own calling. Lawyers can always shelter themselves behind counsel and experts—the latter in many cases being ourselves; while patients die, are buried, and the same medical man who has attended them certifies the cause of their death.

Not so with architects, who, when giving advice of a professional nature, are pinned religiously by their clients to the absolute context of such advice, which is generally asked for in writing. Then our patients, in the form of buildings, live long after our final certificates are given, in some cases (frequent perhaps) with strange undiscovered maladies.

The difficulty of practice at commencement is to get together a decent practice; and with the vast amount of competition, and increasing competition, this is exceedingly arduous work.

Another great difficulty is that created by

The Large Number of Pupils

now being launched to fill the ever-increasing ranks of junior assistants. On this account I consider generally that architects' assistants, junior and senior, are poorly paid in return for the cost of education and preparation for the work they are called upon to perform. It seems a great pity that we as a society cannot agree together that no architect or firm of architects shall take in his or their office more than two pupils at any one time. A minimum nett premium and term should be agreed upon, observed rigidly, and every effort made to standardize all the conditions under which pupils are to be received. It may be argued that country practitioners cannot secure the large premiums which some city architects not only demand but obtain. I venture to say, however, that things would right themselves in time by the country practitioner obtaining higher fees for his personal labours, and a better class of pupil.

Assistants.

Now, then, as to assistants. How very few really good ones can be found, and when they are engaged how long do they stop with us? Judging by the quantity of applications one receives, it seems that at present a large number of assistants are unemployed, but at the same time, I must admit that many of these are unemployable through being launched out of architects' offices immediately on the expiration of their articles, and without further experience.

Overtime and Private Work.

The questions of overtime and of assistants taking private work are difficulties which I will lightly touch upon. As to overtime, I am of opinion that, definite office hours being arranged on the engagement of an assistant and afterwards kept, hours of overtime should be paid for at an agreed rate. The question of assistants taking private work is one upon which we as a body should put down our foot firmly. It is manifestly unfair to the principal for the assistant to entertain such an idea in any form.

An Architect's Clerk

should be to the architect his remembrancer, diary, cash- and book-keeper; but how many have these qualifications? A good clerk with a thorough knowledge of shorthand and typewriting is the greatest help one can

have in any office. My endeavour for years has been to obtain the services of some clerk who has been engaged in the building trade, but I have been unsuccessful, as this class of clerk has generally no knowledge of keeping a diary or of shorthand. Having tried for years to obtain what I wanted, about three years ago I gave it up as a bad job.

Surveying Assistants

(and by this term I mean land and building surveyors, not designers) are of a varied class, as experience proves. Some in their work almost wish to take measurements of and plot to scale the blades of grass, while some go to the other extreme and are guilty of sins of omission which you are apt to find out as your buildings progress. Windows of adjoining owners, easements of water and drainage, and correct divisions of different properties are forgotten, and a multitude of other matters too numerous to mention crop up as the work proceeds.

Designers

(and by this I do not mean copyists) are perhaps the most difficult of all to obtain. I have had a few assistants in my time, but I have known only two who could design. Depend upon it the study of the principles of design is being neglected by pupils and young assistants. That this is the principal art of an architect is a fact that cannot be too strongly impressed upon all. Travel abroad is very fine for educational purposes, but before these trips are undertaken the general principles of design should be mastered. People nowadays crave after something new and original, something which no one else possesses. There is an immense field in architecture in this direction, and those pupils and young assistants who will take the trouble and pains to overcome the difficulty of mastering the principles of design and ornament will find themselves more than repaid in after years.

Specification Writing

is arduous work, but the enforcement of a specification in its literal sense is rarely, if ever, done. How difficult a good specification is to produce, and what an excellent document it is when properly prepared, no one but an architect can appreciate. The wily ways of builders and contractors to distort the meaning of words and sentences are well known to most of us, as well as the insidious suggestions of extra work in connection therewith.

Quantities.

On the question of quantities it seems to me very undesirable that architects should take out their own. By this I mean that the architect and quantity surveyor should be two entirely different men. The drudgery of quantity surveying—and it is nothing more or less than drudgery—cannot help the artistic side of an architect's practice. The difficulty of charging for the preparation of these quantities if debited to the client is overcome entirely if a quantity surveyor be employed. The detail into which some bills of quantities go is ridiculous, and in my opinion must greatly influence and increase the cost of building. It seems to me desirable for uniformity of bills of quantities in a district to be ensured. At Exeter or Plymouth if we architects arranged for one individual to take out our quantities for us, I feel sure there would not be that great difference in tendering which is sometimes observable.

Advertisements for Tenders.

The very general method of inviting tenders by newspaper advertisement is not one to be recommended. The difficulty at times of explaining why the lowest tender has not been accepted, the desire of the building owner to accept the lowest tender, the danger of good firms failing to estimate for work under conditions of public tendering, and the usual unsatisfactory ending if the lowest

tender is accepted and if he be an undesirable man—are all well known to us. It seems to me that a far more satisfactory condition of things is to invite three or four firms of good repute, whom you know from experience do excellent work; and further, to our clients it is far more advantageous to know and feel that the work is not being scamped, as it very often is under conditions whereby Tom, Dick and Harry get an opportunity to contract.

At the present time there are

Two Forms of Contract

in existence—that provided by the Institute and that by the Master-Builders' Association. As far as I read them, it is a matter of indifference which form is used, provided the architect is the sole arbitrator and umpire under the contract. Difficulties do and will arise, and it is far better for all parties that they should be settled quickly and finally and under the conditions named, with the architect as umpire, he having the full knowledge of all the facts. I have never yet consented to a builder signing a contract other than that the architect should be the sole arbitrator and umpire, and I strongly advise others to do the same thing. Nothing is more worrying in the course of a building than to have a builder constantly flaunting the arbitration clause in your face. I know of cases where this has been done over and over again.

Contractors and Builders.

People who work under architects I separate under two headings—contractors and builders. In the former term you can include anything; but in the latter a builder, to be worthy of the name, must be something more than a mere money-maker. Nothing is more difficult than to find really good builders.

Take the real country builder. He generally farms some land, keeps a cow or two, goes in for pony breeding, has a stone quarry, perhaps sells manures and feeding stuffs; then on top of this he runs a building business. His men at times help in the harvest, and his apprentices help on the land when required, with the result that a general slovenly style of work goes on.

Then take the town speculative builder—poor timber, mortar, flooring, plastering and everything of the cheapest and nastiest kind: in fact, one wants to act policeman and detective to this class of tradesman.

There is no more pleasant person to meet than the genuine old-fashioned builder.

Good Work with Speed.

The execution of work of good quality with speed is a great difficulty in our profession. We live fast nowadays; everybody is in a hurry. Impossible time-limits are placed in contracts for the completion of large structures, and ruinous penalties are threatened. With what result—very few buildings are ever finished within the specified time, and the impossible penalties are never inflicted. In my opinion the adoption of some sliding scale in the amount of the contract money would be the best solution of the difficulty, an equitable arrangement giving a date of completion within which the building could safely be finished; and if completed before, then for every day or week before the date of completion a sum to be added to the contract. It would be an incentive to a contractor to endeavour to earn this additional money, whereas now whatever happens he rarely finishes in time and pleads amongst other things delay in the supply of details, action of adjoining owners, alterations in the work, extras, and any excuse which may occur to him.

The Clerk of Works.

Up to the present I have, fortunately, not come across any dishonest clerk of works. On the contrary, I have employed several, and found them of absolute integrity. One feature I have noticed over and over again

* A paper read before the Devon and Exeter Architectural Society on January 5th, 1906.



THE HOTEL REINA CRISTINA, ALGECIRAS, SPAIN. T. E. COLLCUTT, F.R.I.B.A., ARCHITECT.

This hotel, where the delegates at the Morocco Congress are now staying, is interesting as the work of an English architect—Mr. T. E. Colcutt, F.R.I.B.A. It is situated on the shore of the Bay of Gibraltar, facing the Rock, and is built of local stone covered with plaster, the tiles on the roofs being of old Roman pattern (ridge and furrow) dipped and glazed, of the same character and colour as those used for the Savoy Hotel extension. The furnishing was carried out by Messrs. Maple & Co. (the complete selection being made by Mr. Colcutt) and the house baths and sanitary arrangements throughout by Messrs. Twyford. The plan of the hotel follows the arrangement general in Spain and Morocco, namely, with a central quadrangle or *patio* having a fountain in the middle, and wide-projecting roofs and arced to afford as much shade as possible. The columns to the *patio* are of Teba marble. The contractor was Mr. James Thomson (now manager of the hotel), who had been building in Tangier and Spain for eighteen years, and under his direction and that of Mr. Colcutt the work was carried out in the best manner by Spanish workmen, the joinery and marble work being equal to any obtainable in London. The building is treated more as a country house than as an ordinary hotel. The photograph reproduced above was taken soon after the building was completed. Since that date the shrubs and trees have grown considerably, and consequently the appearance is less bare than here shown. At Ronda, about 60 miles north-east of Algeciras, a similar hotel is to be built, and another at Mombassa (just north of Zanzibar), both from designs by Mr. Colcutt and his partner, Mr. Hamp.

is that a clerk of works cannot carry in his head the gist of the drawings, specification and quantities. He has constantly to refer when asked a question, and is never certain without a memory refresher. Always employ the clerk of works for whole time, and make him understand that if he has to work late or early in connection with any special job he must do so. The clerk of works was made for the architect, not the architect for the clerk of works. Many decent men I have had as clerks of works, but I prefer those who have been carpenters and joiners, as they seem more intelligent and far-seeing. Always make your clerk of works give up all drawings, details and papers in connection with the job at the completion of his engagement.

Foremen.

To have a foreman reliable and efficient in all respects on any building is a pleasure to the architect—one who can understand a plan and specification; who can look ahead and see what is wanted and arrange for its being on the job in good time; who can set out his work correctly and show those under him how to do their work. Builders find a difficulty in obtaining such a foreman, and it seems to me that as soon as they get him it is his ambition to become a clerk of works. Why, I cannot understand. A foreman can always obtain employment; a clerk of works cannot always do so. The trend of trades-unionism—namely, standardization—is to increase the difficulty in the production and the continuation of the supply of efficient foremen. I have known foremen who have been simply bullies, or, to use the workmen's definition, devil-drivers. On the other hand, one comes across quiet hardworking men who get much more work out of the mechanic in an unostentatious manner.

Extras and Omissions

constitute, in my opinion, the greatest difficulty in our profession. They cause more disputes than one can even dream of at the commencement of a contract. They are necessary evils, however, for no professional man living can foresee every detail and everything that is likely to occur above and below ground. Then, again, our clients alter and add as the work progresses, thinking in

their amiable way that all their little individual wishes are in the contract; but when the bill arrives it turns out to be an entirely different matter.

In practice watch the items which are omitted; sins of omission sometimes exceed in value sins of commission.

Payments to the Contractor.

One always feels a difficulty in arriving safely at the amount to which a contractor is entitled on a certificate, and very often I have doubted whether we are always fair to the contractor in our certificates—particularly in reference to the work done at the workshop. If you want work pushed forward, the builder must have the wherewithal; and it has always seemed to me that unless the contractor is paid as the job proceeds for that portion of the work going on at the workshop, you do not get stuff ready in time, as he knows he will not get payment until it is fixed on the job.

Difficulties of By-laws.

In every separate local authority one works under there would seem to be different building by-laws. The Model By-laws of the Local Government Board might do for some new country, as the Transvaal or Rhodesia, but to attempt to force the Model clauses on an old city like Exeter is absurd. Under our present by-laws not half the houses without 200 yds. of the exterior of our old city walls could be rebuilt. First, you must make all the sites square, then set back 12ft. from the centre of the road, then obtain the full air-space at the back. A more ridiculous proceeding than the adoption of these Model By-laws for the city of Exeter I never heard of. Those who adopted them could never have realized what was going to be their effect or the manner in which they were to work out.

The draughting of building by-laws on some common-sense code by architects without the aid of the Local Government Board is a work which all architectural societies should take up.

This question of by-laws is one of the greatest difficulties of our profession and a millstone around the neck of every landowner—without whom architects could not

live. Fortunately, in Exeter the revision of the present by-laws is now in hand.

Surveyors taking Private Work.

Some local authorities are lax, others strict, but the greatest nuisance to us as a profession is caused by the surveyors to those local authorities who are permitted to take private work. No local authority should permit its whole-time officers to take private work. Other architects practising in the district are placed at a great disadvantage, and perhaps are not treated altogether fairly and squarely, as some of us know to our cost. It behoves us that in all future appointments within the area of our society we should take the necessary steps to bring this question before the authority making the appointment.

Surveyors, men of high skill and position in the profession, who are appointed to large cities and centres are men whom it is a pleasure to meet and whose word is their bond. Not so with the rural and some urban districts. I have in my mind now a surveyor who indulges in speculative building, is an undertaker, furniture and pony dealer, and does a little architecture; and another who is a retired farmer but has taken on the charge of an urban district, collects the rates, is surveyor, water engineer and sanitary inspector. This difficulty could be met by our again acting together as a society and calling the attention of the authority making the appointment as to what the duties of their office should be.

Adjoining Owners.

Who does not become acquainted with adjoining owners during building operations, some fair, but the majority selfish? The troubles and annoyances one incurs from adjoining owners are very worrying. The difficulty of reconciling their demands with a due regard for your client's interest is enormous. Then at intervals these troublesome owners bring their solicitors on the scene, and that does not make matters easier!

Light and Air Difficulties.

The recent light and air decision in *Colls. v. Home and Colonial Stores* has swept away much difficulty in connection with this question, although it seems to me that some legislative measure might be introduced

referring all these disputes to arbitration with powers to the arbitrators and their umpire to decide whether the proposed building was an obstructive building or not; and if obstructive, whether it should or should not be allowed to proceed; and if the former, to what extent, and what measure of compensation should be paid. Most of these questions when they do get in the hands of the lawyers are generally referred back to our profession to settle, and it seems to me we might just as well come first as last.

Party-wall Questions.

I suppose there is more difficulty in party-wall questions than in light and air cases. As I understand it, party-walls are of three kinds—(a) that in which each party has an undivided moiety and interest as they exist at present; (b) ownership the same as (a) but, in addition to their present interest, rights to take further bearings; (c) that in which half the wall belongs to each party. It seems to me all difficulties in these matters could be got over if the party-wall clauses of the London Building Act, 1894, were extended to the provinces.

Easements.

As to easements generally, light and air, way and water, support—these are all more or less specialists' work, and although good text-books written by architects are in existence on light and air, no such text-books by surveyors who are brought in contact with questions of way, water and support appear to be available. The Architects' Law Reports are the latest attempt to furnish us with this information; but way, water and support appear to be a field for some energetic brother professional to bestir himself in, and so supply information on these heads.

Dilapidations and Valuations.

Difficulties of determining what are dilapidations under different forms of leases are most perplexing. So too are those vast differences in valuations—particularly valuations for compensation. The difficulty of determining the right value is one which is only overcome by experience. All the theory in the world cannot teach a man how to value property, although the prices other properties in the same neighbourhood have made may be to a certain extent a guide.

Thus, then, of some of the difficulties with which we have to deal in everyday practice as architects.

OUR PLATES.

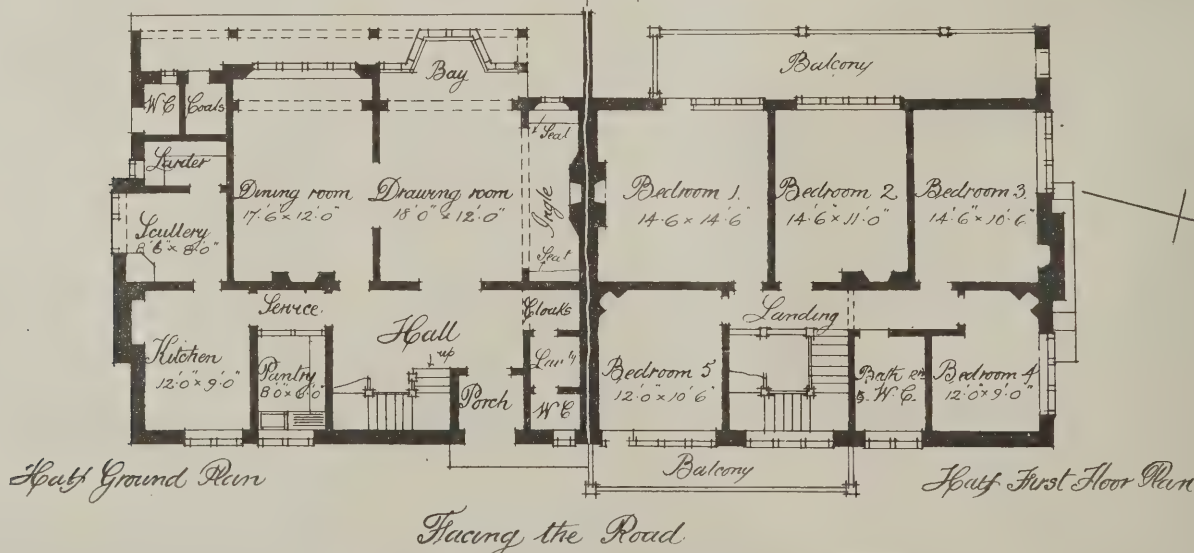
THE Tower Bridge Police Court and Station, illustrated in our centre plates this week, has been erected in Tooley Street, S.E., to replace the old police court in High Street, Scutawark, and the old Bermondsey Police Station. It provides principal and second courts and a large public waiting hall (these are panelled in fumed oak) together with the necessary offices, &c. The style adopted is a free treatment of English Renaissance. It is carried out in red brick and Portland stone. The court was opened in March last year, the architect being Mr. J. Dixon Butler, surveyor to the Metropolitan Police, and the contractors Messrs. John Mowlem & Co., Westminster. The photographs reproduced are by Messrs. S. B. Bolas & Co., 68, Oxford Street, W.

THE REGISTRATION BILL AND THE GENERAL ELECTION.

IN view of the reintroduction of the Society of Architects' Bill into Parliament early in the forthcoming session, the Council has circularized every Parliamentary candidate calling attention to the Bill, giving a brief synopsis of its scope and object, and inviting the candidate to record, by means of a prepaid post-card, his agreement or otherwise with the principle of a statutory qualification for architects, and his intention, if elected, of supporting the Bill. A letter has also been sent to the members of the Society asking them to support the council's action by writing to their local parliamentary candidates to a similar effect, and there are indications that this co-operative action is having good results. Many promises of support have been received.



Facing the Bristol Channel



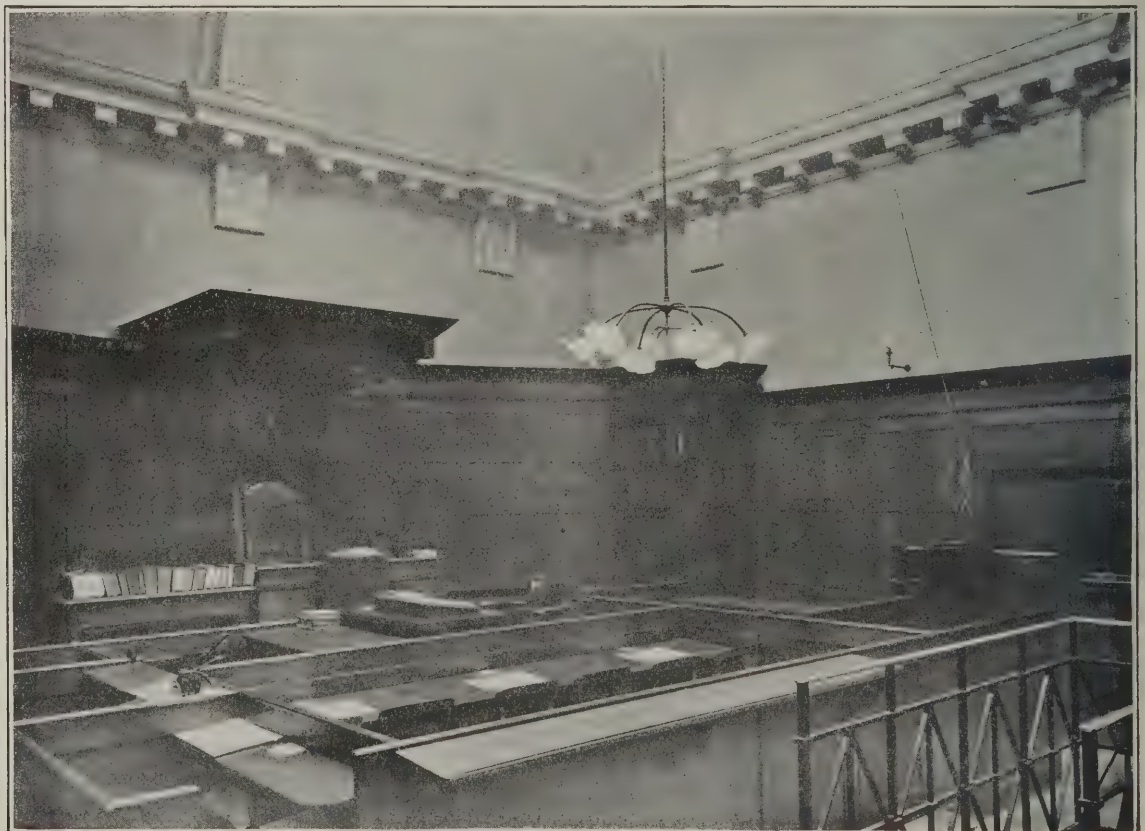
HOUSES FOR THE NORE AVENUE ESTATE, PORTISHEAD, SOMERSETSHIRE. RODWAY AND DENING ARCHITECTS.

The estate for which these houses are designed overlooks the Bristol Channel, and is owned by Mr. George H. Perrin, of Nore Park, Portishead, and Mr. Thomas Hill, of Bristol. To meet the special desires of the clients the plan is arranged with hall, drawing-room and dining-room *en suite*, with folding doors; all the bedroom accommodation required being provided on the first floor. The scullery and minor offices are contained within the building, which arrangement avoids the objectionable and unsightly out-buildings so often seen in this class of property. The walls are to be of brickwork, rough-cast and lime-whited, with rough-cast chimney stacks and red pots. The external paintwork is to be finished a moss-green colour, and the roofs are to be covered with Broseley tiles in varying shades of brown. The interior woodwork generally will be finished cream; the staircase and ceiling joists of hall and landing will be in pitch-pine stained a dark green; and the paintwork in kitchen and offices green combed over a brown ground. The architects are Messrs. E. G. Rodway, A.R.I.B.A., and C. F. W. Denning, of Baldwin Street, Bristol.

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ENTRANCE HALL.



LARGE COURT.



FRONT TO TOOLEY STREET.

TOWER BRIDGE POLICE COURT AND STATION. J. DIXON BUTLER, ARCHITECT.

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R.I.B.A.

Prizes and Studentships; Metalwork.

A MEETING of the Royal Institute of British Architects was held on Monday evening at 9, Conduit Street, W., the chair being occupied by the president, Mr. John Belcher, A.R.A.

Papers on metalwork were read by Messrs. John M. Swan, R.A., Montague Fordham, M.A., and Walter Gilbert.

Mr. John M. Swan, R.A., said he was so far penetrated by a profound reverence for the past that he felt we were but pigmies peeping through the legs of the Colossus of antiquity.

The Processes employed by the Ancients are so shrouded in mystery, and so difficult to verify, that we could not at this distance speak with absolute certainty or form a clear judgment upon them. All the varying changes of colour mentioned by the ancients were occasioned by the nature of the alloys. Many metals combine together when melted, and only remain in union within certain ranges of temperature by reason of the wide differences of their melting and solidifying points. In ancient bronze the proportions of tin mixed with brass or copper and of copper with silver seem to have been—copper 71 to 87 parts, tin 3 to 6 parts, lead 4 to 21 parts. There also traces of iron. With ourselves, in ordinary bronze, 96 copper and 4 of tin are generally used.

The Japanese are the Real Authorities for treatment of colour in metals to-day. They combine such extraordinary manipulative skill with artistic taste in carrying out any imaginative work. The superiority of French workmanship is doubtless due to their fine artistic instinct allied to their excellent art training. The Persian and Arabian metalwork with large plain surfaces of copper and brass might, treated in a bas-relief manner, be well adapted by ourselves for panel treatment for interior decoration. Describing the process of casting in

Cera Perduta,

which we get from Benvenuto Cellini, the author recalled that it is now about twenty years since the first *cera perduta* castings were made in this country. First, an ordinary piece mould or gelatine mould is made from the plaster mould. Then a wax casting is run from the mould, to which are attached the runners and gates for the flow of metal, and vents for air or gases. Afterwards the wax is cored, and an external covering-in mould covers the whole. It is then placed in a muffle or furnace, the wax melted out, and when the mould is dry the metal is passed in that replaces the wax model.

The Founders' Wax

is made of Gambia, Italian, or native beeswax and resin coloured with vegetable matter or vermilion. The colouring of the wax is important, as if some metallic pigment or earth colour were employed it would cause a residue in melting out that would destroy the casting. Speaking of the bronze statues of London, Mr. Swan said everybody must be struck with their uniform dull, heavy, monotonous black. It was a most unsatisfactory state of things for both public and artist. Was it not possible in metallurgy to discover an unchangeable alloy?

The author expressed his preference in many cases for

Gilded Statues

or monuments that would better resist the action of the atmosphere and have a more decorative effect. They might appear too garish at first, but London fog would soon tone the surface and take off the glare of new gilding. The "noble rust," the antique patina, is not naturally formed in the atmosphere of London, or our statues of malachite

and copper domes would be a delightful green. Gilded bronze can work in unison with black bronze, and aluminium may be looked after so that it does not become the uniform London black.

Mr. Montague Fordham said he was anxious to draw architects down into the workshops, which would have the double advantage of giving them more knowledge of the actual treatment of metal and of creating a closer bond between architect and craftsman. With this object he gave particulars of the tools used in the ordinary working of copper, bronze and iron, and followed with some notes on the nature of the metals and their proper treatment. Having discussed the technical side of his subject, he referred to the want of encouragement the craftsmen received from architects, who rarely entrust their metalwork to craftsmen, but deal with trade firms. Doubtless this was much less trouble.

A Trade Firm

employs a traveller, who is at the architect's beck and call, who will supply a design in any manner, adapt it for any metal, and cut his work down to any price. How was the designer-craftsman, the master-craftsman, who could turn out magnificent work under different conditions, to compete with such a system? The matter of the revival of metalwork rested largely with the architects. It was for them to say whether the small industries now growing slowly were to be allowed to flourish; if so, he felt great hope that the present century would become famous in all time for the distinction of its metalwork.

Mr. Walter Gilbert, whose paper was entitled "Romance in Metalwork," confessed his inability to show any fresh views of the art of metalwork, but he would endeavour to explain a little of that impulse which urged the artist to find expression in those methods and materials with which he felt in most sympathy, and which had the most influence in the development of the art.

Primarily it is Imagination,

or rather the consciousness of imagination—the ruling faculty in all art—which creates art. But real art is something more than this; it is imagination allied with skill and dexterity in the creation of beauty. Under all great art of the metal-worker, whether the thing to be done is great or small, there must always be the same working of the intellect, the same poetic feeling for the ideal in story, the same tenderness for material. As for the future, let us not hastily condemn any struggle for new treatment. What the artist requires is not too arbitrary an assertion on the part of the architect of what is good or bad, for which often an architect, owing to present-day methods of training, is not too well qualified to judge, but a stimulus to thought and energy for the artist—that the architect may gather round him a band of men working eagerly in close co-operation with him for the glorification of his buildings and an enhancement of his fame.

Mr. G. Hubbard proposed a vote of thanks, which was seconded by Mr. Harrison Townsend. The president also took part in the discussion.

Prizes and Studentships.

The deed of award of the prizes and studentships for 1905-6 was then announced as follows:—

Essay Medal and 25 Guineas—subject, The biography of a British architect (deceased) practising in the nineteenth century: 6 essays submitted. Winner: Mr. W. H. Godfrey, of London ("Terra Incognita"). Certificates of Hon. Mention: Mr. Martin Shaw Briggs, A.R.I.B.A. ("Gargoyle"), and Mr. Albert E. Bullock, of Chiswick ("Shingalee").

Measured Drawings Silver Medal and 10 Guineas: 15 sets of drawings submitted.

Winners: (Bracketted equal) Mr. Albert E. Poley, of Hampton Hill ("A.D. 1690") for drawings of Hampton Court Palace, and Mr. George John Coombes, of Bournemouth ("Sigillo Ecclesie Trinitatis d. Totham"), for drawings of Christchurch Priory, Hants. Certificate of Hon. Mention: Mr. Percy W. Lovell, of Highgate, N. ("San Marco") for drawings of Santa Maria dei Miracoli, Venice.

Soane Medallion and £100—subject, The realization of the ideal mansion described in Bacon's essay "Of Building": 10 designs submitted. Winner: Mr. Walter S. George, of Ashton-under-Lyne ("John Thorpe"). Certificate of Hon. Mention: Mr. Robert Atkinson, of Nottingham ("White Lion").

Owen Jones Studentship; Certificate and £100—5 sets of drawings submitted. Winner: Mr. Charles Gascoyne. Certificates of Hon. Mention and 5 guineas each: Mr. W. J. Davies, Mr. Arthur D. Nicholson and Mr. A. R. H. Jackson.

Pugin Studentship; Silver Medal and £40—12 sets of drawings submitted. Winner: Mr. G. Drysdale. Certificate of Hon. Mention: Mr. Jordan Green.

Dwin Bursary; Silver Medal and £65—5 sets of drawings submitted. Winner: Mr. H. I. Triggs, of London, W.

Tite Prize; Certificate and £30—subject, An open-air swimming bath with an arcaded or colonnaded enclosure: 21 designs submitted. Winner: Mr. Alec George Horsnell, of Chelmsford ("Dolphin" on white strainers). Medal of Merit: Mr. Charles Bulwer Pearson, of Lancaster ("Ellipse"). Certificate of Hon. Mention: Mr. C. L. Wright, of West Kensington ("Dorian").

Arthur Cates Prize; £42—One set of drawings submitted, by Mr. John H. Markham, of London, S.W.

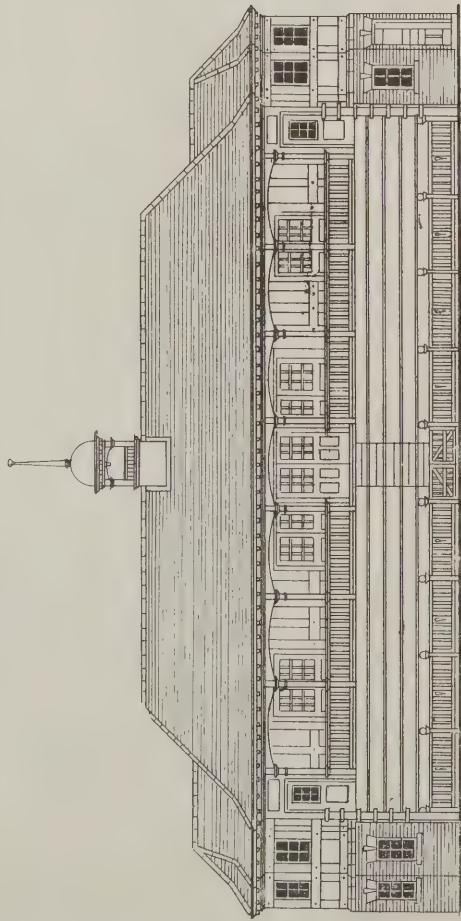
Grissell Gold Medal and 10 Guineas—subject, A stone skew bridge: 6 designs submitted. Winner: Mr. George Nott, of Leicester ("Utile Dulci").

Ashpitel Prize awarded to the Student who distinguishes himself most highly in any Final Examination held during the year.—Winner: Mr. John H. Markham.

Special Prize of Books value £10, for merit displayed at Special Examination in November: Mr. A. R. Myers.

Mr. R. S. Lorimer, A.R.S.A., has designed a Roman Catholic Church for Morningside, Edinburgh. The plan of the church will be a Latin cross, with shallow sanctuary and transept. The interior will be whitewashed and the high altar is to be composed of rough masonry. A rood of great size will hang in the sanctuary arch.

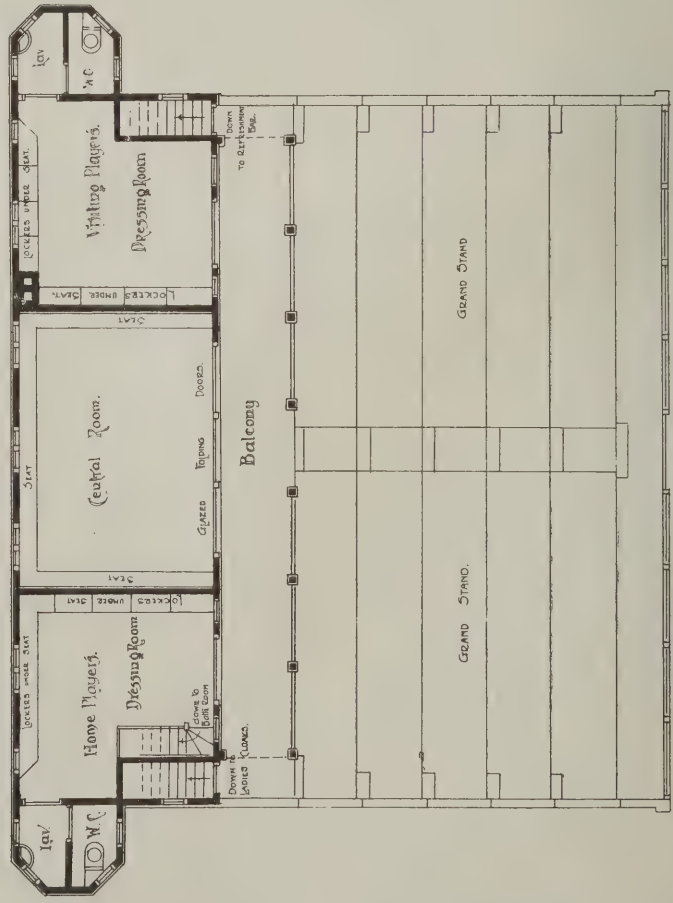
The General Electric Co., Ltd., held its sixteenth annual dinner in the Grand Hall of the Criterion Restaurant on Saturday last. About 350 persons attended. After the Royal and Imperial toasts had been given by the chairman, Mr. H. Hirst (one of the three managing directors of the company), Col. R. E. Crompton, C.B., responding to the toast of the Imperial forces, Mr. Hirst proposed "The Staff." He referred to the great extension of the business of the company which had taken place, rendering necessary the enlargement of their works and offices. Mr. R. Dumas, chief engineer to the company, replied, giving the toast of "The Directors," coupled with the name of Mr. H. Bevis, the managing director at Birmingham, who responded. Mr. Max Byng then proposed "The Visitors," which was replied to by the Hon. Walter James, Agent-General for Western Australia, Professor Ayrton and Sir Richard Awdry. After the dinner a concert was given, and thus a highly successful evening was concluded.



Front Elevation.



Back Elevation.



This design was selected from nine sets of drawings submitted in competition by local architects. The new pavilion is to take the place of an old one which has served for many years. The lower portion will be built of local common bricks and the upper portion of half-timbering and rough-cast. The eaves cornice will be of wood and the roof covered with red Broseley tiles. The eaves cornice will be matchboarded inside and painted green. The grand stand will be built of concrete on brick walls. The half-timbering will be painted green, and the balcony and eaves will be painted white, the rough-cast being also finished white. The pavilion will stand on one of the finest cricket and athletic grounds in the country.

MANCHESTER NOTES.

(By our Own Correspondent.)

THE half-yearly report of the Manchester, Salford and District Building Trades Employers' Association contains nothing of special interest. A small addition to the membership, cordial relations with the operatives, partial success in the effort to establish a conciliation board, are satisfactory if not striking features, and it is good to hear that although trade "is still undoubtedly depressed there are not wanting signs of impending improvement and the approach of more prosperous years." The more hopeful tone in the trade finds justification in the welcome reports of contracts coming out. Messrs. C. Heathcote & Sons have designed new business premises in Deansgate, and for a good site at the upper end of King Street; Mr. Rhodes Calvert, F.R.I.B.A., has in hand a new warehouse in High Street; Mr. Beaumont new shops and offices in Market Street; Messrs. W. & G. Higginbottom a large warehouse in Chepstow Street; and Mr. Willoughby new shops and offices in Deansgate. Messrs. W. Brown & Sons, of Salford, have secured the contract for a new warehouse in Whitworth Street, to the designs of Mr. J. Dent Harker, A.R.I.B.A. This contract amounts to about £35,000, and the work is to be completed within six months. As the building is of terra-cotta above a granite base, Messrs. Brown & Sons have shown considerable pluck in undertaking the job in the time.

A New Restaurant.

The new high-class State Restaurant of the Ceylon Café Co., designed by Messrs. W. Aubrey Thomas & Co., of Liverpool, has just been opened, and, like the premises of the company in Market Street and Mr. Beaumont's new building, is faced with Doulton ware. This forms a glaring contrast to the adjoining sooty fronts, and gives something of the appearance of a new toy in a dustheap. The interior decoration of the State Restaurant is beyond question the most beautiful example of Sicilian marble work to be found in Manchester, and the gold mosaic by which it is relieved is exceedingly effective.

Timber.

From Liverpool there comes a pathetic lament that while the timber imports of that port have decreased the Manchester returns reveal a steady increase. The Manchester imports of timber are so striking that the figures are worth giving. Commencing with 93,810 tons in 1895, the yearly returns show consistent increases until for 1905 the total will fall little short of 400,000 tons. Manchester, in fact, is the fifth largest centre, being only excelled by London, Cardiff, Hull and, for the moment, Liverpool. The principal importers, whose storage grounds are all in Trafford Park, are Messrs. Joseph Griggs & Co., Ltd.; The Imperial Lumber Co., Ltd.; Messrs. Illingworth, Ingham & Co., Ltd.; Messrs. H. Newsum, Sons & Co., Ltd.; and Messrs. J. W. Southern & Sons.

The bankers' clearing returns speak eloquently of the wonderful effect of the Ship Canal upon the trade of the district. The total for 1905 is £263,586,300, an increase of £15,000,000 upon 1904 and £60,000,000 above the Liverpool returns.

The Unemployed.

The proposal of the Manchester Distress Committee to purchase an estate twelve miles from the city upon which to find work for the unemployed has been referred back for further consideration. It was pointed out that the proposed colony was only an experiment, and that for that purpose it would be sufficient to rent ground; also that upon the adjoining Chat Moss estate of the Corporation there are 160 acres still undeveloped. Strong opposition is also being manifested to the proposal of the City Council to spend about £40,000 in the erection of baths and

washhouses in Bradford (Manchester) and £19,000 in the completion and equipment of the baths in High Street. The latter baths are situated in a good middle-class district, and the sum now asked for is extra to the original estimate. It is contended that public money should not be spent in the provision of a luxurious establishment in a district where almost every house contains a bath. A strong association of ratepayers whose object is to keep down the rates seems likely to be successful in preventing many Corporation extravagancies, at the same time furnishing a much-needed protest against reckless municipal collectivism.

NOTES ON COMPETITIONS.

Kingston Baths.

A rather stormy discussion took place at last week's meeting of the Kingstown (Dublin) Urban Council in respect of the recommendation of a committee that an open competition for designs for new baths to be constructed at a cost of £6,000 should be held, with first and second premiums of £54 and £25 respectively. Ultimately the committee's recommendation was rejected in favour of a proposal to employ a local architect to carry out the work.

Baptist Church and Schools at Walthamstow and Ilford.

The design of Messrs. W. D. Church & Son for a Baptist church and schools to be erected at Walthamstow at a cost of £7,500 has been selected by the committee on the recommendation of their assessor. Messrs. Church's design in a limited competition for Baptist Sunday schools at Ilford has also been placed first and accepted, the work to be carried out by Messrs. F. & A. Willmott, contractors, of Ilford.

Alexander Thomson Travelling Studentships.

The first prize (value £60) has been gained by Mr. James Whitelaw, of Uddingston, Glasgow, and the second (£20) by Mr. F. M. Craik, of Glasgow.

Wrexham Schools.

The Education Committee of the borough of Wrexham has just issued the conditions of competition and instructions to architects for new schools to be erected within the borough. It is a relief, after a somewhat lengthy run of condemnation of other conditions, to be able to announce at last that here are some which, on the whole, may be accepted as satisfactory—so satisfactory, indeed, that one would hesitate to place any reserve upon the praise to which they are entitled were it not that the old-fashioned expedient of identifying the designs with a motto is to be adopted, and that the name of the assessor is not given. The former objection is minimized by the fact that the motto is to appear only on the back of the plans; the assessor is mentioned as "competent" and a F.R.I.B.A., and these circumstances, in conjunction with the quality of the conditions, lead one to anticipate an award which shall be beyond question.

The schools are to accommodate 350 boys, 350 girls and 300 infants. The cost at £12 10s. per head works out at a total of £12,500, which is to cover the usual requirements and is exclusive of architects' and quantity surveyors' fees and clerk of works' salary. The premiums are £50 and £30 respectively, the first to merge in the commission of 5 per cent. on the amount of the accepted contract. The drawings are to consist only of such plans as are required by the Board of Education. No perspective view will be required or admitted. Specially praiseworthy is the plan of site and levels which accompanies the conditions. The levels are marked every foot, each way, and

a small block plan is appended sufficient to enable an intending visitor to find and locate the site without trouble. Also worthy of note is the following clause: "The committee are most anxious not to be extravagant in the school building. The general character should be simple and inexpensive, and express the purpose of the building, which should depend for external effect not upon ornamentation but upon good proportion and satisfactory lines. Eaves unduly projecting over the windows should be avoided, as they interfere with the most valuable light—that admitted by the top of the windows." This is excellent alike as general advice and for the insistence of the principle that design should depend upon good proportion and satisfactory lines, a principle universally acknowledged by all worthy the name of architect, but so constantly forgotten by many appearing under the name of competitor.

The conditions are issued free from the requirement of a deposit. This is a course the universal adoption of which has been sought by all competition reformers. It would be interesting to know later how the promoters have been affected by it, whether the number of applications has exceeded the average in similar competitions where a deposit has had to be made, considered in connection with the number of designs submitted. Such information would be most useful in determining the lines of action for the promotion of the principle of free conditions.

Altogether one cannot help regretting that Wrexham is in Wales, as far as Londoners are concerned, and that the proposed buildings are not of such a size as to make it worth the while of those in a more extended radius to take part.

Greenwich Branch Library.

It is due to the promoters of this branch library competition to exonerate them from all blame in connection with the returning, before the award had been made, of cheques paid by competitors as deposits for conditions. The fears expressed that something had gone wrong were, if excusable, unfounded. It has been ascertained that the owners' names were not obtained from the reports which accompanied the designs, and it has been pointed out that signatures upon cheques in conjunction with letters of application for conditions are sufficient in ordinary circumstances to ensure their safe return. It will be amusing to know, however, how this action of a too zealous official will be viewed when the list is prepared of applicants (if any) who did not submit *bona-fide* designs. It would have been also amusing to have witnessed the smiles of such applicants upon the return of cheques to which they had bidden a long farewell.

The most Economical Plan for Tenement Buildings, said Mr. W. P. Rylatt at the last meeting of the Leeds and Yorkshire Architectural Society (when he read a paper on "The Better Housing of the Artizan Population") was a parallelogram two rooms deep and with a common staircase, everything as far as possible being fire-resisting. All staircases, landings and passages should be reduced to a minimum. To bring a little brightness into the lives of the tenants the buildings might be planned around a paved court or quadrangle opening into a street by one or more archways and laid out with flower beds. This court might be overlooked from balconies on each floor. In providing dwellings for the artizan class private enterprise had signally failed. It had created acres and acres of fresh jerry-built property in the suburbs, which probably in a few years would fall into a condition almost as bad as that of the wretched dwellings now being cleared out of slums.

THE PLANNING OF CREMATORIA AND COLUMBARIA.

A PAPER on this subject was read by Mr. Albert C. Freeman before the Society of Architects last Thursday.

Mr. Freeman having recently contributed an article to our columns on the same subject (see our issue for September 6th last), in which similar particulars were given, we need not here repeat them, but the following are some extracts from his paper which will be found additional to the matter already published in our pages:—

Golder's Green Crematorium.

This building, which was opened in November, 1902, is the property of the Cremation Society of England. It is designed in the Northern Italian style, and may be said to be strict in treatment, depending on its breadth and proportion rather than upon ornament. Messrs. Ernest George and Yeates were the architects. Provision is made of a chapel 70ft. long (including gallery) and 25ft. wide, with a waiting-room and vestry arranged beneath the gallery. The incinerating chamber adjoins the chapel; it is 62ft. long and 40ft. wide, with provision for four furnaces, two of which are at present erected. The internal walls of the chapel are panelled to the height of the doors, above which the arched brick walls carry an open timbered roof. The columbarium is about 22ft. square; it is a tower-like building with four storeys, having provision for the reception of 1,700 urns. It is proposed at some future date to connect this building and the chapel with cloisters.

Manchester Crematorium.

This crematorium comprises a hall or chapel about 50ft. long and 25ft. wide. Colonnades for the reception of urns are arranged on each side. On the inside wall of the hall niches are arranged for urns. The incinerating chamber, which is at the rear, has accommodation for two furnaces.

Liverpool Crematorium.

This building is an excellent example of a combined crematorium and columbarium. On the ground floor are arranged the chapel, waiting-room and incinerating chamber; while under the chapel, and with direct access from it, is provided a columbarium having three well-lighted corridors, on either side of which are arranged niches for storing urns: some of these provide for one and some for three.

Leicester Crematorium.

This building stands in the Gilroes Cemetery, Leicester. It is designed in a late Gothic style and comprises two chapels about 24ft. wide and 43ft. long, each having a chancel at the rear 17ft. by 17ft. 6ins. One of these chapels is intended for inhumation services, and the other, which is for cremation, has an oak catafalque. At the rear of the chapel is planned the incinerating chamber, which is 43ft. long and 23ft. wide. Cloisters are arranged at the front and side of the building. It is proposed at some future date to form niches for urns in the recessed spaces on the walls of the cloisters. At this crematorium also mortuaries, waiting-rooms and several other offices are provided.

Hull Crematorium.

This crematorium is built of red bricks externally, with artificial stone dressings. It is designed in the early Perpendicular style, freely treated. It comprises a chapel 24ft. square and an incinerating chamber 20ft. wide and 24ft. long. The catafalque is constructed of stone and draped with velvet.

Sheffield Crematorium.

This building, which was erected in 1904, forms an annexe to the existing chapel of the City Road cemetery. The crematorium is 36ft. square inside, and has accommodation for two furnaces, only one of which is installed at present. The building, which is of fire-resisting construction is roofed with an

octagonal dome of stone ribs and concrete, covered with roofing slabs of artificial stone. It terminates in a stone lantern, which is designed to provide both light and ventilation, and also serves to enclose the furnace shaft.

City of London Crematorium, Ilford.

This building is planned with a chapel 24ft. wide and 25ft. long. The cremating chamber is 37ft. wide and 30ft. long, with provision for two furnaces, only one of which is at present erected. The original plan has been improved, a waiting-room having been added and access from the chapel to the incinerating chamber arranged through a small lobby, instead of passing through the tower at the side of the chimney shaft. The lower floor of the cremating chamber is reached by means of a stone staircase. In this building a fuel store is provided at the ground-floor level, in addition to the one in the basement. The arrangements for a pilot fire in the chimney are also provided at this floor level. The opening into the incinerating chamber, at the head of the catafalque, is designed in terra-cotta, and fitted with a pair of iron doors, which are covered with curtains.

Geneva Crematorium.

This scheme when completed will comprise one of the finest examples of a crematorium and columbarium. The crematorium, which is designed in the Byzantine style, is the only portion at present completed. It provides on the ground floor a chapel, with the incinerating chamber under. The catafalque is of an unusual design. The coffin is placed underneath it, resting upon a lift, which is automatically lowered when the committal sentence in the service is reached. It is proposed at some future date to erect colonnades branching right and left of the crematorium, with provision for urns. The general arrangement of this building is to be found in France and Germany.

Mount Royal Crematorium, Montreal.

This building provides a conservatory or waiting hall 82ft. long and 40ft. 6ins. wide, constructed principally of glass and iron. The floor is laid with coloured marbles and banked with plants, forming a magnificent entrance hall. Leading from the conservatory, the cremating hall is reached, 56ft. long and 20ft. 6ins. wide; it is constructed with a groined stone roof, the floor, like that of the conservatory, being laid with marble, and the walls lined with a marble dado. Four doorways are provided for passing the coffins into the incinerating chamber, each being fitted with an elaborate bronze door. The incinerating chamber, which has provision for two furnaces, is 56ft. long and 20ft. long. At the rear of the conservatory, and with access from same, three large vaults or columbaria are provided for the reception of urns.

The Earl Crematorium, Troy, New York.

This building, which is designed in the Romanesque style, is 136ft. long and 70ft. wide. The chapel is 40ft. long and 26ft. wide, with a chancel 26ft. by 16ft. It is a model of architectural skill, and its furnishings throughout are in good taste. The reception-room, which is 24ft. by 20ft., is most artistically decorated. The walls are of Siena marble blocks, laid in 12in. courses, surmounted by a carved moulded cornice of the same material, and supported by a wainscotting of pink African marble 42ins. high. All the doors and windows are covered with elliptical arches of pink African marble, and in the angles are figures holding laurel leaves and flowers, executed in marble mosaic. These arches are borne upon seventeen columns, each 5ft. 9ins. high and of 11ins. diameter. The tower at the south end is 45ft. from the chapel, with which it is connected by a loggia of three massive granite arches. It is 90ft. high and 18ft. square at the base.

Crematorium and Columbarium, San Francisco.

The crematorium here contains a chapel which occupies one-half of the first floor and has seating accommodation for 140. It is fitted with all the necessities for conducting a funeral service. Beneath the chapel on the ground floor are four rooms—reception-room, preparation room, incinerating room and temporary urn room. The coffin is received in the reception-room and afterwards placed upon a lift and raised to the chapel above, being noiselessly lowered to the incinerating chamber after the service. This latter is supplied with two furnaces. Around three sides of the chamber is constructed a gallery, with seating accommodation for those relatives or friends who wish to witness the introduction of the coffin into the furnace. The columbarium, which is situated about 650ft. from the crematorium, has provision on the ground floor for upwards of 1,700 niches, varying in capacity from two to twenty urns. The first floor is a duplicate of the ground floor, except that the quadrants are lighted at the top instead of at the sides, and contains 1,600 niches. The second floor is similar to the ground floor, but the quadrants and wings are omitted; provision is made for 700 niches on this floor.

Notes.

The chapel or hall should be planned with a minimum floor space of 1,200ft. super.

The catafalque, or table upon which the coffin is placed during the service, should be planned to stand with its head abutting the wall of the incinerating chamber. When the latter is planned underneath the chapel, then the catafalque should be situated so that when the coffin is lowered it will be deposited near the front of the furnace. The catafalque in general use is about 12ft. long, 3ft. 8ins. wide and 4ft. high; the top is fitted with an apparatus worked by means of an endless chain, which conveys the coffin to the carriage arranged to run on lines inside the cremating chamber.

The opening in the wall of the incinerating chamber should be the full width of the catafalque, and about 2ft. 9ins. high; it is fitted with a pair of iron doors and should be covered with curtains.

When planned for a single furnace the incinerating chamber should have a minimum width of 20ft. and a minimum length of 25ft. This will be sufficiently large for either a "Simon" or "Toisoul-Radet" furnace; when two or more furnaces are provided, then the superficial area will be increased in proportion.

Furnaces.

The types of furnace principally in use in this country are that patented by Messrs. Simon, Ltd., of Manchester, which is heated by coal and coke; and that of Messrs. Toisoul, Radet & Co., of Paris, which is heated by coal-gas.

When a "Simon's" furnace is installed a basement about 6ft. 6ins. high is required to receive the lower portion of the apparatus. It is advisable to form an opening in the floor clear of the same. By this means the expansion and contraction which takes place will not affect the structure. The heating of this furnace is generally commenced in the lower part, and the stoking continued from the feed-hole at the ground-floor level.

When a "Toisoul-Radet's" furnace is installed no basement is required, the only provision necessary being a small pit at the rear in addition to the excavation for the lower part of the furnace, flues, &c.

The furnace should in all cases be planned to stand 10ft. from the wall of the chapel.

The Chimney Shaft

should be planned as close to the cremating furnace as possible. At the base it should be at least 2ft. square inside, and be carried up to a minimum height of 60ft. The chimneys at Hull and Ilford are

70ft., while that at Birmingham is 80ft. Mr. Freeman, however, said he had found, when these furnaces were at work, that the dampers were rarely withdrawn to their full extent, and therefore he had arrived at the conclusion that the height was excessive. If an opening of about 21t. wide by 3ft. high, fitted with iron doors, were formed at the base of the shaft it would be found to meet all the requirements for lighting a small fire and causing a draught.

Cost.

The cost of a crematorium will depend upon the number of furnaces installed, the accommodation provided for the reception of urns, and the general style and decoration of the building. The Woking Crematorium cost £5,022; the Leicester Crematorium, with chapel for inhumation service and the various other buildings, £13,830; the Birmingham Crematorium, £5,000; Liverpool Crematorium, £8,000; Ilford, £7,000; while the crematorium at Hull cost only £2,700.

THE ARCHITECTURAL ASSOCIATION.

Mr. Lynn Jenkins on Sculpture.

A MEETING of the Architectural Association was held on Friday evening at 18, Tufton Street, Westminster, the chair being occupied by Mr. Louis Ambler, F.R.I.B.A., vice-president.

The following new members were elected:—Messrs. G. W. Horne, R. Griffin, R. Mountford Piggott, E. P. Cooper, C. H. Rose and E. J. Cartaar. Mr. A. Dicken was reinstated.

The following further donations to the Building Fund were announced:—

	£	s.	d.
J. S. Gibson	-	-	1 1 0
T. H. Russell	-	-	1 1 0
C. H. F. Comyn	-	-	1 0 0
Louis Ambler (double subscription)	-	0	10 6
W. G. R. Bousfield	-	-	0 10 6
W. A. Forsyth	-	-	0 10 6
A. Huntley	-	-	0 10 6
P. E. Newton	-	-	0 10 6
D. W. Stewart	-	-	0 10 0
A. Stratton	-	-	0 10 6
H. A. Satchell	-	-	0 10 6
W. F. Unsworth	-	-	0 10 6
W. Henry White	-	-	0 10 6
T. C. Yates	-	-	0 10 6

Mr. F. Lynn Jenkins then read a paper on the consideration of sculpture by architects.

The Rise and Fall of Sculpture.

In studying the history of the earliest ages of civilized mankind he said we seldom, if ever, found the art of sculpture employed without a direct and useful purpose; the isolated statue, unless it portrayed a hero or an idol to be worshipped, being practically unknown; so that we might infer that sculptured figure or symbolic ornament, whether carved in wood or stone, marble or granite, or cast in metal, was designed and executed solely to convey an intention which could not be well expressed by any other means.

It was not until a later age that sculpture degenerated into being, broadly speaking, a means of ostentatious display of wealth and exuberant luxury, ceasing to be an integral part of the *raison d'être* of the building it adorned.

A time came when the demands of beauty claimed equal, and afterwards greater, rank than those of pure utility, and whereas in the latter case the artist was limited within set bounds, in the former the restrictions were less apparent, depending on the individual taste of the designer.

Hence the architecture of the Egyptian might be taken as one example of a period when sculpture was used solely because it was the only means the builder had of expressing his full intention, and, on the other hand, that of the Greeks as illustrative of the perfect, restrained and refined consummation of the aims of the utilitarian as well as the lover of beauty and style.

The downgrade began with the decline of the Greeks. In the ages that followed sculpture and ornament were applied lavishly, with no logical reason as regards utility of purpose, with no cultured simplicity of style, and with little or no individuality or fitness; though it was true that the Renaissance for a time stimulated a noble order of things, that while it lasted a glimpse of the vital secret of the Greeks enabled the artists of that period to attain a high standard of beauty, in which we found purity of motive, marked individuality and yet another fresh characteristic; for while the Greeks achieved an almost godlike perfection it was a pagan, superhumanly cold perfection, whereas the artists of the Renaissance, though attaining to a lower standard of success, infused a larger proportion of human nature into their productions, a sympathy with mankind born of the warmer culture of a romantic and passionate people. For this reason when the inevitable reaction again occurred the art did not sink so low, because men were striving with ideals they better understood, in which the human element responded and beckoned them on. Another factor, too, was the Gothic movement in Western Europe.

Architect-Sculptors and Sculptor-Architects.

Mr. Jenkins said he had often thought that one of the chief reasons why the sculpture and ornament of the Greeks and Romans, of the Renaissance, and of the Gothic buildings were so perfectly in accord with the architecture was because the architects were the sculptors and the sculptors the architects. Nowadays, unfortunately, we were specialists, and, as a rule, the architect knew little of the practical side of sculpture and the sculptor even less of that of architecture.

The present age, however, was one when many thoughtful, enthusiastic and inventive sculptors would gladly assist in the development of a characteristic and personal style of ornament if architects could but express what they themselves really wanted. So long as ornament was handed to business firms of architectural carvers, with private museums of stock casts as their sole inspiration—not to get new ideas from, but from which to select and arrange—just so long would the neglect of this important part of the detail of many an otherwise good building appear to the historian of our time to have been unwarrantable and inexplicable in architects showing otherwise so much individuality, forethought and enthusiasm.

Some sculptors had felt the want of individuality in carved detail so much that they had evolved their own ornament. Amongst these Alfred Gilbert, R.A., and George Frampton, R.A., were notable instances.

Life Study.

Mr. Jenkins emphasized the great merits to be derived from the close study of the human figure, to which the Greeks had given pre-eminent attention. He said he felt sure that if students were given opportunities to draw and model from life to a much greater extent than at present, and were logically trained to regard this particular study as a means to a definite end in somewhat the same manner as the Greeks must have done, then we should soon find an appreciable advance made towards the higher ideals of artistic architecture.

The Bane of the "Orders."

Students in architecture spent considerable time wading through a long course of study of the "Orders," but Mr. Jenkins doubted if 1 per cent. of such students ever took the trouble to make a complete scale drawing of the entire elevation of which the column, architrave and cornice were but details. How, then, could they possibly train themselves by such means to analyse and appreciate the great principles which guided the Greeks in designing these masterpieces?

The Mistake of Making Sculpture an Afterthought.

Architects were apt to consider sculpture as an afterthought, to be added to the design if funds permitted, or omitted if they did not. The average architect did not regard sculpture as an integral part of his conception from the very outset, the omission of which would inevitably mar the entire design, which would be equally impaired by any afterthought or addition.

There was also a tendency to be too closely bound by tradition in the application of sculpture or ornament to just those parts of a façade which had usually been so filled. Possibly custom had labelled as a general rule the most fitting parts to be decorated, but it did not necessarily follow that under new individual conditions they should still be the most appropriate.

Another Common Fault

was the over-lavish distribution of small frittering ornamental detail, which sometimes completely destroyed the simple dignity of an otherwise good architectural design. It would have been far better in some cases if ornament had been altogether omitted, or at most massed at one or two essential points. Such buildings reminded one of men whose bodies were tattooed all over with designs having no relation whatever to the form thus masked. One might admire the fine detail and workmanship of the tattooed design and yet heartily wish it were not there.

The Proper Use of Sculptured Relief

had always been one of the most difficult problems both to architects and sculptors. Either it was too high and the local colour was too marked, or the reverse was the case. It was to be borne in mind that there were two methods of obtaining strong values in relief. One was by having a high projection and making the sections rather round; while the same effect could be secured with much less actual projection by treating the planes very simply and making the edges sharp and square. It was for the architect to instruct the sculptor as to which method he considered most applicable to his design.

Collaboration.

A great deal had been written and there had been endless discussion on the subject of collaboration between architects and sculptors. Mr. Jenkins, however, said he failed to see how it was possible, in existing circumstances, for true collaboration to occur; and although in a few isolated instances a great measure of success had been attained, it had been more the result of accident than otherwise. Before collaboration could be thorough there must be a common ground of mutual understanding between the sculptor and architect, which certainly did not exist at present.

In this connection Mr. Jenkins recommended the use of

Scale Models of the Architect's Buildings.

He was convinced that in all serious undertakings where sculpture was to be employed as a part of the architectural scheme, success would in the end be more surely attained by the architect's careful consideration at an early stage of the designing of a scale model of his conception. In this model he should express his intention as to the general planes and masses, the proportionate depths and projections of mouldings and reveals, and he himself should decide by means of suggestive bits of clay exactly the disposition, pattern and projection, silhouette and mass of the parts he wished the sculptor to enrich.

In conclusion, Mr. Jenkins said it would be an excellent thing if students in sculpture and in architecture were taught side by side in classes, where the decoration of architecture with sculpture should be the subject for special consideration. Architectural models should be made by the joint efforts

of one sculptor and one architect, in the designing, modelling and decorating of which both students would become intimate with the principal laws governing each branch of the art.

Discussion.

Mr. T. Stirling Lee, proposing a vote of thanks, said that many buildings, especially in London, would be much more dignified without their ornament. The architect and sculptor must work together, and must look look at things in the same way.

Mr. H. H. Statham seconded. Of sculpture on buildings he said there were two stand-points to consider—whether the sculpture was to be put in a frame, or made a part of the building. The architect should have some idea as to what he wished the sculptor to do, and should decide whether he wished the sculpture to be an architectural ornament or, as sculpture, to be studied close at hand.

Mr. H. H. Stannus referred to the collaboration which existed between architects and sculptors in France.

Mr. Henry T. Hare said they had only to look at the monuments of London to see how much the sculptors failed in their architectural accessories.

Mr. M. Garbutt and the chairman also spoke, and Mr. Lynn Jenkins briefly replied.

Law Cases.

Converting One Dwelling House into Two.

—At Stratford recently the Bench gave their decision in a case in which Mr. Ernest F. Selby, a builder, of Leytonstone, was summoned by the Wanstead Urban District Council for converting into more than one dwelling-house a building known as Canfield, Herman Hill, originally constructed as one dwelling-house, and for having refused to submit plans and sections of every floor of such building, as required by section 90 of the council's by-laws. At the hearing of the case it was contended for the defendant that the by-law was bad because it had not yet been sanctioned by the Local Government Board, and there was uncertainty as to the meaning of it. The alterations carried out did not, it was urged, involve any alteration to the exterior of the house, the only thing done being the erection of a partition inside. —The Bench found that by-law 90 was not bad for uncertainty, and as a fact the defendant converted the building, originally constructed as one dwelling-house, into two dwelling-houses. The by-law also applied to a new building as defined by section 159 of the Public Health Act of 1875, and the Bench were of opinion that the defendant had infringed that section. The attention of the Court ought, however, to have been drawn to the case of *Hall and others v. Eastbourne Mayor, &c.* A fine of 40s. and 4s. costs was imposed. The Bench agreed to state a case.

A Travelling Crane not a Building.—At the South-Western Police Court recently Messrs. Anderson & Sons, builders and contractors, of Putney, were summoned by the London County Council for erecting an iron structure at the rear of their premises without the sanction of the Council. The question in dispute was whether the structure—a motor crane worked by electricity with a longitude run of about 120ft.—was a building within the meaning of the Act. Mr. Freeman Barrett, for the defendants, contended that the crane was no more a building than a railway truck that ran on wheels, or a roundabout. Mr. Dimes, for the Council, said section 7 was purposely framed to meet a case of this kind. Mr. Garrett, the magistrate, said in a popular sense the structure was a building, no doubt, but if he held it to be one in the legal sense he would be opening a very wide field, and all pieces of

machinery erected in yards would come within the province of the London County Council. In his judgment a structure must be in the nature of a building erected in the style of a house or shed. He accordingly dismissed this summons with £5 5s. costs.

Notes and News.

The Arts and Crafts Society is now holding its eighth exhibition—now triennial—at the Grafton Galleries. Some very interesting furniture is included in the collection.

At All Saints' Church, Belfast (in University Street) a new chancel has been added by Messrs. H. Laverty & Sons, builders, under the supervision of Mr. W. J. Fennell, M.R.I.A., architect, of Belfast.

Dublin Master-Builders' Association.—Mr. James Beckett has been elected president of this Association for 1906, Mr. R. D. Bolton vice-president, and Mr. John Good (55, Great Brunswick Street, Dublin) hon. secretary.

Reinforced Concrete on the Hennebique System will be used for the first time in Edinburgh at a large extension which is to be made to the Parkside works of Messrs. Nelson & Sons, publishers. The architects are Messrs. Cousin, Ormiston & Taylor.

Liverpool Architectural Society.—At the meeting of this Society held on Monday evening, Mr. T. T. Rees, F.R.I.B.A., read a paper on "The laying-out of streets, buildings, open spaces, parks, planting of trees, advertising hoardings and smoke nuisances," illustrated by lantern slides.

A Mock Arbitration Case *re* "Land near Highgate Road, N.W.," was heard at the Surveyors' Institution (junior meeting) on Monday evening. Mr. Howard Martin was the sole arbitrator, Mr. Sidney A. Smith and Mr. C. H. Dinwiddy were counsel for the claimant, and Mr. J. D. Young and Mr. F. S. Chesterton counsel for the promoters.

A new Weaving Mill.—The foundation-stones of the new Peel Mill at Darwen, which is being built by the Darwen Mill-Building Co., were laid recently. Messrs. John T. Henshaw, of Blackburn, are the architects and Mr. Robert Shorrocks is the contractor. The building is to be a twin mill to the newly-erected Cobden Mill.

Forthcoming Lectures at the Royal Sanitary Institute.—At the Royal Sanitary Institute the following lectures are to be delivered:—

March 19th, 21st and 30th, Mr. A. Saxon Snell, three lectures respectively on "Building Materials," "Sanitary Building Construction and Planning," and "Ventilation, Warming and Lighting."

March 26th and April 2nd, Mr. W. C. Tyndale, two lectures respectively on "Sanitary Appliances" and "House Drainage."

March 28th, Mr. J. Wright Clarke on "Details of Plumbers' Work."

Royal Academy Lectures.—The lectures on architecture and sculpture to be delivered at the Royal Academy during February and March are as follows:—

Mr. T. G. Jackson, R.A., four addresses on "Reason in Architecture," February 5th, 8th, 12th and 15th.

Mr. W. R. Colton, A.R.A., two addresses—"Enthusiasm in the Pursuit of Sculpture" on February 19th and "The Rough-hewed and the Imitation of Life" on February 22nd.

Mr. W. Goscombe John, A.R.A., on "Modern Sculpture" on February 26th.

Sir William Richmond, R.A., three addresses on "The Evolution of Sculpture—Egypt and Greece," March 1st, 5th and 8th.

Dover Harbour Improvements.—At Dover last week, after very noisy scenes, a public meeting at the town hall approved the corporation's scheme for a viaduct road, at a cost of £42,000, in connection with the harbour improvements. Sir William Crundall gave details of the great marine station, on which the harbour board will spend £600,000, and stated that the board hoped that King Edward would lay the foundation-stone in June. Work on the new Duke of York's School at Dover has been commenced by the contractors.

Mr. J. E. Sears, F.R.I.B.A., has been elected M.P. for Cheltenham.

At Colonial House, Liverpool, the new premises of Messrs. Elder, Dempster & Co. (illustrated in our issue for last week), the mosaic flooring was carried out by Messrs. Diespeker, Ltd.

Stone Preservation.—Stone buildings at Glasgow are being successfully impregnated with paraffin wax on the Farnham process. This arrests decay, and is stated to be permanent in effect.

Commemorative Tablets are to be placed on the residence of Thomas Carlyle at 33, Ampton Street; of William Wilberforce at Broomwood House, Clapham; and on 4, Carlton Gardens to mark the fact that Lord Palmerston resided there.

Scholarships for Students of the Surveyors' Institution.—The offer of the Surveyors' Institution to establish three scholarships at Cambridge University, value £80 each and tenable for three years, open only to students of the Institution, has been accepted by the Senate.

Wolverhampton and District Architectural Association.—The annual general meeting of this Association, held on January 18th, was of a business nature, the president (Mr. Fred T. Beck) being unable to be deliver his annual address through indisposition. The vice-president (Mr. W. Edwards) presided.

Architects' Benevolent Society.—Mr. Walter Emden having made an offer of £50 towards the funds of this much-deserving Society conditional on nine other gentlemen also subscribing a similar amount each, making £500 in all, Mr. H. Chatfield Clarke, F.R.I.B.A., has now come forward as the third donor of £50 in response to the appeal.

The Gold Medal of the Society of Architects has been conferred on Mr. Walter W. Thomas, past-president, of Liverpool, in recognition of his services in promoting the interests of the Society. Former recipients have been Mr. Robert Walker, of Cork (president 1890-1 and 1893-7) and Mr. Walter Emden, president for four years.

Changes of Address.—Messrs. Chambers & Martin, architects and surveyors, have removed their offices from No. 2, Lancaster Place, Waterloo Bridge, to Waldorf Chambers, Aldwych, W.C., adjoining the Waldorf Theatre.—Mr. F. C. Moscrof Young, architect and surveyor, has also removed his offices from No. 2, Lancaster Place, Strand, to Waldorf Chambers.

Proposed New County Hospital for Westmorland.—The president (Mr. W. D. Crewdson) and the hon. secretary (Mr. Colin Somervell) of the Kendal Memorial Hospital Committee have issued a statement in regard to the proposed building of a new county hospital for Westmorland. Plans have been prepared by Mr. J. F. Curwen and approved by Mr. Rowland Plumble. It is estimated that the building will cost about £12,000.

Vaults underneath the Courtyard of Charing Cross Station have been found in the course of excavation work for the tube railway. They are about 16ft. below the surface, built of bricks, with stone arches 6ft. or 7ft. high. The vaults occupied about a quarter of the area of the courtyard, and it is believed they are some of the old storage places of the Hungerford Fish Market, which occupied the site of the railway station.

"Cardinal Wolsey's Palace," No. 17, Fleet Street, the restoration of which was completed before Christmas, will cost London altogether £28,700. The committee of the County Council which has charge of the work is considering the question of utilizing the interesting room on the first floor, which has oak panelling and carving belonging to the original building, while the ceiling is an excellent example of Jacobean plasterwork.

NEW LONDON BUILDINGS.

AT yesterday's meeting of the London County Council the Building Act Committee reported the following applications under the London Building Act, 1894, their recommendations as to consent or refusal being appended in *italics*:—

Retention of buildings on the south side of Morning Lane, Hackney, between Belsham Street and the "Duke of Wellington" public-house, and the erection of buildings on a site abutting upon Morning Lane, Belsham Street and Stockman Road, on the further application of Hodson & Whitehead. (*Consent.*)

Additions to Nos. 68 and 74, Peckham Road, and four-storey bay windows at Nos. 68, 70, 72, and 74, Peckham Road, Camberwell, on the application of A. E. Mullins, on behalf of J. Tee. (*Consent.*)

Retention of a projecting porch in front of No. 4, Eddystone Road, Crofton Park, Lewisham, on the application of Mrs. F. G. Small. (*Consent.*)

Projecting porch in front of Nos. 33 and 34, Tavistock Place, St. Pancras, on the application of G. S. Wain, on behalf of F. W. Smith. (*Consent.*)

One-storey building at the rear of No. 123, Maida Vale, Paddington, with external walls at less than the prescribed distance from the centre of the roadway of Canterbury Terrace, on the application of D. C. Martin & Son, on behalf of M. Goodman. (*Consent.*)

Bay windows to Nos. 10 and 12, Glenshell Road, Eltham, on the application of J. J. Bassett, on behalf of A. Cameron Corbett. (*Consent.*)

Projecting porch in front of No. 69, Bostall Hill, Plumstead, on the application of W. B. Sheppard, on behalf of the Royal Arsenal Co-operative Society, Ltd. (*Consent.*)

Two projecting balconies in front of Nos. 10 and 11, Park Place, St. George, Hanover Square, on the application of Hart & Waterhouse. (*Consent.*)

Buildings on the site of Nos. 3, 4, 5, 6 and 7, Cleveland Row, St. James's, on the application of F. T. Verity, on behalf of J. H. Lukach. (*Consent.*)

Hotel building on a site on the west side of Gordon Street, St. Pancras, to abut also upon Gower Place and Little Gower Place, on the application of T. E. Colcutt and Stanley Hamp, on behalf of H. Regnart. (*Consent.*)

An iron structure upon the forecourt of No. 205, Clapham Road, Brixton, on the further application of H. J. Doughty. (*Refusal.*)

An advertisement board in front of No. 109, King Street, Hammersmith, on the application of F. J. Weary & Co. on behalf of Messrs. Rosenberg. (*Refusal.*)

Re-erection of No. 6, Thomas Street, Woolwich, with external walls at less than the prescribed distance from the centre of a footway leading from Thomas Street to Peakes Place, on the application of F. J. Gurney, on behalf of the Cheltenham and Gloucester Permanent Building Society. (*Consent.*)

Buildings on the south side of Talgarth Road, West Kensington, abutting upon Gliddon Road, on the application of F. P. Marwood. (*Refusal.*)

Iron lean-to van-shed on the east side of Green Lane, Lavender Hill, Battersea, on the application of W. C. Poole, on behalf of Stanley & Co. (*Consent.*)

Wood and slate played in the grounds of the Grey Coat Hospital, on the west side of Horseferry Road, Westminster, at less than the prescribed distance from the centre of the roadway of such street, on the application of J. O. Smith, on behalf of the governors of the Grey Coat Hospital. (*Consent.*)

Two external iron gangways to connect buildings on the north and south sides of Old Court, Hackney Road, Hackney, and an external iron gangway to connect No. 31, Hackney Road, with buildings on the south side of Cotton's Gardens, on the application of J. E. Saunders, on behalf of Howard, Wall & Co. (*Consent.*)

Means of escape in case of fire proposed to be provided on the sixth (top) and fifth storeys of a proposed building on the south side of the Strand, abutting upon Milford Lane, the upper surfaces of the floors of which storeys are above 6ft. from the street level, on the application of Henry T. Hare, on behalf of the United Kingdom Provident Institution. (*Consent.*)

Street out of the north side of Braidwood Road, Lewisham, at the rear of buildings abutting upon Muirkirk Road, and in connection therewith the erection of stable-buildings, on the application of E. H. Harrison, on behalf of Mr. J. Johnson. (*Consent.*)

New street for carriage traffic in continuation northward of Bloemfontein Road, Uxbridge Road, Hammersmith, on the application of R. B. Grantham & Son, on behalf of the Ecclesiastical Commissioners. (*Consent.*)

New street for carriage traffic out of the north-west side of Nimrod Road, Streatham, on the application of D. Young & Co., on behalf of A. W. Gosden & H. F. Crunden. (*Consent.*)

New street for carriage traffic to lead from Fernhill Street to Auberon Street, North Woolwich, on the application of Beale & Co., on behalf of Colonel Kennard. (*Consent.*)

Projecting one-storey shop in front of No. 88, Clapham Park Road, Clapham, on the application of H. Smith, on behalf of H. and C. Davis & Co. (*Consent.*)

Retention of porches to Nos. 7, 8, 9, 10, 11 and 12, Ruskin Walk, Herne Hill, on the application of R. L. Muskin. (*Consent.*)

Additions to a house known as "Harlestone," on the south side of Mortimer Road, Kilburn Priory, on the application of W. Reynolds-Stephens. (*Consent.*)

Building on a site between Nos. 11 and 13, Portland Place, St. Marylebone, on the further application of V. Buckland & Gerrard, on behalf of the Right Hon. Earl Temple. (*Consent.*)

Buildings on the site of Nos. 247 to 257, Fulham Road, Chelsea, on the application of Elms & Jupp, on behalf of R. C. H. Sloane Stanley. (*Refusal.*)

Raising of projecting one-storey shops in front of Nos. 168 and 170, Edgware Road, Marylebone, on the application of J. W. Stevens, on behalf of E. S. Burns. (*Refusal.*)

Iron and glass shelter in front of the South London Central Mission, New Kent Road, Walworth, on the application of A. Conder, on behalf of the Rev. A. Mearns. (*Refusal.*)

Houses on the site of Nos. 1 to 12, King's Court, Southwark, with external walls at less than the prescribed distance from the centre of the roadways of King's Court and Prince's Place, on the application of A. Burr, on behalf of the trustees of the Jolly Trust. (*Consent.*)

Addition to the St. John's Schools, Halley Street, Stepney, with external walls at less than the prescribed distance from the centre of the roadway of John Street, on the application of T. J. Bailey, on behalf of the Education Committee of the Council. (*Consent.*)

Temporary buildings at the school, Gipsy Road, Norwood, on the application of T. J. Bailey, on behalf of the Education Committee of the Council. (*Consent.*)

Retention of a lavatory addition to the United Services Club, Pall Mall, abutting upon Waterloo Place, on the application of H. L. Florence, on behalf of the trustees of the United Services Club. (*Consent.*)

Projecting one-storey shops in front of Nos. 123 and 125, Fortress Road, St. Pancras, on the application of T. Fraser, on behalf of T. H. Hawkins. (*Refusal.*)

Projecting one-storey shops in front of Nos. 103 to 121 (odd numbers only) inclusive, Fortress Road, St. Pancras, on the application of T. Fraser. (*Refusal.*)

Retention of a building at the rear of No. 35, Thornhill Road, Islington, with a forecourt boundary at less than the prescribed distance from the centre of the roadway of the southern arm of Barnsbury Square, on the application of F. J. Eedle & Meyers, on behalf of T. Heath. (*Refusal.*)

Artizans' dwellings on the north-eastern side of Pond Place, Chelsea, on the application of Joseph & Smithem, on behalf of the council of the metropolitan borough of Chelsea. (*Consent.*)

Artizans' dwellings on the north-eastern side of Marshall Street, Westminster, in the position, to the height and with irregular open spaces at the rear, on the application of Joseph & Smithem, on behalf of the Council of the City of Westminster. (*Consent.*)

Retention of buildings abutting upon Cathcart Street and Holmes Road, Kentish Town, on the application of P. Dollar, on behalf of Birch Brothers. (*Refusal.*)

Two houses on low-lying land situated at the rear of Nos. 18 and 20, Havil Street, Camberwell, on the application of T. Wilson. (*Consent.*)

Buildings on part of the open space at the rear of Nos. 164 to 172 (even numbers only) inclusive, Earl's Court Road, Kensington, on the application of W. G. Hunt. (*Consent.*)

One-storey shops at Nos. 164 to 172 (even numbers only) inclusive, Earl's Court Road, Kensington, to abut also upon Penyern Road, on the application of W. G. Hunt, on behalf of Jones Brothers. (*Consent.*)

Retention and completion of a building on the south side of Dalgarno Gardens and western side of Bracewell Road, Hammersmith, on the application of P. Tinckham. (*Refusal.*)

Three houses, and the retention of nine houses, on the east side of Garratt Lane, Wandsworth, between Quinton Street and Littleton Street, and the retention of a house on the west side of Trannere Road, abutting upon Quinton Street, on the application of Holloway Brothers. (*Consent.*)

Building on a site abutting upon the north side of New Kent Road and the west side of Old Kent Road, Bermondsey, on the application of A. Harrison, on behalf of the council of the metropolitan borough of Southwark. (*Consent.*)

Deviation from the plan approved on 18th July, 1905, in respect of the erection of buildings on the west side of Streatham Hill, at the corner of Drewstead Road, Wandsworth, so far as relates to the erection of an office building on the south side of Drewstead Road, and to an alteration in the space at the rear of the buildings on the west side of Streatham Hill, on the application of Taylor & Sons. (*Consent.*)

Uniting of No. 5, Threadneedle Street with No. 8, Finch Lane, City, on the application of T. B. Whinney, on behalf of the London City and Midland Bank. (*Consent.*)

Deviations from the plans relating to the proposed re-erection of No. 13, Golden Square, Strand, on the application of W. Woodward. (*Refusal.*)

Coming Events.

Wednesday, January 24.

EDINBURGH ARCHITECTURAL ASSOCIATION (Associates' Section).—Mr. J. M'Kessack on "Architectural Photography," at 8 p.m.

Friday, January 26.

JUNIOR INSTITUTION OF ENGINEERS.—Prof. J. D. Cormack on "Notes on Boiler Trials," at 8 p.m.

INSTITUTION OF CIVIL ENGINEERS (Students' Meeting).—Mr. T. R. Grigson on the "Prince of Wales' Pier, Falmouth," and Mr. H. C. H. Etheridge on the "Ferro-concrete Pier at Purfleet," at 8 p.m.

GLASGOW TECHNICAL COLLEGE ARCHITECTURAL CRAFTSMEN'S SOCIETY.—Mr. James Campbell Reid on "Architectural Censorship," at 8 p.m.

Saturday, January 27.

ARCHITECTURAL ASSOCIATION.—Visit to the New Central Criminal Court, Old Bailey, at 2 p.m.

JUNIOR INSTITUTION OF ENGINEERS.—Visit to University College Engineering Laboratories.

Monday, January 29.

SURVEYORS' INSTITUTION.—Ordinary General Meeting at 8 p.m.

Tuesday, January 30.

MANCHESTER SOCIETY OF ARCHITECTS.—Mr. J. Norquay on "Hints on Quantity Surveying," at 6.45 p.m.

Wednesday, January 31.

NORTHERN ARCHITECTURAL ASSOCIATION.—Mr. A. W. S. Cross on "Rome in the Augustan Age," at 7.30 p.m.

SOCIETY OF ARTS.—Mr. T. Adams on "The Garden City and the Cheap Cottage," at 8 p.m.

ARCHITECTURAL ASSOCIATION (Discussion Section).—Mr. A. C. Dickie on "Internal Steps and Stairs and their Treatment," at 7.30 p.m.

Friday, February 2.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—Mr. H. V. Lanchester, F.R.I.B.A., on "Cardiff Municipal Buildings."

ARCHITECTURAL ASSOCIATION.—Students' Smoking Concert, Gaiety Restaurant, at 8 p.m.

JUNIOR INSTITUTION OF ENGINEERS.—Mr. Kenelm Edgcombe, M.I.E.E., on "Some Recent Electrical Engineering Measuring Instruments," at the Westminster Palace Hotel, at 8 p.m.

Monday, February 5.

ROYAL ACADEMY.—Mr. T. G. Jackson, R.A., on "Reason in Architecture."

Current Market Prices

FORAGE.

			£	s.	d.	£	s.	d.	
Beans	per qr.	1	13	0	1	15	0
Clover, best	per load	3	12	0	4	0	0
Hay, good	do.	3	5	0	3	17	0
Sainfoin mixture	do.	3	5	0	3	15	0
Straw	do.	1	8	0	1	14	0

OILS AND PAINTS.

Castor Oil, French	per cwt.	1	1	10	1	2	0
Colza Oil, English	do.	1	6	0	—	—	—
Coppers	per ton	2	0	0	—	—	—
Lard Oil	per cwt.	2	15	0	2	17	0
Lead, white, ground, carbonate	per ton	16	0	0	—	—	—
Do. red	do.	15	0	0	0	19	0
Linseed Oil, barrels	per cwt.	1	1	6	—	—	—
Petroleum, American	per gal.	0	0	6½	0	0	6½
Do. Russian ...	do.	0	0	5½	0	0	5½
Pitch	per barrel	0	8	0	—	—	—
Shellac, orange	per cwt.	9	5	0	—	—	—
Soda, crystals ...	per ton	3	2	6	3	5	0
Tallow, Town ...	per cwt.	1	6	0	1	7	0
Tar, Stockholm	per barrel	1	5	0	—	—	—
Turpentine	per cwt.	2	7	4½	—	—	—

METALS.

Copper, sheet, strong	per ton	93	0	0	—	—	—
Iron, Stuffs, bar	do.	7	5	0	8	10	0
Do. Galvanized Corrugated sheet	do.	12	7	6	12	10	0
Lead, pig, Soft Foreign	do.	16	12	6	16	13	9
Do. do. English common brands	do.	17	0	0	—	—	—
Do. sheet English, 3lb. per sq. ft. and upwards	do.	18	0	0	—	—	—
Do. pipe	do.	18	10	0	—	—	—
Nails, cut clasp, 3in. to 6in.	do.	9	5	0	—	—	—
Do. floor brads ...	do.	9	0	0	—	—	—
Steel, Stuffs, Girders and Angles	do.	7	0	0	7	5	0
Do. do. Mild bars ...	do.	7	5	0	7	10	0
Tin, Foreign	do.	162	7	6	163	7	6
Do. English ingots	do.	165	0	0	167	0	0
Zinc, sheets, Silesian	do.	31	5	0	—	—	—
Do. do. Vielle Montaigne	do.	31	15	0	—	—	—
Do. Spelter	do.	27	13	9	28	2	6

TIMBER.

Soft Woods.

Fir, Dantzic and Memel	per load	2	15	0	5	0	0
Pine, Quebec, Yellow	do.	4	2	6	7	10	0
Do. Pitch, American	do.	2	19	0	5	0	0
Laths, log, Dantzic	per cu. fath.	4	0	0	6	0	0
Deals, Nederkalix, Yellow, 1st, 4x11	per std.	12	15	0	—	—	—
Do. do. 2nd, 3x5	do.	8	5	0	—	—	—
Do. Gothenburg, Yellow, 4th, 4x11	do.	10	5	0	—	—	—
Do. do. 5th, 4x11	do.	8	15	0	—	—	—
Do. Batiskarsnas, Yellow, 1st, 4x7	do.	9	0	0	—	—	—
Do. do. 2nd, 4x7	do.	8	15	0	—	—	—
Do. Soroka, Yellow, 2nd, 3x11	do.	16	5	0	—	—	—
Do. do. 3rd, 3x11	do.	10	15	0	—	—	—
Do. do. 3rd, 3x9	do.	10	15	0	—	—	—
Do. St. Petersburg, Yellow, 1st, 3x9	do.	13	15	0	—	—	—
Do. do. 3rd, 2½x7	do.	8	10	0	—	—	—
Do. do. White, 3rd, 3x9	do.	8	15	0	—	—	—
Do. do. 3rd, 2½x7	do.	8	10	0	—	—	—
Do. Archangel, Yellow, 3rd, 3x9	do.	11	5	0	—	—	—
Do. Umba, Yellow, 1st, 3x9	do.	18	15	0	—	—	—
Do. do. 2nd, 3x9	do.	15	15	0	—	—	—
Do. Onega, Yellow, 2nd, 3x9	do.	15	5	0	—	—	—
Do. Soderhamn, Yellow, low, Unsorted, 3x½	do.	9	10	0	—	—	—
Do. Riga, White, Unsorted, 2½x7	do.	8	0	0	—	—	—
Battens, all kinds	do.	6	10	0	9	10	0
Flooring Boards in prepared, 1st...	persquare	0	11	0	0	11	9
Do. 2nd	do.	0	8	9	0	10	6
Do. 3rd, &c.	do.	0	8	9	0	9	6

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Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

Weight on Girder.

MANCHESTER.—F. J. A. writes: "The answer to my enquiry as to weight carried by girder over shop front does not quite state what I want to know. You give me the weight of brickwork on girder only. I ask for the total weight (near enough for practical purposes) carried by the girder—that is to say, brickwork, floor which is carried by girder, and roof."

Assuming that the total dead load on the roof is 20 lbs. per sq. ft. of horizontal projection, and that the vertical component of the windload is 35 lbs., and weight of ceiling 10 lbs. per sq. ft., we have a total load of 65 lbs. per sq. ft. to be carried on the wall. Assuming also a total dead and live load on floor of 125 lbs. per sq. ft. and the weight (as per our previous answer to this question) 12,667 lbs., we have—

Roof and ceiling, 14ft. x 16ft. x 65 lbs. + 2	7,280
Floor 12ft. x 16ft. x 125 lbs. + 2	12,000
Wall - - - - -	12,667

Total uniform load on girder = 31,947

Say 32,000 lbs., or approximately, 14½ tons.

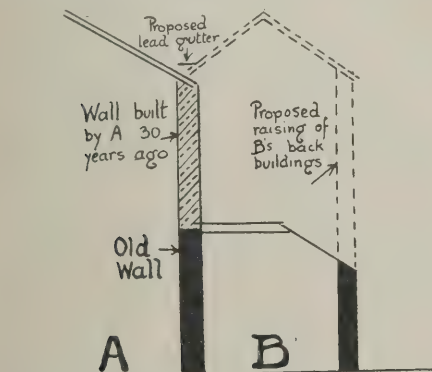
The maximum bending moment in the beam will be $\frac{32,000 \times 17\text{ft.} \times 12}{8} = 816,000$ inch-lbs.

For a fibre stress of 16,000 lbs. per sq. in. the section modulus required would be $\frac{816,000}{16,000} = 51$ inch³. The most economical

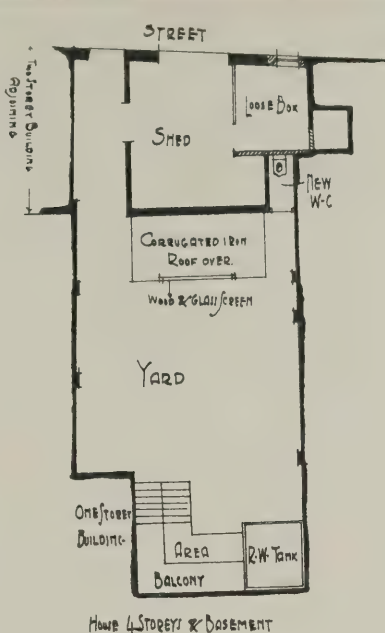
British standard beam to use is 12in. x 6in. x 144 lbs. The section modulus of this beam is 52.57. B.

Adjoining Owners: Right to heighten Wall.

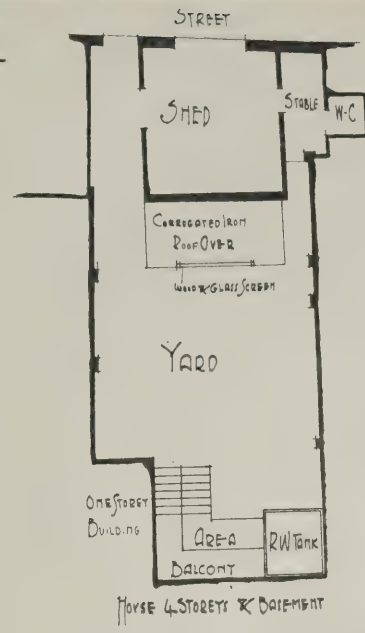
S. writes: "A and B are adjoining owners. About thirty years ago the wall dividing the back buildings of the two properties and supporting the timbers of the floors and roofs of each was raised 10ft. by A in order to



add a storey to his back buildings. The new roof was made to cover the wall, and the gutter to project 2ins. beyond the face of the wall on B's side. B now wishes to raise his back buildings, to make use of the upper part of the wall (built by A) to support his (B's) roof timbers and to lay along the top of the wall a lead gutter common to both and taking away the water from both A's and B's roofs. Has B the right to do this, and is it necessary for him to serve a notice on A? A's solicitor says B has no right to use the wall above the height of his (B's)



PLAN AS PROPOSED



PLAN AS AT PRESENT

PLANS FOR ALTERATIONS.

old buildings—that is, he has no right to use the portion added by A thirty years ago: and that even if he had right he could not strip slates from A's roof in order to lay the new lead gutter. B's solicitor says that A has acquired ownership of the whole of the wall from top to bottom by having built upon it and roofed it and remained in possession of it for 30 years. I am acting as architect for B. I took the wall as a party-wall, and maintain it to be so in spite of the above opinions. Am I right? There are no writings or plans defining any boundaries."

A's solicitor is quite right. The ownership of this wall is divided horizontally at the uppermost point of B's building; below that point the wall may be (1) a party-wall, or (2) A's wall, subject to an easement on B's part, and above that point the wall is entirely A's property. The case of *Weston v. Arnold* (Law Reports, 8 Ch. 1084) deals with an exactly similar position. If you have access to the "Transactions" of the Surveyors' Institution you will find an almost exhaustive paper on this difficult subject in volume 24 (1891-2). F. S. I.

Submission of Plans for Alterations.

SCARBOROUGH.—UNDECIDED writes: "The accompanying plans represent a portion of premises recently taken over. Would it be possible to make the small alteration shown without submitting plans to the urban authority, whose by-laws practically coincide with those issued by the Local Government Board? Also, have the council power to veto the work under their by-laws? The existing shed is of one storey. The old roofs would not be touched, a new roof being provided to the new w.c. Alternatively, have the council power to veto a new two-storey building of similar height and section to that adjoining? It is undesirable to approach the council unless it is practically certain that the alterations will be approved, as the present arrangement is most insatisfactory, and there is a great probability that the whole premises might be condemned."

I fear that there is no doubt you must submit plans for this work and give the usual notices to the local authority. The alterations shown are small but are not exempt from the operation of the by-laws. The urban council cannot veto a two-storey building if it is to be built in accordance with the by-laws and you have sufficient air-space in the rear. F. S. I.

Right of Council to ask for Elevations.

TONDU.—E. B. & S. write: "A few weeks ago we forwarded plans of four small cottages to the rural district council for their approval, but we showed no elevation. The plans were refused and sent back with a letter requiring an elevation. This we sent under protest. They were again refused, the surveyor stating to his council that he required yet another elevation. In no part of the by-laws in force by the council can we see any mention of an elevation being required. Section 52 states that plans and sections to a scale of 8ft. to an inch and a block plan to a scale of not less than 44ft. to an inch are required. The same wording occurs in the requirements for the laying-out of streets, and surely no elevation can be made of a street! By demanding one elevation the surveyor seems to us to be at liberty to demand the four. As an instance of an opposite view, we give you the following:—Some time ago we sent to the urban district council adjoining the above rural district council plans of some large houses and shops, in this case also not sending an elevation, and they were passed at once, the surveyor then remarking that elevations could not be demanded. Yet the by-laws in force by both councils are the same. We also know of other urban district councils where elevations are not sent in and not demanded, though as a rule we send one with all our plans, but think that if not distinctly asked for in the by-laws the surveyor has no authority to demand one or more as he likes."

The Model By-laws call only for "complete plans and sections of every floor," and I believe you are correct in your contention that elevations cannot be legally demanded. Is it, however, worth while to contest so small a point, annoying though, no doubt, the surveyor's action has been? F. S. I.

Oversailing Courses on Chimneys.

HANDSWORTH.—DILEMMA writes: "I have recently erected some chimneys, the side faces of which were flush on the boundary line of our land, and have returned the moulded courses to the caps round the sides, overhanging about 4½ins. over the adjoining land. The adjoining owner objects to the oversailing courses overhanging his land, and demands that I shall cut them off at once. Can he legally enforce this? I have asked several architects, but they were

unable to tell me whether by law the adjoining owner could compel me to cut off the courses. I can see any number of chimneys in similar circumstances, similarly treated, and, as I knew before erecting them that these courses, being simply ornament, carried no easement, I am very loth to spoil my chimneys, and shall not do so unless the law compels me."

Upon the broad principle "that the land that one buys is one's own to the skies" you have undoubtedly committed a trespass in building the smallest portion of your chimney over the adjoining land, and I advise you to make the best terms with your neighbour which you are able. Probably the footings of your wall are also projecting into his property. You should have kept your external wall $4\frac{1}{2}$ ins. within your boundary had you intended to build in this way. F. S. I.

A Building Plot.

STRONG writes: "I wish to buy a piece of vacant land in a town at the junction of two roads, and desire to erect a building thereon. The corporation wish to widen one of the roads, and have drawn an improvement line on the ordnance survey on the road in question, which can be seen at their offices. I want to know before purchasing the land (1) whether the corporation are obliged to give their consent for the erection of a suitable building on application being made to them; (2) whether such a building can be built to the road improvement line, notwithstanding that buildings stand further back than the improvement line, though at a distance of several hundred yards buildings come to the causeway; (3) whether I should be obliged to sell to the corporation the amount of land required by them for less than cost price, such price being reasonable market value."

(1) Yes, if the proposed building is in accordance with the by-laws. (2) This would be in the discretion of the corporation. Section 3 of the Public Health Act, 1888, provides that the building owner may not erect any building beyond the front main wall of the building on either side of it without the consent of the local authority. (3) If any land be taken from you compulsorily you must be properly compensated for the land taken and for any other damage suffered by you in consequence of such compulsory taking, and if necessary the amount to be paid must be settled by arbitration. The fact that you have recently paid a certain price for the land would constitute strong evidence of value. F. S. I.

Expansion of Cement.

YORK. — J. W. writes: "In the British standard specification for Portland cement (issued by the Engineering Standards Committee) a description of the Le Chatelier test is given in clause 11, which closes with the words: 'The difference between the two measurements represents the expansion of the cement, which must not exceed the limits laid down in the specification.' The specification does not give limits; what should they be?"

The words you quote are at the end of clause 11. The limit of expansion is given in the opening sentence of the same clause.

Formulae for Beam.

M. C. O. writes: "Rivington, vol. 4, and Mitchell's 'Advanced Building Construction' give maximum bending moment for beam with distributed load, supported at ends $\frac{wl^2}{8}$, but Charnock's 'Graphic Statics,' vol. 2, Dorman, Long & Co.'s and Redpath, Brown & Co.'s catalogues give $\frac{wl}{8}$. Which is correct?"

The formula $\frac{wl}{8}$ is generally given as $\frac{wl^2}{8}$

where w = load per foot run in tons, l = span in feet, 8 = coefficient for uniformly distributed load on beam with ends supported.

The formula $\frac{wl}{8}$ is the usual form for a total distributed load, so that $w = wl$; hence the exact agreement in value of the two formulæ for the bending moment.

HENRY ADAMS.

Widenings and New "Streets."

LONDON. — R. N. writes: "Does the widening of a street constitute a 'new street'?"

It is impossible to give an opinion without having all the details. There have been several decisions more or less bearing on the point; and some of them are conflicting. The enquiry does not state if the street is at present repairable by the inhabitants generally, or if there are houses on one or both sides of it; both of which questions have an important bearing on the case.

Mr. WALMSLEY ON MODERN SURVEYING INSTRUMENTS.

AT last week's meeting of the Surveyors' Institution Mr. Arthur T. Walmisley, M.I.C.E., read an interesting paper on "Modern Surveying Instruments." He said there was no survey so accurate as an ordinary chain survey properly triangulated, and the measurement of horizontal distances in levelling operations by the chain was a system unrivalled for correctness. Various ingenious devices had nevertheless been brought forward to attain not only records of levels but also horizontal measurements by optical instruments (many forming the subject of patents), and for giving greater simplicity of setting up during out-door work, transport in the field, and other improvements calculated to aid speed, accuracy and concise records.

There had been many consecutive improvements upon old forms of instruments, and the development of modern machinery had greatly contributed to securing perfection of wearing surface combined with solidity.

Dumpy Levels and Theodolites.

The best form of level was largely a matter of experience. For a beginner a 14 in. dumpy level without the addition of a compass (which only increased the cost), and with comparatively heavy tripod legs for stability in the field, would undoubtedly prove the most suitable, but an experienced surveyor could work equally well with a 12 in. or even with a 10 in. telescope, supported upon lighter tripod legs.

Mr. Walmisley proceeded to refer to modern improved instruments—Cushing's level, Cooke's reversible level, Pastorelli's level, Jahn's level, Doering's level (which has a gimbal-joint action in the tripod head, so that on uneven ground the tripod can be put down anywhere and the telescope adjusted by the vertical arcs of the instrument), the new engineer's level made by W. F. Stanley, and Troughton's and Simms's level.

Adjusting the Line of Collimation.

The line joining the optical centre of the object-glass and a point in the line of the horizontal wire of the diaphragm should be horizontal when the bubble was in the centre of its opening. Whenever the object-glass had been removed a re-determination of this adjustment, known as the adjustment of the line of collimation, was necessary for absolute accuracy. Hence upon receiving a new instrument from the makers Mr. Walmisley said he always took the precaution to file a mark across the junction of the object-glass holder with the telescope, in order to ensure the replacement of its screwed end in its proper position after removal for purposes of drying or cleaning the object-glass.

In the majority of modern dumpy levels

Stadia Lines

were added in the diaphragm set to $\frac{1}{100}$, so that in taking the readings on a distant staff by means of these subtense lines the surveyor read every $\frac{1}{100}$ ft. (or metre) upon the staff as being equal to 1 ft. (or metre) of the distance from the centre of the instrument, adding to the reading a constant for any distance shown. This constant was usually given by the maker of the instrument, and could be checked experimentally by the surveyor. With regard to

The Diaphragm

this might consist of (a) webs, (b) platinum iridium points or (c) lines on glass. Mr. W. F. Stanley argued that the use of iridium points obviated the covering of the divisions on a level staff, but Messrs. Troughton & Simms adhered to the old form of spider-web diaphragms as preferable both for reading an ordinary level staff or a special stadia rod. Messrs. T. Cooke & Sons also maintained the superiority of web diaphragms except for reversible eye-pieces.

Various modern theodolites were next discussed by Mr. Walmisley, and reference was made to the Hoffman tripod head, which combines the action of a ball and socket joint with the rigidity of the ordinary parallel plates.

The Tacheometer.

Speaking of this addition Mr. Walmisley said that the use of an anallatic or conveying lens ($6\frac{1}{2}$ ins. focal length to an object-glass of 12 in. focal length) in a tacheometer dispensed with the addition to every reading of what was called "the constant" of the instrument, which was always necessary in the case of theodolites merely provided with stadia lines to attain a similar object.

Stanley's Inclinometer

(Lister's patent) was somewhat similar in construction to a theodolite, but with the addition of an extra vertical axis to the telescope carried through the horizontal axis at right angles. By this means the telescope could be moved upon this supplementary vertical axis in a plane of any inclination desired, so that if the horizontal axis were set to the slope of a railway cutting a number of pegs might be set out continuously with the same setting by direct observation through the telescope across any inclination of the land surface.

By the use of such an instrument an immense amount of work might be saved in setting-out the surface of land for widths of slopes or batters by pegs, over the ordinary system of pegging, by calculation with a theodolite, where each peg required a separate setting of the instrument. In taking cross-sections and all levelling on sloping uneven ground the saving of time and labour was also very great, and the work resulting therefrom was sufficiently accurate for trial sections and preliminary investigations.

Sheldon's suspension level, the Grubb circumferentor, Puller's new tachymeter, the eidograph (which has superseded the pentagraph), Amsler's planimeter for the measurement of areas in square inches and other instruments were described, and, lastly, reference was made to

The Application of Photography to Surveying

(as shown by Mr. Bridges Lee), Mr. Walmisley observing it was probable that photography would prove quite as satisfactory a process as fixing survey lines by the magnetic needle of a compass for general plans, and that it would come gradually into greater use for assisting the surveyor to record not only the base lines of plans but the vertical section lines of the surface of the ground. Building plans, in which dimensions were to be stated, had of course to be correctly measured in the field, but for index or key plans the value of photography was universally acknowledged.

THE FOREIGN COMPETITOR IN THE BUILDING TRADE.

SPEAKING recently at Reading, Mr. G. H. Johnstone (Conservative and Unionist candidate) dealt with the question of unemployment as it affected the building trade. As to the cause of this unemployment and the slackness of the trade of which it was the expression, those who wished for some alteration in the present fiscal system were of opinion that it was due entirely to the fact that certain articles which they felt could and should be made in England were made and manufactured in foreign countries. After reading a letter which had appeared in a local contemporary in which the writer said that the altar rails used in church extension work at Caversham were made in Belgium and put up by Belgian workmen, as an instance of the way in which foreign competition was affecting the trade, Mr. Johnstone said he would first turn their attention to

The Importation of Foreign Doors.

They had only to go down to one of the wharves at Reading to see arriving week by week large barge-loads of doors which had come from foreign countries. He believed it was a fact that those doors were brought into the town and sold at 4s. 3d. each, which was, he understood, less than the price at which the raw material of which the doors were made could be bought here. Foreign manufacturers were selling their goods in England under the price at which the Englishman could make them, and that was why the trade was being ruined. He inspected a house recently built near Reading in which all the doors, window frames and sashes, floors and every particle of "inside building" had been brought over from France and put in by French labourers.

Granite Industry Going.

The granite industry had also suffered. It used to be one of the very best of Cornish industries, but it had become absolutely stagnant owing to foreign importations. In the Keyham extension works almost all the granite used came from Norway and Sweden. The curb granite trade up to 1880 was a most important branch of the industry, more than 20,000 tons being shipped every year from Devon and Cornwall. But it had now become almost extinct, owing to the increasing use of foreign granite, while the heavy engineering work had also been attacked of recent years, more than 2,000,000 cub. ft. having been shipped from Norway and Sweden for dock and harbour works in Great Britain.

French and American Slates.

Slates too were affected, the exports to foreign countries in 1902 having been £30,000, while in 1904 they were only £24,000. French and American slates were dumped on the English market at 15 to 20 per cent. less than the home prices, with the result that the Welsh and the English quarries were only working two or three days per week, while their stock was daily increasing with no chance of sale, whereas four years ago the Welsh quarries were in full swing and unable to cope with the demand.

There were also being brought into the country from abroad a large number of bungalows ready for fitting up.

Bricks.

Our exports of bricks to foreign countries in 1889 were worth £220,000, whereas in 1904 they were only £150,000, but the increased exportation to the Colonies counter-balanced the decreased supply to foreign countries. The tariff put on English bricks by foreign countries went far to explain the diminished exports.

The cabinet and furniture trade had the same tale to tell, while as to the cement trade he would not give any figures, for again the facts were similar.

Aberdeen Granite Association and Protection.

At a recent meeting of the members of the Aberdeen Granite Association a resolution was passed affirming "the necessity for fiscal reform in order to secure fair conditions for employers and workmen," and appointing a committee to prepare a statement of facts for publication, together with an appeal to the general public to support the candidates for Parliament favourable to fiscal reform.

A CLERK OF WORKS ON MORTAR.

AT last week's meeting of the architectural section of the Royal Philosophical Society of Glasgow Mr. Samuel Smith, clerk of works at the new Glasgow Technical College, read a paper on "Mortar."

After briefly referring to the conversion, by burning, of limestone into caustic or quick lime, and describing the chemical changes that take place during the operation, he went on to show how an ordinary lime set or hardened by the action of the carbonic acid gas in the atmosphere. The gas, aided by the water with which the mortar was mixed, reconverted the slaked lime into the carbonate of lime, or limestone. He also showed how sand, in addition to counteracting the shrinkage of the lime, assists in the process of setting.

Excellence of Old Mortar.

By the aid of diagrams he showed the difference in composition of the various limes that are classed as natural hydraulic and artificial hydraulic limes. Specimens of various mortars were exhibited, one being from the foundations of the old Andersonian Buildings, recently demolished to make room for the extension of the Technical College buildings. On analysis this mortar was found to be composed of 1 part of Roman cement (in all probability from the quarry at Crossbasket) and 1 of sand. It was in a perfect state of preservation, while the ordinary Scotch lime mortar used for the rest of the building was friable and rotten. Mr. Smith was of opinion that this mortar was prepared in 1836, nearly 70 years ago.

Another sample shown was a piece of mortar composed of 1 part Arden lime, 1 of engine ashes and 1 of freestone shivers, ground together in a mortar mill. This, to judge by the sample shown, made a first-class mortar.

Mr. Smith then described the process of the manufacture of Portland cement, which was an artificial hydraulic lime, and described various mechanical tests of the quality of that material, giving also its chemical constitution. He then went on to speak of

Sand and its Substitutes.

showing how to test sand for mud and other impurities, and gave a description of some of the substitutes.

After describing the methods of slaking and mixing mortar, he spoke of the evils of remixing or softening up of hydraulic limes. By the aid of a large diagram it was shown that Arden lime mortar to which water was added after it had commenced to set lost all its hydraulicity or setting power and became the same as an ordinary fat lime, which had to depend on the assistance of the carbonic acid gas to help it to set.

The lecture closed with a description of the effects of frost on mortar and the various expedients adopted to counteract them.

Obituary.

Mr. John Walker, of Messrs. Walker & Slater, builders, of Derby, died recently, aged 64.

Mr. Walter Woodward, of the firm of Woodward, Clark & Co., timber merchants, of Nottingham, died worth £13,660.

SCOTLAND'S HISTORICAL BUILDINGS.

What H.M.'s Office of Works is doing.

MR. W. T. OLDRIEVE, principal architect for Scotland of H.M. Office of Works, read a paper at last Wednesday's meeting of the Edinburgh Architectural Association in the course of which he explained what his Department was doing for national historical buildings in Scotland. He said that Scotland was rich in remains of architectural monuments of the past, but the greater number of these were under no official cognizance. That being so, the work of the National Art Survey of Scotland deserved special notice and recognition; he could not imagine a more praiseworthy scheme than that of encouraging architectural students under proper guidance to systematically measure and sketch the more important architectural remains. If these were tabulated and published in due course, they would be of universal value for reference when the official inventory was compiled.

The historic buildings and remains over which his Department had direct control might be classified under two heads—(1) buildings vested in the Department, and (2) architectural and antiquarian remains of which the Commissioners of Works were custodians under the Ancient Monument Acts. It was now recognized, however, that other Government Departments which carried out building works referred to the Commissioners of H.M. Works cases which affected ancient buildings of an architectural character, as, for instance, the War Department with reference to Edinburgh Castle, Stirling Castle, &c., and the Admiralty Department in the case of Rosyth Castle, a proposed restoration of which was contemplated.

Mr. Oldrieve then enumerated the archaeological remains and ancient monuments under the charge of his Department, after which he proceeded to show by means of limelight views other important historical buildings under the charge of the Board of Works on which certain restorations had recently been made. First among these was

Edinburgh Castle.

the care of which, he said, had now been transferred from the Royal Engineers' Department of the War Office to H.M. Board of Works. One of the first things that was done was to rearrange, at a cost of about £1,000, the fire appliances at the castle, and on that account it was now much safer from fire than it had formerly been. They were also considering how best to re-model the block known as the "new barracks." He was quite alive to the necessity of moving very carefully in the matter, and before anything was actually attempted upon the building itself he should endeavour to have not only photographs and perspective sketches from various standpoints, but a model prepared for full consideration.

Holyrood Palace.

In regard to this building he mentioned the restoration which had just been carried out in Queen Mary's audience chamber by the removal of a comparatively modern partition which divided the room into two parts. Visitors would now be able to see the chamber practically as it was at the famous interview of John Knox with Queen Mary, and it would be worth while to look at the old ceiling, now that it could be properly seen, especially as it was the only ceiling which was part of the original building as occupied at the Queen Mary period.

Lastly Mr. Oldrieve directed attention to the restoration of Parliament Hall, and to the preservation work which had been executed at Linlithgow Palace, at Dunfermline Abbey, at St. Andrew's Cathedral (where in September last stone coffins of the priors had been discovered), at Arbroath Abbey, Dundrennan Abbey, Fortrose Cathedral, Haddington Abbey and Rosyth Castle.

Complete List of Contracts Open.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING :			
Jan. 25	Fressingfield—School	Managers	Rev. Canon Raven, The Vicarage, Fressingfield.
" 25	Marsden—Houses	Instruction Committee	J. Kirk & Sons, Architects, Huddersfield.
" 25	Kingstown—Technical School	Education Committee	G. T. Moore, Architect, 1 and 2 Foster Place, College Green, Dublin.
" 25	Barry—Schools	J. A. Ripley	G. A. Birkenhead, Architect, 21 Park Avenue, Barry.
" 25	Castleside—Villa	Girls' College	J. J. Eltringham, Architect, Derwent Street, Blackhill.
" 25	Edgehill—Extending Wing	Corporation	J. Crocker, Architect, 98 Queen Street, Exeter.
" 25	Balsall Heath—Electric Sub-station	E. Stanhope	G. Kenrick, Surveyor, 83 Colmore Row, Birmingham.
" 25	Churwell—Cottages	Governors	Buttery & Bird, Architects, Exchange Buildings, Queen Street, Morley.
" 27	Dorchester—Alterations	Corporation	F. T. Maltby, Architect, Dorchester.
" 27	Glasgow—Extensions, &c.	Presbyterian Church	Public Works, City Chambers, 64 Cochrane Street, Glasgow.
" 27	Llwynypia—Houses	Guardians	Evan L. Parry, 80 Partridge Road, Llwynypia.
" 27	Londonderry—Manse	Cricket Club	J. M. Robinson, Architect, 7 East Wall, Londonderry.
" 27	Warminster—Villas	Committee	A. F. Long, Architect, 53 Market Place, Warminster.
" 27	Windsor—Porter's Lodge	Corporation	Edgington & Summerbell, 7 Park Street, Windsor.
" 29	Dewsbury—Extension of Pavilion	Corporation	C. H. Marriott, Son & Shaw, Church Street Chambers, Dewsbury.
" 29	Halstead—Alterations	Corporation	R. L. Hughes, Clerk, Sudbury Road, Halstead.
" 29	Wallsend—Mortuary, &c.	Corporation	G. Hollings, Borough Surveyor, Corporation Offices, Wallsend.
" 29	West Hartlepool—Heightening Wall	Corporation	Nelson F. Dennis, Borough Engineer, Municipal Buildings, West Hartlepool.
" 29	Ipswich—School	Education Committee	J. A. Schuermann, Architect, 23 High Street, Ipswich.
" 29	Levenshulme—School	Education Committee	H. Littler, Architect, 16 Ribblesdale Place, Preston.
" 29	Beanworth—School and House	County Council	W. J. Taylor, County Surveyor, The Castle, Winchester.
" 30	Nelson—Free Library	Corporation	J. R. Poyser & W. B. Savidge, Architects, Queen's Chambers, King Street, Nottingham.
" 30	Belfast—Villa	Great Western Railway Co.	Hobart & Heron, Architects, 124 Scottish Provident Buildings, Belfast.
" 30	London, W.—Offices	Corporation	Engineer, Paddington Station, W.
" 30	Darwen—Free Library	Corporation	Haywood & Harrison, Architects, Church Street, Accrington.
" 30	Kilmarnock—Concrete Work	Corporation	C. Fairweather, Engineer, Gas Office, Kilmarnock.
" 30	Stockport—Completion of Schools	Education Committee	A. Lawton, Secretary, Education Offices, Stockport.
" 30	Loughton—Completion of Schools	Education Committee	Cubitt and Manchip, Architects, 2 Broad Street Buildings, E.C.
" 30	Capcoch—Houses	Building Club	T. Roderick, Architect, Ashbrook House, Aberdare.
" 30	Capcoch—Houses	Powell-Duffryn Co.	T. Roderick, Architect, Ashbrook House, Aberdare.
" 31	Govan—Hospital Additions	Parish Council	Thomson & Sandilands, Architects, 4 Jane Street, Govan.
" 31	Thirsk—Extension	Hospital Committee	T. Stoes, Architect, Westgate, Thirsk, Yorks.
" 31	Ayr—Post-office Enlargement	H.M. Office of Works	W. T. Oldrieve, Architect, H.M. Office of Works, Parliament Square, Edinburgh.
Feb. 1	London, S.E.—Waiting-room	Borough Council	H. C. J. Edwards, Borough Engineer, 346 Kennington Road, S.E.
" 2	Portslade-by-the-Sea—School	Education Committee	F. J. Wood, County Surveyor, County Hall, Lewes.
" 2	Chiddingfold—School	Education Committee	F. J. Wood, County Surveyor, County Hall, Lewes.
" 2	Plumpton—Additions, &c.	Education Committee	F. J. Wood, County Surveyor, County Hall, Lewes.
" 3	Brinsworth—Works	Education Committee	County Hall, Wakefield.
" 3	Glasgow—Reconstructing	Managers	J. Miller, Architect, 15 Blythswood Square, Glasgow.
" 3	Garforth—School	Education Committee	J. Vickers-Edwards, County Architect, Wakefield.
" 3	Temple Newsam—School Alterations	Ditto	Ditto
" 3	Thrybergh—School	Ditto	Ditto
" 3	Wath-upon-Deane—School	Ditto	Ditto
" 3	Rawmarsh Rye-croft—Alterations	Ditto	Ditto
" 3	Wallasey—Bricks and Lime	Works Committee	W. H. Travers, Surveyor, Public Offices, Egremont, Cheshire.
" 5	Southwich—Public Offices	Urban District Council	G. W. Warr, Surveyor, Council Offices, Southwich.
" 5	Llansamlet, Chapel, &c.	Methodists	Rees Llewellyn, Architect, Birchgrove House, Birchgrove, Llansamlet.
" 6	Morley—Extensions	Marshall & Son, Ltd.	Buttery & Bird, Architects, Exchange Buildings, Queen Street, Morley.
" 6	Swansea—Cells	Corporation	Borough Surveyor, 13 Somerset Place, Swansea.
" 7	Kensington—Lime, Cement, Bricks, &c.	Council	Town Hall, Kensington.
" 7	Kensington—Jobbing Builders' Work	Council	Town Hall, Kensington.
" 8	Haughley—Classroom, &c.	Managers	H. G. Bishop, Architect, Bury Street, Stowmarket.
" 9	Middleton—Conveniences	Corporation	W. Welburn, Town Hall, Middleton.
" 12	Brettenham—School	Urban District Council	A. Ainsworth Hunt, Architect, Sudbury, Suffolk.
" 12	Cheshunt—Hospital	Lunacy Board	A. C. Lee, Clerk to Council, Manor House, Cheshunt.
" 12	Dykebar—Asylum	County Council	T. Graham Abercrombie, Architect, County Place, Paisley.
" 17	Bedford—Extension	County Council	W. H. Leete, County Architect, Shire Hall, Bedford.
" 17	Portsmouth—Extension	Guardians	C. W. Bevis, Architect, Elm Grove Chambers, Southsea.
No date	Shortlands—Shops	Guardians	Arthur Cole, Architect, "Mogok," Thurlstone Road, West Norwood.
ENGINEERING :			
Jan. 26	Blackburn—Heating Apparatus	Guardians	F. C. Ruddle, Architect, 4 King Street, Blackburn.
" 27	Huddersfield—Sewage-disposal Works	Corporation	K. F. Campbell, Engineer, Town Hall, Huddersfield.
" 30	London, S.E.—Rebuilding Engines	Guardians	G. E. Arnold, C.E., 25 Victoria Street, Westminster, W.
" 30	Culham—Reconstruction of Viaduct	Great Western Railway Co.	Engineer's Office, Paddington Station, W.
" 30	London, S.W.—Deck Bridges	Southern Mahratta Railway Co.	E. Z. Thornton, Secretary, 46 Queen Anne's Gate S.W.
" 31	London, S.W.—Steam-piping, &c.	Borough Council	A. J. Fuller, Town Hall, Fulham.
Feb. 2	Arkeley—Reservoir	Gas and Water Co.	T. H. Martin, Engineer and Manager, Station Road, New Barnet.
" 2	Reigate—Hot-water Works	Guardians	Dolby & Williamson, Engineers, 8 Princes Street, Westminster, S.W.
" 3	Broadstairs—Station Governors	Gas Co.	F. Higginson, Engineer and Secretary, Gas Office, Broadstairs.
" 7	Hammersmith—Arc Lamps, Globes, Carbons, &c.	Borough Council	G. Gilbert Bell, Borough Electrical Engineer, 85 Fulham Palace Road, S.W.
" 9	Dublin—Sewage Liming Station	Improvements Committee	G. Chatterton, Engineer, 6 The Sanctuary, Westminster, S.W.
" 12	Portcawl—Reservoir, &c.	Urban District Council	J. Taylor & Sons and Santo Crimp, Engineers, 27 Great George Street, Westminster, S.W.
" 12	Barnes—Steam Dynamo and Switchboard	Urban District Council	C. S. Davidson, Engineer, Electricity Works, High St., Mortlake, S.W.
" 13	Pontypridd—Steam Dynamo	Urban District Council	J. Colenso Jones, Clerk, Council Offices, Pontypridd.
Mar. 15	Pretoria—Refuse destructor	Municipality	Mosenthal, Sons & Co., 72 Basinghall Street, London, E.C.
May 1	Talcahuano, Chili—Dock	State Railways	Direccion de Material, Valparaiso.
IRON AND STEEL :			
Jan. 25	London, E.C.—Iron Screws, Water Tubes, &c.	Great Indian Peninsula Ry Co.	J. I. Berry, Secretary, 48 Copthall Avenue, E.C.
" 26	Pembroke—Iron Railings	Urban District Council	J. C. Manly, Town Hall, Ball's Bridge, Pembroke, Ireland.
" 30	Kilmarnock—Steelwork	Corporation	C. Fairweather, Engineer, Gas Offices, Kilmarnock.
" 2	Belgium—Iron Gasfittings	Works Committee	Hotel de Ville, Brussels.
" 3	Wallasey—Iron and Steel	Metropolitan Water Board	W. H. Travers, Engineer, Public Offices, Egremont, Cheshire.
" 3	Bulgaria—Iron Pipes, &c.	Council	Financial Commission's Office, Sofia, Bulgaria.
" 5	London, W.C.—Iron Pipes, Castings, Sluice Valves, &c.	Board of Public Works	A. B. Pilling, Clerk, Savoy Court, Strand, W.C.
" 7	Kennington—Iron Goods	State Railways	Town Clerk, Town Hall, Kensington.
" 8	Dublin—Ironmongery	State Railways	H. Williams, Office of Public Works, Dublin.
Feb. 2	Christiania—Posts, &c.	State Railways	Commercial Intelligence Branch, Board of Trade, 73 Basinghall Street.
PAINTING AND PLUMBING :			
Jan. 25	Harrogate—Colour-washing	Corporation	F. Bagshaw, Borough Surveyor, Harrogate.
" 27	Bury—Painting, &c.	Corporation	Borough Engineer, Bank Street, Bury, Lancs.
Feb. 5	Manchester—Painting	Lancashire and Yorkshire Railway Co.	Engineer's Office, Hunt's Bank, Manchester.
" 5	London, W.C.—Paints, &c.	Metropolitan Water Board	Metropolitan Water Board Offices, Savoy Court, Strand, W.C.
" 5	London, W.C.—Plumbing Work	Metropolitan Water Board	Metropolitan Water Board Offices, Savoy Court, Strand, W.C.
" 8	Dublin—Plumbing and Gasfitting	Board of Public Works	H. Williams, Office of Public Works, Dublin.
ROADS AND CARTAGE :			
Jan. 26	Chipping Norton—Granite	Rural District Council	R. Entwistle, Surveyor, Charlbury, Oxon.
" 26	Hull—Paving and Flogging	Corporation	A. E. White, City Engineer, Town Hall, Hull.
" 27	Camelsdale—Road	Education Committee	J. H. Howard, Architect, Lower Street, Haslemere, Sussex.

Complete List of Contracts Open.—continued.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
ROADS AND CARTAGE—cont.			
Jan. 27	Norwich—Granite	County Council	T. H. B. Heslop, County Surveyor, Norwich.
" 27	Bicester—Highway Repairs	Rural District Council	J. W. Tubb, Surveyor, Fewcott, Bicester.
" 27	Bicester—Materials	Rural District Council	J. W. Tubb, Surveyor, Fewcott, Bicester.
" 29	Hatfield—Granite and Slag	County Council	Urban A. Smith, County Surveyor, Hatfield.
" 29	Romford—Making-up	Urban District Council	Herbert T. Ridge, Council Offices, Romford.
" 29	Warrington—Street and Passage Works	Borough Council	T. Longdin, Borough Surveyor, Town Hall, Warrington.
" 29	Sale—Road Materials, &c.	Council	W. Holt, Surveyor, Council Offices, Sale.
" 30	Bootle—Granite Paving Materials	Corporation... ..	B. J. Wolfenden, Borough Engineer, Town Hall, Bootle.
" 31	Boston—Materials	County Council	H. Chaderton Johnson, Clerk, Sessions House, Boston.
" 31	Kettering—Tar Paving, &c.	Rural District Council	C. W. Gillson, Surveyor, Market Street, Kettering.
" 31	Kettering—Granite, &c.	Rural District Council	C. W. Lane, Clerk, George Street, Kettering.
Feb. 1	Isle of Ely—Materials	County Council	H. Farr Simpson, County Surveyor, Northern Division, Wisbech.
" 3	Wallasey—Granite, Concrete Flags, Macadam	Works Committee	W. H. Travers, Surveyor, Public Offices, Egremont, Cheshire.
" 3	Wallasey—Street and Passage Gulleys... ..	Works Committee	W. H. Travers, Surveyor, Public Offices, Egremont, Cheshire.
" 5	Southwich—Street Works, &c.	Urban District Council	G. W. Warr, Surveyor, Council Offices, Southwich.
" 5	Royal Parks—Road Materials	H.M. Office of Works	H.M. Office of Works, Storey's Gate, S.W.
" 6	Middleton—Street Works	Corporation... ..	W. Welburn, Town Hall, Middleton.
" 7	Kensington—Granite, Gravel, &c.	Council	Town Clerk, Town Hall, Kensington.
" 7	Kensington—Horse Hire	Council	Town Clerk, Town Hall, Kensington.
SANITARY:			
Jan. 25	Burnham—Sewerage and Sewage-disposal Works	Rural District Council	Engineer, Eton Rural District Council, Eton.
" 26	Macroom—Sewerage Works	Urban District Council	T. Murphy, Clerk, District Council, Macroom, Ireland.
" 26	London, W.C.—Sewers, &c.	Westminster City Council	Works Dept., Westminster City Hall, Charing Cross Road, W.C.
" 26	Burslem—Sewers, &c.	Corporation... ..	F. Bettany, Borough Surveyor, Queen Street, Burslem.
" 29	Halifax—Extension of Sewage-disposal Works	Highways Committee	J. Lord, Borough Engineer, Town Hall, Halifax.
" 30	Cheriton—Removal of Refuse	Urban District Council	A. Atkinson, Clerk, Public Offices, Cheriton.
" 30	Hillingdon—Drainage Works	Rural District Council	Engineer, Corn Exchange, Uxbridge.
" 31	Kettering—Disinfectants	Rural District Council	C. W. Lane, Clerk, George Street, Kettering.
Feb. 3	Wilton—Drainage Works	Corporation... ..	J. Taylor, Sons & Santo Crimp, Engineers, 27 Great George Street, Westminster, S.W.
" 5	Eastry—Drainage Works	Guardians	F. S. Coke, Clerk, Workhouse, Eastry.
" 5	Sleetburn—Sewage Works	Urban District Council	Surveyor's Office, Langley Moor, Durham.
" 5	Prestwich—Sewer	Urban District Council	Surveyor, Council Offices, Chester Bank, Prestwich.
" 7	Sparkhill—Sewers	Rural District Council	A. W. Smith, Surveyor, Council House, Sparkhill, near Birmingham.
TIMBER:			
Jan. 25	London, E.C.—Creosoted Sleepers	Great Indian Peninsula Rly Co.	J. I. Berry, Secretary, 48 Copthall Avenue, E.C.
" 30	Kilmarnock—Timber Work	Corporation	C. Fairweather, Engineer, Gas Offices, Kilmarnock.
Feb. 1	Cairo—Teak Wood	Coastguard Administration	Director of Stores, Arsenal, Alexandria.
" 3	Glasgow—Wood Blocks	Corporation... ..	Public Works Office, City Chambers, Glasgow.

List of Competitions Open.

DATE OF DELIVERY.	DESIGNS REQUIRED.	AMOUNT OF PREMIUM.	DEPOSIT REQUIRED FOR CONDITIONS, &c.	FROM WHOM PARTICULARS MAY BE OBTAINED.
Jan. 31	Hackney—Library	50, 30 and 20 guineas	£1 1s.	W. A. Williams, Town Clerk, Town Hall, Hackney.
" 31	Crompton—Library	£30, £20 and £10	10s. 6d.	F. F. Gartside, Clerk, Town Hall, Shaw, near Oldnam.
Feb. 15	Vrexham—Schools (W. E. Willink, Assessor)	£50, £30	—	Clerk to Education Committee, Vrexham.
Mar. 12	Greenock—School	—	—	A. F. Niven, Municipal Buildings, Greenock.
" 20	Bangor—Free Library	£25 and £15	—	W. H. Worrall, Municipal Offices, Bangor, North Wales.
" 24	Swadlincote—Free Library	£25, £15, £10	—	W. A. Musson, Clerk, Council Offices, Swadlincote.
" 31	Birmingham—Council House Extension (Sketch Plans).	—	£1 1s.	Town Clerk, Council House, Birmingham.
No date	Coventry—Municipal Offices and Shops (Local Architects only)	£50	—	G. Sutton, Town Clerk, 10 Hay Lane, Coventry.
"	Bangor—New College Buildings (Names only)	—	—	Plans Committee, North Wales University College, Bangor.
"	King's Norton—School (Preliminary Competition)	—	—	J. F. Moore, Education Offices, King's Norton, near Birmingham.

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Guaranteed Gearing and Fittings.

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ADVERTISER (27) desires **ENGAGEMENT** in Architect's office or superintendence on gentleman's estate. Building experience. Ten years as draughtsman, leveller. Good references.—**TEMPLER**, Graham Road, Wimbledon. 1600

ARCHITECT'S ASSISTANT (24) desires **ENGAGEMENT**; working drawings, details, perspective quantities, &c. Good designer and colourist.—**AUBREY PRITCHARD**, The Grove, Rhyl, North Wales. 1537

ARCHITECT'S ASSISTANT disengaged (27). Nine years' all-round experience, London and provinces; thoroughly practical. Quantities. R.A. exhibitor.—**"W."**, Brinklow Rectory, Coventry. 1569

ARCHITECT'S ASSISTANT (25) **DISENGAGED**. Nine years' experience. Good draughtsman, designs, working drawings, details, &c. London or country.—**W. A. N.**, 46, St. Augustine's Road, Camden Square, N.W. 1578

ARCHITECT'S ASSISTANT.—Working drawings, details, specification, perspectives, measuring, &c.; five years' experience.—Box 1586, **BUILDERS' JOURNAL** Office, 6, Great New Street, Fetter Lane, E.C.

ARCHITECT'S ASSISTANT desires **ENGAGEMENT** for year or two with view to future partnership; country town preferred.—Box 1587, **BUILDERS' JOURNAL** Office, 6, Great New Street, E.C.

ARCHITECT AND SURVEYOR'S capable **ASSISTANT DISENGAGED**. Designer, good-class draughtsman; thorough knowledge construction; 11 years' provincial experience; hotels, domestic work, chapels, &c.—Box 1539, **BUILDERS' JOURNAL** Office, 6, Great New Street, Fetter Lane, E.C.

ARCHITECT'S JUNIOR ASSISTANT (22) desires **ENGAGEMENT**; 5 years' experience, neat and accurate draughtsman; elementary and advanced building construction and architecture certificates; sal. 25s.—Address, **ASSISTANT**, 34, Wingate Road, Hammer-smith, W. 1556

ARCHITECT AND SURVEYOR'S ASSISTANT seeks re-engagement; four years' sound experience in general office work; excellent testimonials; willing to commence for moderate salary.—**C. E. L.**, Station Road, Ashburton, S. Devon. 1576

ARCHITECT AND SURVEYOR'S competent **ASSISTANT (25)** requires engagement. Working drawings, details, specifications, land surveying, &c.; practical experience; excellent references.—Apply Box 1575, **BUILDERS' JOURNAL** Office, 6, Great New Street, Fetter Lane, E.C.

ARCHITECT AND SURVEYOR'S JUNIOR ASSISTANT (23), seeks situation. London experience; good draughtsman, detail and small scale drawings; five years' general experience; good references; moderate salary.—**B. A. E.**, "Glebeside," Preston Park, Brighton. 1562

ARCHITECT AND SURVEYOR'S ASSISTANT (23), 6 years' exp.; good draughtsman, working drawings, details, surveying, levelling, assist with quantities. Salary 35s.—Box 1546, **BUILDERS' JOURNAL** Office, 6, Great New Street, Fetter Lane, E.C.

ARCHITECT AND SURVEYOR'S JUNIOR ASSISTANT (22), 6 years' sound general experience, desires appointment with opportunity of developing knowledge. Good draughtsman, dilapidations, &c.—**E. W.**, 10, Roseneath Road, New Wandsworth, S.W. 1548

ARCHITECT'S ASSISTANT, 23. Six years' varied experience. Salary 35s.—**HACKETT**, Ivy Bank, Addiscombe Road, Croydon. 1599

BUILDER'S ASSISTANT desires re-engagement. Nineteen years' experience. Drawing, quantities, measuring up, levelling; land surveying; supervision of operations, &c.—**L. J. G.**, 88, Adelaide Road, Shepherd's Bush, W. 1572

BUILDER'S ASSISTANT DISENGAGED. Quantities, abstracting, billing, good office routine, business inside and out; practical experience; excellent references as to character and ability; abstainer; moderate salary.—**P. TOWNSEND**, Great Missenden. 1593

BUILDER'S CLERK, experienced, double-entry book-keeping, time sheets, correspondence, and general routine, plans, &c.; town or country; moderate salary.—**E. W. H.**, 11, Archibald Road, Tufnell Park, N. 1561

BUILDER'S CLERK (22) seeks **ENGAGEMENT**; seven years' experience; book-keeping and office routine, neat tracing, quantities, and estimates; good refs.—**B. G.**, 19, London Road, Neath, South Wales. 1585

BUILDERS' GENERAL FOREMAN (40) Disengaged, thoroughly experienced in all description of city and suburban work; new and alterations; good and reliable refs.—Box 1565, **BUILDERS' JOURNAL** Office, 6, Great New Street, Fetter Lane, London, E.C.

BUILDER'S SON (30) desires **RE-ENGAGEMENT** as General Foreman or Management of Estate. Life experience in London, Midlands, and the South. Splendid references; eight building construction certificates. Abstainer, competent, energetic, of good address, and capable of improving a business.—Box 1584, **BUILDERS' JOURNAL** Office, 6 Great New Street, Fetter Lane, E.C.

BUILDER'S SMITH and FITTER (26) seeks **JOB**; eight years in last yard; abstainer; plain and ornamental; gas and hot-water.—**L. W.**, 139, Cornwall Road, Bayswater. 1594

CLERK OF WORKS desires re-engagement, town or country. Moderate salary; life abstainer, good references.—Box 1570, **BUILDERS' JOURNAL** Office, 6, Great New Street, Fetter Lane, E.C.

CONTRACTOR'S ASSISTANT seeks Position. Ten years' exp. office and works. Draughtsman, prime cost, general routine; foreman's assistant.—**SMITH**, 2, Douglas Rd., Lewisham, S.E. 1545

GENERAL FOREMAN seeks re-engagement. Wide and varied experience; age 45; carpenter and joiner; 9 years with last employer.—**W. S. C.**, 129, Howard Road, Walthamstow. 1543

GENERAL or WORKING FOREMAN wants re-engagement; shop or outside. Conversant with allied trades. Steady and reliable; trade, carpenter and joiner.—**HARRY HEMS**, 7, Park Grove, Bromley, Kent. 1579

GENERAL FOREMAN seeks **RE-ENGAGEMENT**. Town or country. New or alterations. Thoroughly practical in all branches. First-class references. Age 39. Carpenter and joiner.—**HOUGHTON**, 36, Bywater Street, King's Road, S.W. 1598

JUNIOR ASSISTANT (21) requires **ENGAGEMENT**; just completed articles; neat draughtsman and tracer; good constructionist.—**R.**, 73, Wool Exchange, Coleman Street, City. 1595

MACHINIST seeks **RE-ENGAGEMENT** to take charge and work any class of wood-working machinery. Steam or gas engines. Ten years last situation, excellent reference.—**HERBERT**, 42, Selhurst Road, South Norwood, S.E. 1591

MANAGER (30) desires **ENGAGEMENT**. 12 years' experience in W.E.; plans, specifications, estimates, &c.; good manager, reliable, energetic; all branches; decorations, &c.; country preferred.—Box 1564, **BUILDERS' JOURNAL** Office, 6, Great New Street, Fetter Lane, E.C.

PLUMBER'S FOREMAN (35), quick, reliable, and thoroughly experienced in all classes of work; work to plans, &c., at competitive prices; town or country; references.—**PLUMBER**, 45, Gunnersbury Lane, Acton, W. 1538

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STAINED GLASS PAINTING.—Youth (18) requires **SITUATION** as **IMPROVER** or **Ornamental Painter**. Four years' experience. Good references.—**A. V. B.**, 13, Speldhurst Road, Chiswick. 1590

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The Guardians do not bind themselves to accept the lowest or any Tender.

All applications are to be made to the undersigned immediately, and Tenders must be received by him on or before the 2nd day of FEBRUARY 1906.

(Signed) FRANK C. MORRISON,
Clerk to the Guardians of Reigate Union,
Reigate, Surrey.

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TENDERS are invited for the ERECTION of THREE SHOPS at Shortlands, Kent.

Full particulars can be obtained on application (by letter only) to the Architect, Mr. ARTHUR COLE, "Mogok," Thurlstone Road, West Norwood.

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The Tenders received will be opened on the 27th JANUARY, but the lowest or any Tender will not necessarily be accepted.

Union Offices, Cardwell Place, CHAS. E. BYGRAVE,
Blackburn. Clerk to the Guardians.
9th January, 1906.

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ARTHUR LAWTON,
Secretary to Education Committee.
Education Offices, Stockport
17th January, 1906.

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See p. xx for the Employment Register.

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We are encouraged to find how largely our columns have been instrumental in meeting the requirements of both parties in the manner indicated above, and we thank those advertisers who have written expressing their pleasure and indebtedness to THE REGISTER.

Many have found it an invaluable aid in getting appointments, and we would urge all those who are out of work, or want to change their situations, in fact, all who have a "want," to make use of these columns and thus make THE REGISTER a record of still more value to Employers and Employed.

For 3s. we give 3 insertions (four lines), in our "Appts. Wanted" Columns, and also 6 insertions in the "EMPLOYMENT REGISTER" (see page xx).

Tenders.

Addressed postcards on which lists of tenders may be stated will be sent post free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Fetter Lane, E.C. Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Abertyswg (Cardiff).—Accepted for the erection of a school for the Rhymney Education Committee:—
W. Williams & Sons, New Tredegar... £1,897

Aberystwyth.—Accepted for the erection of the new Davies memorial laboratories at Buarth Mawr Mr. A. W. S. Cross, architect, 46, New Bond Street, London, W. Quantities by Mr. W. Windsor, 37, Brown Street, Manchester:—
H. Willcocks & Co., Wolverhampton ... £16,164

Bridlington.—Accepted for the erection of a pavilion and café. Messrs. Magnalls & Littlewoods, architects, 42, Spring Gardens, Manchester:—
T. Spink, Bridlington ... £8,750

Brighton.—For the erection and completion of mains, store, blacksmith's and testing shops, &c., as extension of electricity works, for the Borough Council. Mr. T. Garrett, architect, 30, Ship Street, Brighton, and at Hayward's Heath, Quantities by Messrs. Matthews & Coleman, 11, Old Queen Street, Westminster:—
W. H. Hyde ... £5,166

Bostel Brothers ... 4,900
G. R. Lockyer ... 4,847
J. Martin ... 4,595
H. J. Penfold ... 4,437
J. Parsons & Sons ... 4,413
W. A. Field & Co. ... 4,365
J. & W. Simmonds ... 4,320
Saunders Brothers ... 4,299
Rowland Brothers ... 4,268
Miller & Selmes ... 4,295
J. Barnes & Sons ... 4,284
Lynn & Sons ... 4,269
R. Cook & Sons ... 4,198
J. Longley & Co. ... 4,148
Hockley & Co. ... 3,993
Sattin & Evershed,* Brighton ... 3,970
* Accepted subject to a few minor deductions.

Brynteg.—For the erection of a villa residence near Brynteg, Merthyr, for Councillor David Phillips, Mr. C. M. Davies, architect, 112, High Street, Merthyr Tydfil:—
J. Jenkins ... £1,170
S. Hawkins ... 1,150
M. Warlow,* Warlow Street ... 1,100
D. Daniel ... 1,000
* Accepted. [All of Merthyr.]

Caerphilly.—Accepted for the erection of twenty-eight dwelling-houses at Pontywindy Road, for the Ty Cwm Building Club. Mr. W. G. Young, architect, 23, Bartlett Street, Caerphilly:—
A. J. Rossiter, Pontywindy Road ... £5,740
[Twelve tenders received.]

East Preston (Worthing).—For the erection of a new infirmary and nurses' home at the workhouse, for the Guardians of East Preston Union:—
A. Crane, Worthing ... £8,108 11 8
J. Longley & Co., Crawley... 7,798 0 0
A. Burrell, Littlehampton ... 7,673 0 0
J. H. Elliott, Worthing ... 7,542 12 0
Linfield & Sons, Littlehampton ... 7,486 0 0
Norman & Burt, Burgess Hill ... 7,447 0 0
H. M. Patrick, Wandsworth ... 7,379 0 0
C. J. Drake, Rustington ... 7,250 0 0
Rowland Brothers, Horsham ... 7,198 0 0
R. Cook & Son, Crawley ... 7,138 0 0
Sandell & Sons, Worthing ... 7,000 0 0
T. J. Hawkins & Co., 109, Victoria Street, Westminster... 6,955 0 0
W. Wallis,* 207, Balham High Road, S.W. ... 6,497 0 0
* Accepted, and by arrangement reduced to £6,058 7s. 5d.

Gravesend.—For additions to engine-house at the electric-light generating station, Suffolk Road, for the Town Council. Quantities by Mr. W. H. Smith, 5, Great Winchester Street, E.C.:—
F. Blay, Dartford ... £2,098 0 0
T. W. Hooker ... 2,088 6 9
W. & F. Tuffee ... 2,056 0 0
Dering & Son ... 2,055 0 0
Beal & Hubbard ... 1,999 0 0
Multon & Wallis ... 1,998 0 0
H. W. Martin ... 1,978 0 0
A. E. Tong ... 1,946 0 0
Hughes & Stirling, London ... 1,903 0 0

J. Lonsdale, Swanley ... £1,862 0 0
F. Miskin, Ltd. ... 1,797 14 2
W. E. Thomas* ... 1,678 0 0
* Accepted.

London, N.—For extensions to King's Cross Laundry, Caledonia Street and Netherland Place, N. Messrs. S. J. Reynolds & Herbert Hicks, architects, Reigate and Broadstairs. Quantities by Mr. J. Kennard, Croydon:—
McCormick & Son ... £11,550
Goddard & Son ... 11,264
Colls & Sons ... 10,885
J. Simpson & Sons ... 10,642
Perry & Co. ... 10,550
C. Wall, Ltd. ... 10,489
D. W. Barker ... 10,347
Martin, Wells & Co. ... 10,132
F. & H. F. Higgs ... 10,123
E. Lawrence & Sons ... 9,981
Holliday & Greenwood* ... 9,949
* Accepted.

London, N.—For the erection of a school to accommodate 1,260 children on the Parkhurst Road site, for the Tottenham Education Committee. Mr. G. E. T. Laurence, architect, 22, Buckingham Street, Adelphi, W.C.:—
Chesum & Sons ... £25,300 ... A.
Cowley & Drake ... 24,395 ... 2,136
Newby Brothers... 23,441 ... 1,945
J. Guttridge ... 23,281 ... 1,680
Patman & Potheringham ... 23,273 ... 2,000
Whitehead & Co. ... 23,085 ... 1,797
Lovatt, Ltd. ... 23,000 ... 1,477
Wilkinson & Son ... 22,820 ... 1,823
A. Porter ... 22,771 ... 1,990
Johnson & Son ... 22,750 ... 1,791
Goddard & Sons ... 22,282 ... 2,205
Oak Building Co. ... 21,992 ... 1,870
Davey, Ltd. ... 21,969 ... 1,771
B. E. Nightingale ... 21,835 ... 1,804
Pollard & Brand... 21,690 ... 1,680
Myall & Upson ... 21,442 ... 1,999
Young & Son ... 21,197 ... 1,350
Wallis & Sons ... 21,000 ... 1,560
C. Wall, Ltd. ... 20,780 ... 1,631
Fairhead & Son ... 20,468 ... 1,545
F. J. Coxhead ... 20,242 ... 1,269
Rowley Brothers ... 19,980 ... 1,776
Lawrence & Son ... 19,844 ... 1,345
Clark & Sons ... 19,785 ... 1,473
A. Amount to be deducted for glazed brick dados and plastered walls.

London, S.W.—For the erection of a new police candidates' section house at Regency Street, Westminster. Mr. J. Dixon Butler, architect and surveyor, New Scotland Yard, S.W. Quantities by Messrs. Thurgood, Son & Chidey, Charing Cross Chambers, Duke Street, Adelphi:—
W. Eyre ... £14,765
F. C. Minter ... 14,641
Lascelles & Co. ... 14,463
Harris & Wardrop ... 14,290
Treasure & Son ... 14,252
J. Carmichael ... 14,250
Lovatt, Ltd. ... 14,000
Grover & Son ... 13,972
Prestige & Co. ... 13,955
Lathey Brothers ... 13,895
C. Ansell ... 13,731
Higgs & Hill ... 13,647
Appleby & Sons ... 13,630
F. & H. F. Higgs ... 13,544
Goldson & Sons... 13,489
Holovay Brothers... 13,450
Fairhead & Co... 13,427
Lawrence & Son ... 13,295
Mowlem & Co... 12,980

Plymouth.—For the erection and completion of block 5, fronting How Street, for the Corporation. Mr. James Paton, borough engineer and surveyor. Mr. S. W. Houghton, quantity surveyor, 22, Courtney Street, Plymouth:—
Pearn Brothers, Gilwell Building Yard ... £9,833 0 0
Wakeham Brothers, Friary Yard ... 6,448 0 0
Stevenson & Co., 43, Tavistock Place ... 6,403 0 0
F. I. Stenbury, Devonport Building Yard, Devonport ... 6,189 10 1
A. C. Jones, 16, Alma Road ... 6,043 0 0
Pearce Brothers, 11, Alma Road ... 5,986 0 0
S. Roberts, New Town Chambers ... 5,930 1 8
A. N. Coles,* New Town Chambers ... 5,878 18 0
* Accepted subject to confirmation.
[Rest of Plymouth.]
(Continued on p. xviii.)

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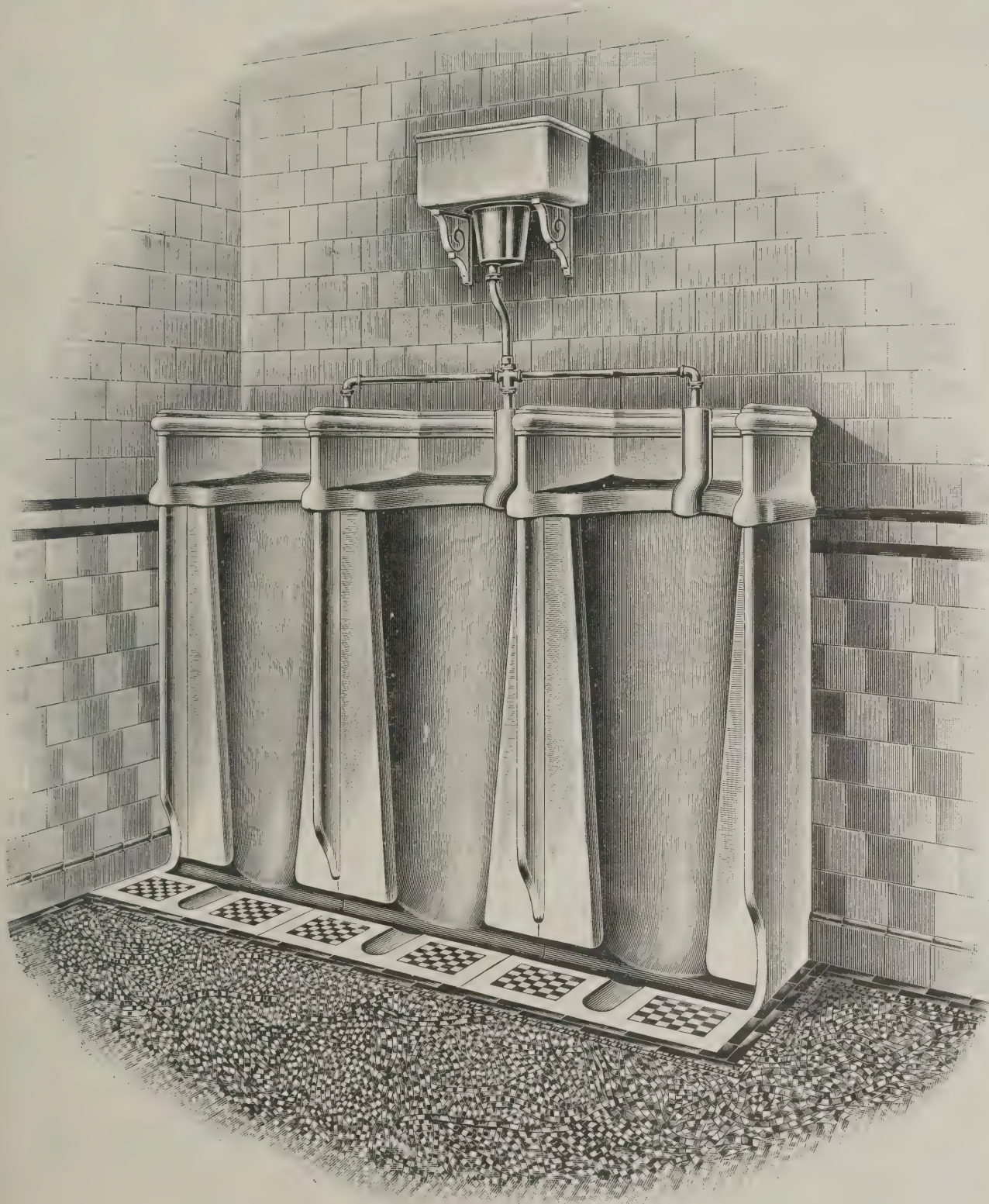
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	SHEFFIELD:	38, Church Street ...	" " Fireclay " ...	" 2469.
	HULL:	South Side, Queen's Dock, Alfred Gelder Street ...	" " Fireclay " ...	" 395.
	MIDDLESBROUGH:	Royal Exchange.		

TENDERS—cont. from p xvi.

London, S.W.—Accepted for the erection of a new town hall on Brixton Hill, for the Lambeth Borough Council:—

J. Greenwood, Ltd., London ... £38,274
[Twenty-two tenders received.]

London, N.—For the enlargement of the Gopsall Street school, Haggerston, for the London County Council. Mr. T. J. Bailey, Council's architect (education):—

W. H. Lascelles & Co., Bunhill Row £5,907 12 5
Marchant & Hirst, Highbury Road ... 5,740 8 3
McCormick & Sons, Northampton Street, Essex Road ... 5,669 0 0
J. Grover & Son, Wilton Works, New North Road ... 5,624 0 0
J. Simpson & Son, Paddington Street ... 5,531 0 0
G. S. S. Williams & Son, Richmond Street, Thornhill Square ... 5,414 0 0
W. Shumrun & Sons, Ltd., Riverside Works, Upper Clapton ... 5,382 0 0
Leslie & Co., Ltd., Kensington Sq. ... 5,254 18 10
L. H. & R. Roberts, 34, Rheidol Terrace, Islington ... 5,130 0 0
E. Lawrence & Sons, 14 to 16, Wharf Road, City Road ... 5,114 0 0
A. E. Symes, Stratford ... 4,922 0 0
Patman & Fotheringham, Ltd., Park Street, Islington ... 4,883 0 0
* Recommended for acceptance.

[Architect's (education) estimate, £4,618.]

Twickenham.—For the erection of the Carnegie free public library, for the Urban District Council:—

Prestige & Co. ... £5,916 0 0
T. Bendon ... 5,843 0 0
W. Gibson & Co. ... 5,834 0 0
J. W. Brooking ... 5,650 0 0
T. Almond & Son ... 5,635 0 0

J. Cassee ... £5,596 0 0
J. Minter ... 5,471 0 0
Martin, Wells & Co. ... 5,465 0 0
S. E. Moss & Co. ... 5,400 0 0
W. J. Renshaw ... 5,395 0 0
Myall & Upson ... 5,375 0 0
S. N. Soole & Son ... 5,300 0 0
Spencer, Santo & Co. ... 5,300 0 0
W. H. Hyde ... 5,294 0 0
Speechley & Smith ... 5,289 0 0
Eldridge & Son ... 5,278 0 0
W. Lawrence & Son ... 5,274 0 0
Wisdom Brothers ... 5,250 0 0
J. & C. B. Wyer ... 5,237 0 0
Vigor & Co. ... 5,197 0 0
W. J. Fryer & Co. ... 5,150 0 0
L. F. Lamplough ... 5,149 0 0
W. J. Dickens ... 5,143 0 0
W. & B. H. Davey ... 5,127 10 10
J. Barker & Co. ... 5,126 0 0
H. Lovatt, Ltd. ... 5,100 0 0
F. & G. Foster ... 5,077 0 0
W. Taylor & Co. ... 5,074 0 0
McC. E. Fitt ... 4,987 0 0
J. Christie ... 4,977 0 0
E. & E. Davey ... 4,973 0 0
Cowley & Drake ... 4,873 0 0
H. Kent ... 4,850 0 0
B. E. Nightingale* ... 4,832 0 0
* Accepted.

Witley.—For the erection of a farmhouse on Witley Park Estate, for the Right Hon. Lord Derby. Mr. John H. Howard, architect, Haslemere:—

Chapman & Lowry, Ltd., Haslemere £1,617 0 0
F. Milton, Witley ... 1,529 0 0
D. Fry, Godalming ... 1,498 10 0
E. Euticknap & Sons, Milford ... 1,313 0 0
* Accepted provisionally

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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

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At the Alpine Gallery. In the present exhibition of R.I.B.A. students' work at the Alpine Club two men hold paramount place, the one by reason of the excellence of his draughtsmanship and his design, and the other for the beauty of his colouring and composition. Mr. Walter S. George's Soane Medallion design embodying the mansion described in Bacon's essay "Of Building" will be generally admitted to be far and away the best of all sent in; a design, indeed, permeated with the spirit of the Elizabethan day to which it properly belongs, and a design moreover rendered by most artistic and suggestive draughtsmanship. We do not say that such draughtsmanship should be followed generally, but in this particular case the building was one belonging to John Thorpe's time, and we think it a very happy adaptation for Mr. George to have copied that quaint architect's manner. The other outstanding exhibitor is Mr. Charles Gascoyne, whose studies for the Owen Jones Studentship are excellent and delightful examples of colour and composition. He has in every case endeavoured to give a sort of mystery to his subject; and though maybe in some cases no such mystery attaches to the original, we are only now considering his studies as studies and not as absolute transcripts. For

the rest of the exhibition we can only say that there is not very much that calls for appreciative comment. The bulk of the Soane designs are, to our mind, altogether in the wrong strain, being more or less ingenious medleys of buildings by architects of to-day—town hall examples having evidently been a great source of inspiration. We exempt, however, the design by "Fraxinelle," the pencil drawing of which is very effective, though here one cannot help feeling that there is a mixture of the chateau of Pierrefonds, with a dash of Mr. Flockhart's Gothic and Mr. Guy Dawber's Gloucestershire dormers. Mr. Robert Atkinson's design, honourably mentioned, is certainly very well put together, and the pencil perspective of it is good, but here again there are strong reminiscences—this time of Hampton Court and Mr. Leonard Stokes. The Tite designs taken as a whole are poor. There seems to have been a very vague idea among competitors as to what was required. Some of them provide merely a colonnaded enclosure to a simple swimming bath, while others show two- or three-storey buildings of considerable magnitude. The majority of them are far too elaborate. Before leaving the Tite we cannot omit reference to the design of one competitor—a design in itself exhibiting much thought and ability, but rendered with a too vivid fancy in draughtsmanship. The scores of trees are so drawn that they give the place the appearance of a balloon ground, with the sun bursting through overhead like a shell over Ladysmith, while the clipped yews look like nothing else than so many mallets standing on their handles, and last but not least in the picture is an aged man toiling up a flight of seven steps—a hopelessly incongruous object.

The Office of Works under the new Government.

In accordance with British custom a change of Government involves a change of minister at the Office of Works, and Lord Windsor gives place to Mr. Lewis Harcourt. It is often said that our constitutional system "pitchforks" a politician into an office of whose working he is entirely ignorant, but, as a matter of fact, some of the most successful administrators of recent times—men like the late Mr. W. H. Smith—have found themselves at the head not only of departments but even of professions, and have acquitted themselves admirably. Lord Windsor will be remembered as a man sympathetic to architecture and the arts; Mr. Harcourt is a young statesman of great promise who has his spurs to win; and perhaps the public—in so far as they attend to the matter at all—and the professional and artistic world in a more special sense, will judge of both by their treatment of the Mall and its approaches, of Queen Victoria's monument, and of the vistas and grouping which the changes begun under Lord Windsor will produce. The Mall itself is for the

moment somewhat injured, but time and the growth of trees will restore it. It is important in all improvements in London to remember two very simple things, to wit, that England has an architecture of her own, and that London is not Paris. We yield to none in admiration of the stately streets which arose in the French capital forty years ago, and of the skilful planning and arrangement of their intersections and of squares and *ronds points*. But in dealing with the western part of the Metropolis, where the jurisdiction and influence of the Office of Works are mainly exercised, mere "Haussmannizing" is to be deprecated. Several foreign cities, notably Antwerp, have discovered to their cost that a *boulevard à vue infinie* has an empty unattractive appearance. It is possible to make a street too wide and a building too high for the best architectural effect. There is much in the present condition of London's architecture and London's traffic which calls for attention, for rearrangement and for completion, and none of the problems thus presented can be solved without the intelligent co-operation of public bodies, national and local, and the sanction and assistance of the Crown. We have at all times a monument among us of "how not to do it" in the familiar example of Hyde Park Corner, where, to ease the approaches to Victoria Station, the triumphal arch was set back at an angle and the equestrian statue removed. In a moment the buildings seemed to have run away to the horizon, a meaningless space was created, a new presentment of the Iron Duke—better in itself than its predecessor—was placed in the midst of it and lost, whilst the object of the change was not attained, as the daily "block" of vehicles and the enormous difficulties of foot traffic abundantly prove. This is one problem for a minister with taste and knowledge. His attention might also be given to the crowning of Decimus Burton's open colonnade, which gives access to the Park, with suitable groups of statuary. His labours, indeed, would not end here. The new Strand, now rapidly rising, must before long raise the question of the approach to Waterloo Bridge, which is Crown property and might be better treated architecturally than at present. And there are many other matters to which Crown officials could give attention. This is not the place to discuss styles and periods, but it is certain that historic Whitehall, now immensely affected by the new War Office, is destined to see further changes. Some of the buildings hereabouts are unworthy of the place and are only fit to be pulled down—dingy boxes of dirty brick with still dirtier windows. The question too of the width and alignment of the street where it enters Trafalgar Square will become a pressing one when the new entrance to the Mall is opened. Mr. Harcourt could hardly signalize his administration better than by the construction of a suitable gateway for the latter.

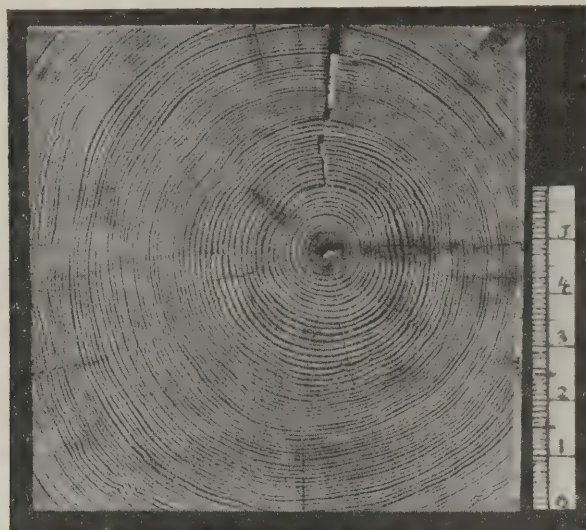
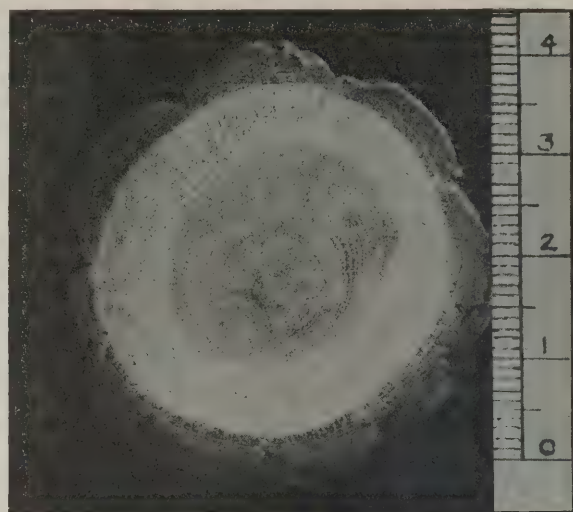
FIG. 1.—PITCH-PINE (*Pinus Palustris*), SHOWING ANNUAL RINGS.

FIG. 4.—TRANSVERSE SECTION OF OAK LOG SHOWING MEDULLARY RAYS.

THE CAUSES OF FIGURE IN TIMBER.

By H. Busbridge, A.R.I.B.A.

FOR the purposes of construction the value of any given kind of wood depends chiefly upon its strength, durability, ease of working and the facility with which it may be obtained in the market.

It sometimes happens, however, that in work where a beautiful effect is desired—for instance, in joinery and cabinet-making—woods are chosen more because of their colour or grain than for any other reason.

Broadly speaking, light-coloured woods are soft, whilst those of dark colour are generally hard and heavy. There are, however, a few exceptions to this rule, such as holly and boxwood, which, although pale in colour, are very hard and dense.

The prevailing tints among woods are white, buff, yellow, brown and red, nearly all shades of these colours being obtainable. Purples and greenish tints are rare, and blue is quite unknown, except as a stain caused by the action of fresh water upon the sapwood of coniferous timber.

Hardwoods owe their colour to the presence of some definite colouring matter or pigment which is generally more or less soluble in water.

Although many woods are prized simply because of their delicate or rich colour, the majority owe their value as ornamental or decorative materials to the "figure" or markings which appear in their grain.

Whenever the various parts of the wood differ from each other, either in colour or in structure, there will be differences in appearance which, if sufficiently pronounced, produce a more or less strongly-marked figure. Thus in the case of poplar the annual rings, although large and easily distinguished, are nearly uniform in tint, and the wood

consequently has scarcely any distinct figure; whilst in pitch-pine each annual ring consists of a pale yellow inner portion ("spring-wood") followed by a deep yellow outer portion ("autumn-wood") giving a distinct "grain" to the wood, conspicuous on all sections of it. If the trunk be cut transversely, as in Fig. 1, we have a series of concentric circular markings whose number at once indicates the age of the tree. A radial section (through the axis of the trunk)

The relative fineness or coarseness of the figure depends upon the thickness of the annual rings, and consequently upon the rapidity of growth of the wood; hence, slow-growing woods as a rule have little beauty of figure resulting from annual rings.

Whenever it is desired to obtain the best figure obtainable from this class of wood the tangential sections are preferred, and as a rule the beauty of the board increases with its distance from the centre of the tree, since the rings which appear in the middle of the board are of large diameter, and consequently wide stripes are produced.

Fig. 2, reproduced at the foot of this page, shows two methods of converting a log so as to obtain a large number of tangentially-cut boards.

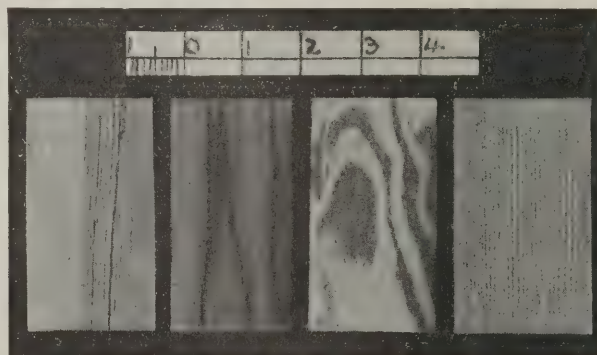
Owing to slight irregularities in the annual rings, the markings produced on the surfaces of boards are never perfectly straight; and when cut very obliquely, as in the middle of tangential sections, the irregularities are emphasized in a manner which adds

greatly to the richness of the figure. Fig. 3—examples of yellow deal and Oregon pine—shows the effect of radial sections, the left-hand half of the yellow deal being sapwood; whilst the Brazil tulipwood and Carolina pine are typical examples of tangential sections. In Carolina pine each annual ring is partly pale yellow and partly deep yellow, whilst those of tulipwood are pale yellow irregularly marked with red.

Many woods owe their figure chiefly to what is termed "felt," "flower," "shingle" or "silver grain." The radiating lines which appear upon the transverse section of a log of oak (Fig. 4) are caused by medullary rays permeating the whole of the stem. All woods which have these rays large enough to be visible to the naked eye show the "silver grain" when the rays are cut obliquely, and the more nearly the direction of the section agrees with the direction of the rays the more of the figure will be seen. It follows that generally, in order to obtain the largest number of well-figured boards from an oak log, they should be cut as nearly as possible in a radial direction.

Fig. 5 shows the appearance presented by specimens of wood containing large medullary rays.

Of woods in common use, those characterized by distinct silver grain are oak, beech, horn-



Yellow Deal Brazil Tulipwood Carolina Pine Oregon Pine
(*Pinus Sylvestris*). (*Harpullia Pendula*). (*Pinus Mitis*). (*Abies Douglasii*).
FIG. 3, SHOWING FIGURE PRODUCED BY ANNUAL RINGS.

gives a number of parallel streaks of approximately equal width; whilst a section cut so as to touch one of the rings (a tangential section) gives a board marked with stripes which are widest at the centre and narrowest at the edge. An oblique section will give approximate ellipses, whilst a surface of double curvature cut in such wood gives streaks whose forms depend upon the inter-sections it makes with the approximately cylindrical surfaces of the annual rings.

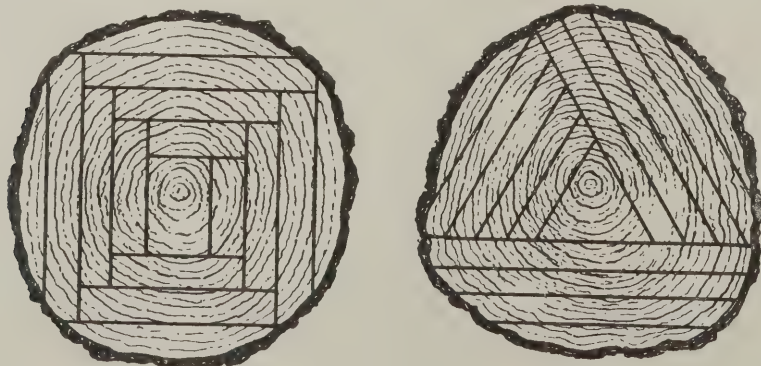
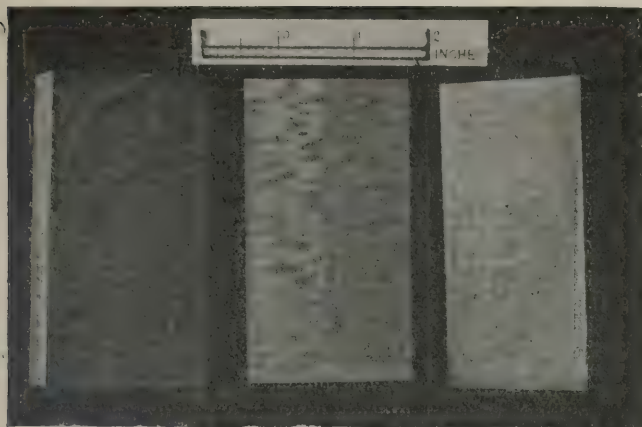
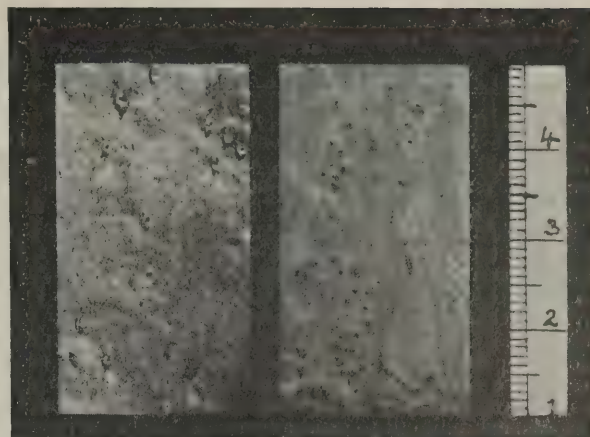


FIG. 2, SHOWING TWO METHODS OF CONVERTING A LOG SO AS TO OBTAIN A LARGE NUMBER OF TANGENTIALLY-CUT BOARDS.



English Oak (*Quercus*). Lacewood (Plane Tree). (*Platanus Occidentalis*). Beech (*Fagus Sylvatica*).

FIG. 5, SHOWING FIGURE PRODUCED BY MEDULLARY RAYS SHINGLE, FELT OR SILVER GRAIN.



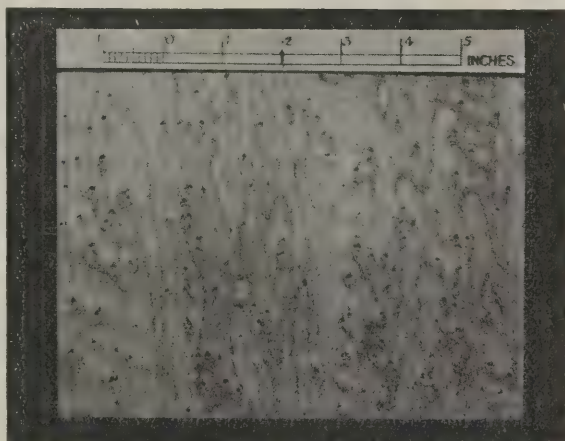
Bird's-eye Maple (*Acer Saccharinum*). Yew (*Taxus Baccata*).

FIG. 6, SHOWING FIGURE PRODUCED BY KNOTS OR EYES.

beam and plane tree (or lacewood), whilst in many others, including elm, holly, sycamore, acacia and maple, it is quite visible, although not sufficiently pronounced to give distinct markings on the surface.

Another class of figuring owes its origin to the presence of very small knots or eyes. Wood marked in this way is known as "pollard wood." Since each knot or "eye" corresponds to a twig or shoot in the living tree, it follows that pollard wood can only be found in trees which throw out a large number of shoots. Some trees do this naturally, and their wood then becomes dotted with numerous small knots. More often, however—as in the case of pollard willows seen on the banks of country streams—the number of young shoots is increased artificially by lopping off each year's crop of shoots, in which case a new set of twigs is thrown out in the following spring, thus giving rise to another set of knots or eyes in the wood. We then obtain wood thickly set with knots, none of which are larger in diameter than a pencil. In this way pollard oak, elm, yew and other wood are produced. Fig. 6 shows a piece of pollard yew tree. Since the axes of knots generally radiate from the axis of the trunk, it follows that pollard wood shows to the best advantage in tangential sections.

The markings in bird's-eye maple are similar in appearance to the figure last described, but are due to small pittings which occur on the surface of the trunk of the sugar maple. On a surface tangential to the annual rings these pittings look very much like small knots, although rather less strongly marked, and they give rise to a very similar figure (see Fig. 7). As far as I know,



Bird's-eye Maple.

FIG. 7, SHOWING FIGURE CAUSED BY PITTINGS.

the sugar maple is unique in this respect, and it is highly esteemed for the beauty of its grain.

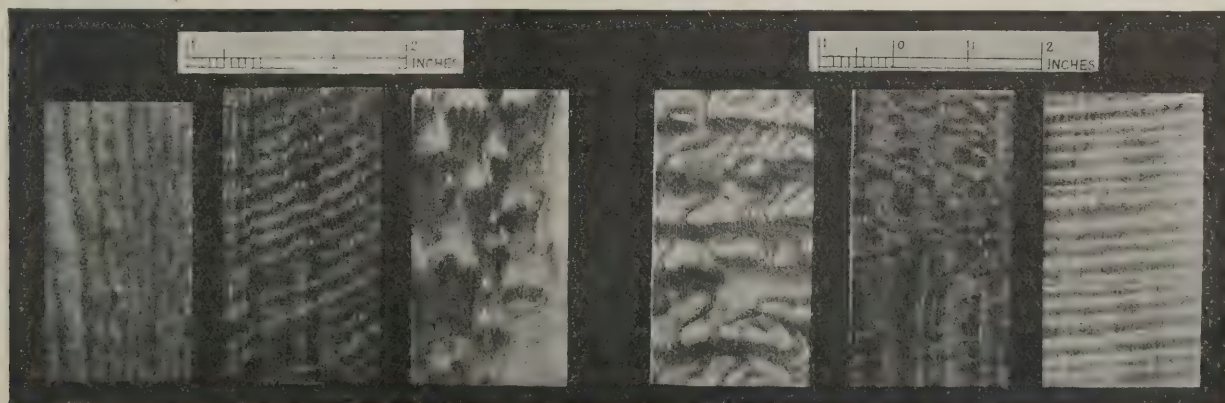
Logs of maple are generally converted so as to produce the maximum number of boards or veneers cut tangential to the annual rings, since it is only the tangential sections that exhibit this kind of marking to the best advantage. Sometimes veneers of this wood are cut spirally by taking a continuous circumferential cut from the surface of a well-figured log.

In most trees the surface of the wood just beneath the bark is slightly uneven owing to depressions and swellings. These often continue through several annual rings and then "die out," being compensated by the growth. Occasionally such prominences are caused by dormant buds, which then give rise to circlets

in tangential boards, sometimes seen in black ash and maple. The appearance of Hungarian ash, Devonshire elm, and the figured basswood (shown in Figs. 8 and 9) is due to such undulations in the surfaces of the annual rings.

Closely allied to this kind of figure is that obtained from the burrs or swellings which form upon the trunks of many kinds of trees. It appears that these excrescences are caused by parasitic insects which pierce the bark of the tree. In a continuous effort to repair the damage sustained, the tree adds new wood in successive irregular patches, until a considerable mass of woody tissues has accumulated. The burrs thus formed often attain considerable dimensions, a common size being 2ft. 6ins. wide by 12ins. thick, those of the best quality being exceedingly valuable for veneers, sometimes realizing as much as £50 per ton in the market. The most esteemed burrs for cabinet work are those of the Austrian, Italian and Turkey walnut tree (*Juglans regia*).

One other description of figure may be referred to. This is known as "wavy grain" or "curl." The effect is produced by small patches of "cross-grain" occurring at regular intervals throughout the substance of the wood. This cross grain arises when, instead of being truly parallel to the axis of the tree, the wood fibres arrange themselves in a spiral direction. In some trees it has been found that starting with an annual ring whose fibres are vertical, the ring formed next has its fibres slightly oblique; those of the next ring more oblique in the same direction, and so on, until a maximum deviation from the vertical is attained. After



Devonshire Elm (*Ulmus*). Australian Jarrah (*Eucalyptus Marginata*). Basswood (*Tilia Americana*). Hungarian Ash (*Fraxinus Excelsior*). E. India Satinwood (*Chloroxylon Swietenia*). Sycamore (*Acer Pseudo Platanus*).

FIGS. 8 AND 9, SHOWING FIGURE PRODUCED BY WAVY GRAIN OR "CURL."

this, the fibres of the successive rings gradually return to the vertical and then continue to deviate in the opposite direction, until a maximum is reached on that side, and so on. This oscillating process continues throughout the life of the tree, so that upon any vertical section of the trunk there will be a series of regularly recurring patches of "cross-grain" the character of which depends upon the individual character of the tree in which it occurs. This alternating spiral grain is found in cypress and eucalyptus trees, whilst Figs. 8 and 9 show the effect which it produces in sycamore and jarrah wood, the latter often exhibiting it to great advantage.

Another kind of grain known in the trade as "curl" is sometimes obtained by cutting veneer from the wood found at the base whence two branches separate.

A few woods occasionally used in cabinet work are irregularly marked with dark brown or deep red streaks or by mottling, giving rise to richly coloured figuring in choice samples. Among these may be mentioned tulipwood, zebra-wood, king-wood, snake-wood, rosewood, and some kinds of Spanish mahogany.

NOTES ON COMPETITIONS.

Greenwich Library.

If there are any who still hold misgivings as to the conduct of this competition on account of deposits having been returned before the result was announced, in spite of the explanation which was offered in this column last week to the effect that the action was due to official indiscretion, the information which it is now possible to give should allay all fears, for the assessor has made his award, and the envelopes containing the identity of the authors of the various designs have been opened in his presence. For the information of those who did not take part in this competition it may be stated that the subject was a branch library to be erected in London Street for the Metropolitan Borough of Greenwich, at a cost of £4,500 inclusive of fees, under the assessorship of Mr. A. W. S. Cross, M.A., F.R.I.B.A. The premiums offered were £25, £15 and £10 respectively, the first to merge in the commission payable to the architect. These premiums have now been awarded as follows:—The first to the authors of design No. 140, Messrs. Wills & Anderson, of London; the second to the authors of design No. 14, Messrs. Goldsmith & Son, of Manchester; the third to the author of design No. 11, Mr. H. A. Crouch, of London.

The conditions, instructions and particulars of competition were in themselves models of terseness and lucidity, but the report of the assessor to the libraries committee is a perfect example of all that such a report should be, dealing as it does with each individual design, and commenting upon its merits and demerits. The libraries committee have been advised that it should be available for perusal by the competitors, or others interested in the competition, during the public exhibition. Thus all who run may read; the devious paths through which the assessor travelled before arriving at his decision may be ascertained, and the reason why this design was selected and that rejected may be discovered by those that have eyes to see. This method of assessing is one which has been long urged by all desirous of having competitions conducted upon sound lines. Mr. Cross is to be congratulated upon putting an excellent principle into practice. Such a course is most instructive to successful and unsuccessful competitors alike, for by a careful study of the report each may see why and where he failed, or how his scheme might have been improved. His lesson learned, his next design for a similar subject should at least

be free from these defects, and thus the general standard would be raised and good would accrue to all, where otherwise mere disappointment had been the sole result. That the assessor's task was not a light one may be gathered from the fact that no fewer than 172 designs were submitted. Each of these designs is separately commented upon, the critical notes appearing in the report in the numerical order of the designs. A perusal of the report conveys the general impression that competitors failed for one or more of the following reasons:—Objectionable small internal areas; borrowers' counters which should have been recessed; reference library and staff-rooms upon the first floor; badly-planned entrances; bad supervision; no glazed screens between public apartments; caretaker's store-room badly placed; and wasted space. The universal adoption of the system of assessors' verbatim reports in all competitions, readily accessible to all competitors, should, as has been before suggested in these columns, go some way towards preventing the dissatisfaction often felt and expressed at apparently illogical awards. It might not remove it altogether, for even this system would not preclude the possibility of error. It would, however, provide the means of proving that an assessor's method of deduction had been wrong, and so he at least would be the better by a lesson. But perhaps that is why assessors are chary of making their reasons known.

Students' Competitions.

With the object of improving the competitions open to students of the Society of Architects, and of forwarding the cause of architectural education generally, the council of the Society has adopted the following recommendations of the committee appointed to report upon these subjects:—

(1) That the Society's silver medal and a travelling studentship of £25 be offered annually for competition among the students of the Society, under such conditions as may from time to time be announced.

(2) That an open scholarship of £10 per annum, tenable for three years at any architectural school or college, or to be used in furtherance of the holder's architectural education in some other manner approved by the Council, be offered for competition annually under such conditions as may from time to time be announced: the maximum age limit to be nineteen and the holder to be required to register as a student of the Society.

It will be noted that competition for the travelling studentship will be confined to those on the register of students of the Society, but that the scholarship is an open one and is intended to assist those who are just commencing the study of architecture with a view of adopting it as a profession. The regulations and conditions will be published in due course. In the meantime those who propose to compete for the travelling studentship would do well to apply for admission to the register of students without delay, so as to qualify for entry immediately the conditions are issued. Particulars may be obtained at the offices of the Society, Staple Inn Buildings, Holborn, W.C.

Central Library, St. Pancras.

The following architects have been selected to compete for the new central free library which is proposed to be built in the borough of St. Pancras:—Messrs. J. S. Gibson, Maurice B. Adams, E. Wimperis, Mallows & Cross, Russell & Cooper and Wills & Anderson. At last Wednesday's meeting of the borough council it was suggested that Mr. Henry T. Hare should be added to the list, but on the ground that the selection had been made by the president of the Institute by request of the borough council it was decided that the list should be accepted as it stood.

Cape Town Law Courts.

The important competition for new law courts to be erected at Cape Town has been decided as follows:—First premium (£500), Hawke & McKinlay; second (£300), Milne & Sladdin; third (£200), Baker & Masey—all of Cape Town. Mr. Mervyn Macartney, F.R.I.B.A., was the assessor. Messrs. Hawke

& McKinlay were the successful architects in the competition for the Cape University, their design for which was published in THE BUILDERS' JOURNAL for May 27th, 1903. This building is now being erected.

Competition for Bangor University College.

The Council of the University College of North Wales at Bangor will shortly invite a limited number of architects to submit competitive designs for the permanent buildings of the college. Architects who desire their names to be considered by the council in selecting their list should send particulars of work designed or executed by them—before March 1st next—to the secretary and registrar, Mr. John Edward Lloyd, M.A., from whom further particulars can be obtained.

LIVERPOOL ARCHITECTURAL SOCIETY.

IN a paper on "Architects and the Improvement of Cities" which he read before last week's meeting of the Liverpool Architectural Society Mr. T. T. Rees, F.R.I.B.A., drew attention to the need for wide streets. Bidston Road, Birkenhead, he said, might serve as an illustration of modern tendencies. It ought to have been twice the width, with a tree-planted footway in the centre, like Prince's Road, Liverpool. Every street over 50ft. wide in the crowded parts of a city ought to be planted with trees, and no new streets should be less than 50ft. wide. The corporation should have power to insist on streets being continuous, and not blocked by an arbitrary landowner. Having contended for the more systematic cleansing of streets, and for the abolition of overhead wires, the lecturer proceeded to advocate land purchase by municipalities on their borders. The pioneer action of the Prussian Government in this respect should be followed. Municipalities ought, of course, to supervise and control private restrictions as to building, thus preventing the deterioration of property. Having commended the gift to Liverpool by Alderman W. B. Bowring of the Roby Hall estate, and extolled the former wisdom of Birkenhead in buying its cheap park, he expressed a desire to see Sir Joseph Paxton's beautiful designs for that park carried fully into effect. Contrasting Hamilton Square, Birkenhead, and St. John's Gardens, Liverpool (the "Stoneyard"), he praised the simplicity and effectiveness of the former to the disadvantage of the latter. The Continental principle of placing important buildings on prominent sites required greater study in this country. Moreover, England lacked the Continental censorship of hoardings and posters. Chicago permitted no hoarding in a residential street without the consent of three-fourths of the inhabitants. Edinburgh had obtained power for its corporation to licence positions for mural advertisements. The advertisements around the Queen Victoria Memorial in Liverpool had proved a sore trial to the nerves of many.

Law Cases.

A Slating Accident: Liability for the Supply of Tackle.—At the Bromley County Court recently a slater named Whitcher sued Messrs. J. Knowles & Co., slaters and tilers, of Bromley, for £50 damages for personal injuries resulting from an accident which occurred, it was alleged, through defective tackle supplied by the defendants—a cord having snapped whilst Whitcher was pulling up some cripples on the roof, causing him to fall 25ft. Whitcher, who was stripping and recovering the roof of a barn, took the job as piece-work at so much per square and as subcontractor to Messrs. Knowles.—In summing-up, the judge said the question was whether there was any evidence of personal control by



NEW FONT, ALL SOULS' CHURCH, LOUDOUN ROAD, HAMPSHIRE.
NICHOLSON AND CORLETTE, ARCHITECTS.

the defendants. He found there was no such evidence. It was part of the agreement that the defendants should supply tackle; that was, no doubt, important, but it did not make them employers, and it did not bring them within the meaning of the words of the Act. He was sorry for the unfortunate plaintiff, but it was his duty to dismiss the action, and he did so without any order as to costs.

PAYMENT OF DISTRICT SURVEYORS BY SALARIES.

ON December 19th last the Building Act Committee of the London County Council submitted a report giving full details of a scheme which they proposed to recommend for the payment of district surveyors by salaries, instead of fees, in connection with a model scheme for the ultimate rearrangement of district surveyors' districts. The report, after having been postponed, was before the Council yesterday, the Building Act Committee recommending that the scheme should apply as and from April 1st next, and that the salary of each district surveyor should be equal to the amount of the average of the fees received in his district during the seven years ended December 31st last, as provided in section 158 of the London Building Act, 1894.

Finance Committee Sceptical.

The Finance Committee of the Council also submitted a report on the matter. They stated that during the seven years ended 1904 the average annual receipts of district

surveyors from fees amounted to £50,748, that (with the exception of one year) there was a continuous increase in the fees received, and that in 1904 the fees amounted to £52,932. "It would therefore appear that in the event of the Council deciding to exercise the powers conferred by the section the salaries to be paid to the district surveyors would, assuming that the figures for the year 1905 shall be found to follow the upward tendency of recent years, result in a balance in favour of the Council of upwards of £2,000 a year.

"The proposal of the Building Act Committee, however, is not limited to the substitution of salaries for fees on the basis of the section above referred to. The more important part of their proposal is to institute a model scheme, to be brought into operation gradually as circumstances permit, under which the Council, instead of paying salaries covering all the expenses of the district surveyors for assistance, office accommodation, &c., should pay to each a nett salary, and in addition the salaries of any necessary assistants, the cost of offices, &c. The Committee state that owing to the fact that there are now several vacant districts, and that other vacancies are likely to occur in the near future, the present time is opportune for the Council to make any such change of system as is proposed.

Re-division of Districts.

"The Building Act Committee state that, in the event of the model scheme being adopted, the total annual cost of the service would ultimately be reduced to about £40,245, and that there would thus be an

increased margin to secure the Council against loss by shrinkage of fees, &c. The model scheme provides for the division of London into thirty-three districts instead of fifty-seven as at present, and it is indicated that the salaries of the district surveyors would be £1,000, £800 or £500 a year in accordance with the importance of the district. It is proposed that in all but two of the sixteen districts where the salary is to be £1,000 there shall be one or two professional assistants, and, in one case, three assistants at a uniform salary of £200 each. In the other two districts, and also in the eleven districts at £800, and the six districts at £500, no assistant is proposed. Every surveyor is to be provided with a boy clerk at the rate of pay of 15s., rising to 25s. a week, and allowances for office expenses are suggested at £150 or £200 a year according to the district."

The Finance Committee reported that they were not in a position to judge whether the suggested amount of professional and clerical assistance was sufficient, "but having regard to the fact that it is proposed that the district surveyors shall collect the fees which will in future be receivable on behalf of the Council, it will be necessary for their accounts to be kept in such a manner as to be easily examined and audited by the Council. We have therefore considerable misgivings whether the provision for staff will be found to be adequate.

Office Expenses.

"With regard to office expenses, we feel that as soon as district surveyors became the salaried officers of the Council, there would be a tendency to regard many of the present offices as unsuitable, and to secure more expensive accommodation in prominent positions. We are, moreover, advised that, in the event of district surveyors being paid by salaries, the Council will probably have to provide them with more legal assistance than at present, and the cost of taking any necessary proceedings for recovery of fees would also fall upon the Council, the increase of expenditure for this additional legal work being estimated at from £300 to £500 a year, for which no provision has been made in the above-mentioned estimate of £40,245. We are informed by the Building Act Committee that the cost of furnishing the thirty-three offices comprised in the model scheme would involve additional expenditure, not included in the estimate, of £950, but this of course would only occur once, namely, on the establishment of new offices.

"We are very doubtful whether the model scheme could be carried out except at a cost considerably in excess of the estimate of the Building Act Committee.

"As regards the receipts, we are of opinion that the mere adoption of a salary system would remove some of the incentive at present existing to the discovery by district surveyors of cases under the Building Act in respect of which fees are payable, and would probably lead to a diminution in the total fees recovered; and we are by no means satisfied that when all the available vacant land in the county shall have been built upon, the present upward tendency of the total fees received might not, in the normal course of events, be replaced by a downward tendency."

Architect M.Ps.—Mr. T. B. Silcock, of the firm of Silcock & Reay, architects, of Bath, has been elected M.P. for the Wells division of Somerset; Mr. J. E. Sears, architect, London, M.P. for Cheltenham; Mr. A. C. Morton, architect, London, M.P. for Sutherlandshire; and Mr. A. W. Soames (trained as an architect and formerly in practice as such) M.P. for South Norfolk. Mr. Philip E. Pilditch, architect, London, was not elected for St. Ives, nor Mr. William Hunt, architect, London, for South Islington.

THE AMERICAN CEMENT INDUSTRY.

Its Wonderful Growth.

FROM figures published by the United States Geological Society the growth of the American cement industry within the past few years is seen to be very considerable. Only a very few years ago, says "Engineering," the output of cement in the United States was quite insignificant: in fact, there hardly was any output at all, nearly the whole of the cement used coming from abroad. But now the country itself supplies a very large proportion of the cement it uses. In 1900 the value of the three classes of cement—Portland, Natural and Puzzolana (slag)—manufactured in the States was £2,656,700, while in 1903 it was £6,386,270, or an increase in three years of about 140 per cent. Nearly the whole of this increase was in Portland cement; for although the output of Puzzolana increased about 100 per cent. the total amount manufactured was small in comparison with Portland.

"It will be seen from the preceding figures that the position held by Portland cement as an industrial product is vastly superior to that occupied by either the natural product or slag cement. This is as one would expect, for the uses to which both the natural and the slag cement can be put are limited when compared with Portland cement . . .

A Comparison between Portland and Natural Cements.

"As is well known, Portland cement differs in many ways from natural cement. In the first place, it is produced in quite a different way, by a method much more complex and exact; and, secondly, its characteristics are more important. Moreover, Portland cement is a definite product, its percentages of lime, silica, alumina and iron oxide varying between narrow limits, while brands of natural cements vary greatly in composition. The temperature at which Portland cement is burned is much higher than that required for natural cement, the temperature necessary for the former being somewhere near 3,000 degs. Fahr., while for the latter it may never approach the fusing or clinkering point. Portland cements are heavier than natural cements; they also set slower and attain a

higher tensile strength. In many ways the composition of the two is similar, though in the case of one its constituent parts are of lime, silica, alumina and iron oxide artificially mixed in certain definite proportions, while in the other they are burned in the state in which they are found in Nature.

Natural Cements.

"In the natural cement manufactured in the United States a clayey limestone is invariably used which has from 13 to 40 per cent. of clayey matter, from 10 to 22 per cent. of silica, and from 4 to 16 per cent. of alumina and iron oxide. The presence of magnesium carbonate in a natural rock is regarded as merely incidental, where, for natural cements at least, it takes the place of lime as far as the hydraulic properties of the product are concerned.

Slag Cements.

"In the Puzzolana cements the required properties are made by mixing powdered slaked lime with either volcanic ash or blast-furnace slag, the product being simply a mechanical mixture, which is not burned at any stage of its manufacture. The Puzzolana cements are more suitable for setting under water than in air.

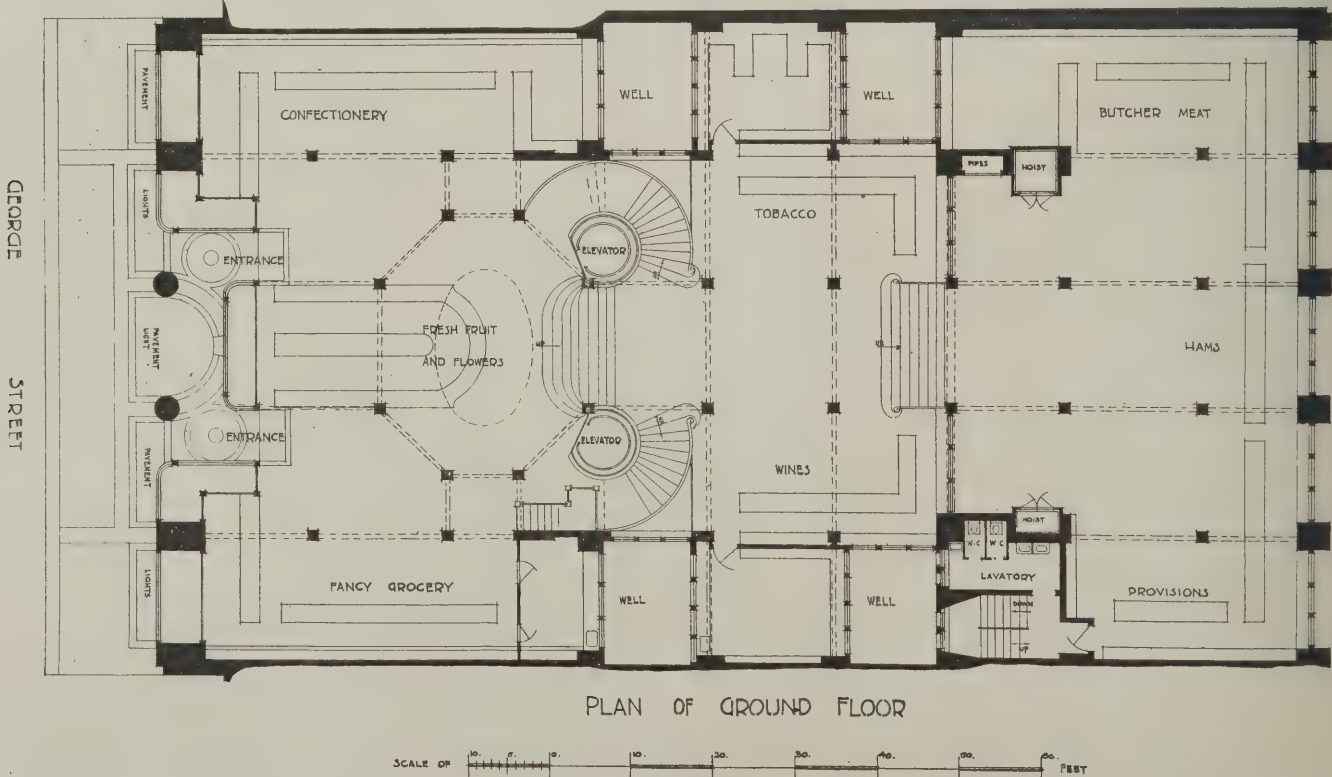
"These slag cements are lower in specific gravity and lighter in colour than Portland cements; normally they set more slowly, though this can be overcome by treatment during manufacture. They do not very well resist mechanical wear, and in dry situations they do not set in a satisfactory manner. Under water or in permanently damp situations they are, however, useful."

An Architectural Attaché is being appointed to the German Embassy in London to study and report upon working-class dwellings in this country. In the matter of such dwellings Berlin (as, indeed, all large German towns) is astonishingly backward, and some well-ordered scheme for the housing of the growing population is becoming increasingly necessary. In connection with the above appointment it may be recalled that from 1896 to 1898 there was attached to the German Embassy in London an architectural expert to report upon our public buildings and the means of transit between the Metropolis and the suburbs.

OUR PLATES.

THE new Dental Hospital in Great Charles Street, Birmingham, was opened by Sir Oliver Lodge last July. The cost has been about £10,000 altogether, allowing £8,500 for the building and £1,500 for its equipment. It is built of red bricks with stone dressings, and provides the following accommodation:—On the ground floor a general waiting hall, staff rooms, classroom, students' room and museum; on the first floor a lecture hall and rooms for operations (with and without anæsthetics), and recovery rooms; on the second floor filling and saving rooms, specially lighted; and on the top floor a mechanical department and workroom for the making of artificial teeth and crowns. Messrs. Bateman & Bateman, of Birmingham, were the architects.

The new building in George Street, Edinburgh, for the Professional and Civil Service Supply Association was completed towards the end of last year from designs by Messrs. John Burnet & Son, architects, of Glasgow. The frontage to George Street is about 80ft. and the depth of the building about 145ft. In all there are eight floors, namely, sub-basement, basement, ground, entresol, and four floors above. The general refrigerating department, with wine cellars and refrigerators, occupies the sub-basement; the grocery storage and despatch department the basement, with four van entrances in Ros Street Lane; the grocery and provision department the ground floor; clerical department on the entresol floor; drapery and tailoring departments on the first floor; drug, stationery and boots departments on the second; ironmongery and furniture on the third; and a restaurant and tea-room on the top floor. The front of the building is constructed of Prudham white sandstone, enriched on the lower floors with white and green marble. The main contracting work—masonry, brickwork, ironwork, slating, plasterwork, plumbing and glazing—was carried out by Edinburgh firms; the refrigerating installation by Messrs. J. & E. Hall, Ltd., of Dartford; passenger and goods lifts by Messrs. Archibald Smith & Stevens, of London; and "Fram" fire-resisting floors throughout by the "Fram" Fireproofing Co.



NEW BUILDING FOR PROFESSIONAL AND CIVIL SERVICE SUPPLY ASSOCIATION, EDINBURGH. JOHN BURNET AND SON, ARCHITECTS.

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NEW DENTAL HOSPITAL, GREAT CHARLES STREET, BIRMINGHAM.

BATEMAN AND BATEMAN, ARCHITECTS.



NEW BUILDING FOR THE PROFESSIONAL AND CIVIL SERVICE SUPPLY ASSOCIATION, GEORGE STREET, EDINBURGH.
JOHN BURNET AND SON ARCHITECTS.

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Notes and News.

Mr. T. M. Cappon has been instructed to prepare new plans for the Westgreen Asylum, Dundee, together with Gowrie House.

Mr. J. T. Cackett's Presidential Address to the Northern Architectural Association, delivered on November 22nd last, has been reprinted as a pamphlet from the R.I.B.A. Journal.

An Austrian Exhibition of Architecture and Building Construction is proposed to be held in 1908 in the Vienna Prater. Although the exhibition will be mainly an Austrian one, foreign nations will be invited to participate.

The Society of Architects has subscribed £700 towards the expenses of the Seventh International Congress of Architects to be held in London in July next—in the Grafton Galleries, Bond Street—and has appointed twelve delegates to represent the Society at the Congress.

A new School at Abingdon, dedicated to St. Helen and brought into being by the community of St. Mary the Virgin—the Wantage Sisters—has been built on the Shippon Road at a cost of £30,000 from designs by Mr. Frank L. Pearson, F.R.I.B.A. Accommodation is provided for 40 boarders and 200 scholars.

The L.M.B.A. Diary and Handbook for 1906 has just been issued from the offices of the London Master-Builders' Association, 31 and 32, Bedford Street, Strand, price 2s. 6d. It preserves the form hitherto adopted, including with the diary a collection of notes as to wages, lists of members, rules, memoranda, &c., and a glossary of electrical terms.

The Architects', Surveyors' and Auctioneers' Diary and Almanac for 1906, issued by Waterlow Brothers & Layton, Ltd., 24 and 25, Birch Lane, E.C., price 6s. (also 3s. 6d.), has come to hand. In addition to a very ample diary, it provides a great deal of information and memoranda of use to architects and others, including lists of members of the R.I.B.A., the Society of Architects, the Surveyors' Institution, the Institution of Civil Engineers, the Auctioneers' Institute, &c., together with the London Building Act, house agreements, &c.

An Interesting Letter about Carron Stoves has been sent to us by the Carron Co., of Carron, Stirlingshire. It is from a Mr. W. Waller, at Whitewood, North-west Territories, Canada. He says: "I was on a business trip this fall in the north-east part of Saskatchewan; saw a box-stove of what I thought was a new design in box-stoves. On enquiring where the man got it, he said it was his great grandfather's, and that it was made by the Carron Co. 150 years ago. I thought it most extraordinary for a stove to last that length of time. The stove belongs to the early settler's family that came out with Lord Selkirk." This speaks wonderfully well of the lasting qualities of Carron manufactures.

At the Birmingham Builders' Exchange the following lectures are to be delivered on Thursday evenings:—February 1st, "The Underground Slate Quarries of North Wales," by Mr. H. Browning Button. February 15th, "The Housing Problem," by Mr. F. G. Whit-tall, president of the Midland Centre of the National Federation of Building Trade Employers. March 1st, "Architectural Ceramics," by Mr. J. Miller Carr. March 15th, "Talks on Canadian Cities," by Mr. Peter B. Ball, resident agent for the Commercial Agency of the Government of Canada. March 29th, "The Goldfields of the City," by Mr. W. Francis Goodrich, an authority on the disposal of waste. The lectures will commence at 6 p.m.

The London County Hall Bill has been ordered for first reading.

A new Church at Boness has just been completed from designs by Messrs. Scott & Campbell, of Edinburgh, at a cost of £6,000. The seating capacity is for 600.

New Members of the Royal Sanitary Institute include Mr. Percy E. Nobbs, professor of architecture at the McGill University, Montreal, and Mr. Heaton Comyn, A.R.I.B.A.

A Book on Bourneville—Cadbury's model village outside Birmingham—has just been published by Mr. Batsford, price 8s. It is admirably illustrated. The author is Mr. Alexander Harvey, architect to the estate.

Fifty Years of English Renaissance.—At last Thursday's meeting of the Sheffield Society of Architects and Surveyors, Mr. C. F. Innocent, A.R.I.B.A., delivered a lecture on "English Renaissance Architecture, 1650 to 1700," the third of a series.

The Furniture for the King's Sanatorium, now being completed at Midhurst, Sussex is being supplied to a special design by Messrs. Heal & Son, of Tottenham Court Road. It is called "Aseptic," and is white enamelled and free from all mouldings and other lodgments for dust.

Tower Bridge Police Court and Station.—The mosaic flooring in the entrance hall of this building, illustrated in our issue for last week, was executed by Messrs. Diespeker, Ltd., of 57-60, Holborn Viaduct, who have also carried out similar floorings in the police courts at Shoreditch and King's Cross under the same architect.—Mr. J. Dixon Butler.

Dissolutions of Partnership.—Mr. Humphreys-Davies and Mr. W. C. D. Cruttenden, hitherto practising as architects under the style of Messrs. Humphreys-Davies & Co., architects, London, E.C., have dissolved partnership.—Messrs. W. E. Fenwicke and O. L. Smith, practising as architects at Newcastle-on-Tyne under the style of Dunn, Hansom & Fenwicke, have also dissolved partnership.

Messrs. Patman & Fotheringham, Ltd., of Theobald's Road, W.C., and Islington, N., have secured the contract for the rebuilding of Nos. 132, 133, 134 and 135, Long Acre, W.C., destroyed recently by fire. The architect for the work is Mr. William Woodward, F.R.I.B.A. These premises when completed will be used for very large motor warehouses.

Building Accidents.—On Wednesday evening last the copings of four shops facing the London County Council's school in Akerman Road, North Brixton, fell into the street, killing one boy and seriously injuring another.—On Thursday a serious accident occurred in a large reservoir which is being constructed by the South Staffordshire Waterworks Co. at Shavers End, Sedgeley. A scaffold gave way, and eight men fell nearly 20ft., two sustaining serious injuries. The cause of the accident is said to have been the slipping of the ropes by reason of their being saturated with the heavy rain.—A granary floor collapsed on January 21st at the Bradford corporation stables in Harris Street. Luckily, no one was killed, but three men were injured.

Bedford Estate Scheme Adopted.—At last Wednesday's meeting of the Holborn Borough Council the report of the works committee in regard to new streets, &c., on the Bedford estate was adopted, subject to the Duke of Bedford contributing £2,000 towards the expenses of paving, &c., and allowing for the use of the old materials of the demolished houses for levelling purposes. The scheme involves the closing of Torrington Mews, the widening of Kepple Mews North, the construction of a new street on the site of Kepple Mews South, and the widening of Torrington Place, from Torrington Mews, westward from 50ft. to 60ft.

A new Theatre at Scarborough is to be built in Queen Street. The building will seat about 1,500 people.

Six new Schools at Bootle are proposed to be built by the Bootle Education Committee, one for 750 children and the others for 1,000 children each.

The Holborn Empire, formerly the Royal Music Hall, was opened on Monday. The house has been transformed under the direction of Messrs. Frank Matcham & Co., the well-known theatre architects.

South Wales and Monmouthshire Architects' Society.—Mr. H. Dare Bryan, F.R.I.B.A., of Bristol, read a paper on "The Evolution of the English Cathedral" at last week's meeting of this Society, held at Cardiff.

The new Carnegie Library at Harrogate was opened on Wednesday last. It is built on the town hall site. The reading-room is 50ft. square and the lending department will hold 15,000 volumes. The cost, including furnishing, has been about £8,000. Mr. Henry T. Hare, F.R.I.B.A., was the architect.

Newport Borough Asylum.—This building was opened on Thursday last. It is situated at Caerleon and has been built from designs by Mr. A. J. Wood, of Surrey Street, London, W.C. The total cost will be about £155,000. Accommodation is provided for 368 patients with administrative offices for 500 patients, thus making provision for two further patients' blocks without any enlargement of the administrative block. The contractors for the work were Messrs. John Linton & Co., Ltd., of Newport.

The new Church of St. Michael and All Angels at Manselton, Swansea, was consecrated by the Bishop of St. David's on Wednesday last. The nave is 72ft. long by 25ft. wide; north aisle and south aisle each 72ft. long by 20ft. 6ins. wide; and chancel 36ft. by 25ft. The accommodation is for 700 people. The portion of the church already completed has cost £5,000. Mr. E. M. Bruce Vaughan, F.R.I.B.A., of Cardiff, was the architect, and Messrs. Lloyd Brothers, of Swansea, were the contractors.

A Definite Arrangement about Ayr Bridge has now been arrived at. Provided the sum believed to be necessary, namely, £10,000, is obtained by August 1st next, a committee (to be appointed at a public meeting in Ayr) will be allowed to carry out the necessary preservative works on the bridge, after the plans have been approved by the burgh surveyor in the interests of the public safety. The whole work must be completed by August 1st, 1908. Should it be necessary to rebuild any portion of the old bridge, the cost of such rebuilding will be borne out of the Templeton bequest funds. If the amount of £10,000 is not raised by public subscription, the town council of Ayr will instruct the surveyor to proceed with the rebuilding of the bridge.

Ancient Building Construction.—Lecturing on this subject at the Manchester Municipal School of Technology last Wednesday, Prof. S. H. Capper described how the huge blocks of stone used in the construction of the great Egyptian temples were brought across country and placed in position by means of a series of inclined planes, being dragged down one slope, raised by leverage to the top of another, dragged down the second slope, and so on. Professor Capper also described and illustrated the probable method used in erecting the huge statues, some of which were 52ft. high and weighed nearly 1,000 tons. In one case there were inscriptions and evidences to show that a colossal statue, carved out of one solid piece of granite, was brought down the river to the place where it was to be erected resting on eight pontoons or rafts, dragged by 15,000 men, who pulled at ropes 1,000ft. long.

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Correspondents are particularly requested to be as brief as possible.

The querist's name and address must always be given, not necessarily for publication.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

Strength of Rib Truss.

DORSET.—E. J. B. writes: "I send rough tracing of the arched principal for a roof to be covered with lead. The principals are of English oak. Do you consider the construction satisfactory without a tie-rod? Is there a possibility of the principal spreading and thrusting-out the walls?"

The truss shown by querist and reproduced herewith with alterations, namely, larger bolts and outline buttress (as Fig. 1) offers a very important case, and one that does not lend itself readily to the ordinary methods of solution; an attempt has therefore been made in the following notes to substitute a braced structure within the same dimensions and from that to obtain an analysis of the stresses. The roof naturally divides itself into two portions (see Fig. 2), which may be assumed to be pivoted at the apex. It will be seen that the loads and reactions form two couples acting in opposite directions, and the first thing to determine will be the moments of these couples. The loads 1-2, 2-3, 3-4 and one-half of load 4-5, making a total of $8 + 16 + 16 + 8 = 48$ cwt., are equal to and balanced by the reaction 9-1a of 48 cwt. The moment of the first couple consists of load 1-2 of 8 cwt. acting without leverage = 0, load 2-3 of 16 cwt. with a leverage of 7.5 ft. = 60, load 3-4 of 16 cwt. with a leverage of 7.5 ft. = 120, and one-half of load 4-5, or 8 cwt., with a leverage of 11.25 ft. = 90; making a total of $0 + 60 + 120 + 90 = 270$ cwt.-ft.; or this moment may be obtained by multiplying the reaction of 48 cwt. by 5.625 ft., which is the mean arm of the couple, $48 \times 5.625 = 270$ cwt.-ft. This is balanced by the moment of the forces 1-1a and the horizontal thrust at the crown, which will be the same moment acting with a leverage of 9 ft. Therefore force 1-1a = $\frac{270 \text{ cwt.-ft.}}{9 \text{ ft.}} = 30$ cwt.

The load line 1 to 8 (Fig. 3) may now be drawn. Then for 1-1a set out 30 cwt. to scale from 1, and for 8-8a set out 30 cwt. from 8; join 1a to 8a, and the point 9 will be midway between the two extremities. The remainder of the stress diagram may then be completed without further difficulty. The nature and amount of the stresses as scaled from Fig. 3 are marked on Fig. 2, where also thick lines denote members in compression and thin lines those in tension. For the stresses on the principal rafter the method of working is as follows:—Draw AB (Fig. 4) equal to the horizontal span of rafter = 11 ft. 3 ins., and add the loads from the purlins at c and d. Then the bending moment due to load c will be

$$w_{ab} = \frac{16 \times 3.75 \times 7.5}{11.25} = 40 \text{ cwt.-ft., or } 40 \times 12 = 480 \text{ cwt.-ins.}$$

Setting this down as CE and a similar amount from D giving DF, then adding CG to CE and DH to DF, CJ and DK are obtained, and joining AJKB the outline of the bending moment diagram is found, the maximum bending moment being anywhere between CJ and DK and

equal to 720 cwt.-ins. The formula $\frac{w}{A} \pm \frac{M}{Z}$

may now be used, where w is taken as the stress in bar 6-17 = 57 cwt., A the effective sectional area of the rafter taken as 9 ins. \times 6 ins. owing to the underside being moulded,

the maximum bending moment = 720 cwt.-ins., and $z = \frac{bd^2}{6} = \frac{6 \times 9^2}{6} = 81$. Then

$$\frac{57 \pm \frac{720}{81}}{996} = 1.06 \pm 8.9 = 9.96 \text{ cwt. compression per sq. in.; and taking oak as crushing with } 3.2 \text{ tons per sq. in. (as given by Hurst), } \frac{3.2 \times 20}{996} = 6.4, \text{ say a factor of}$$

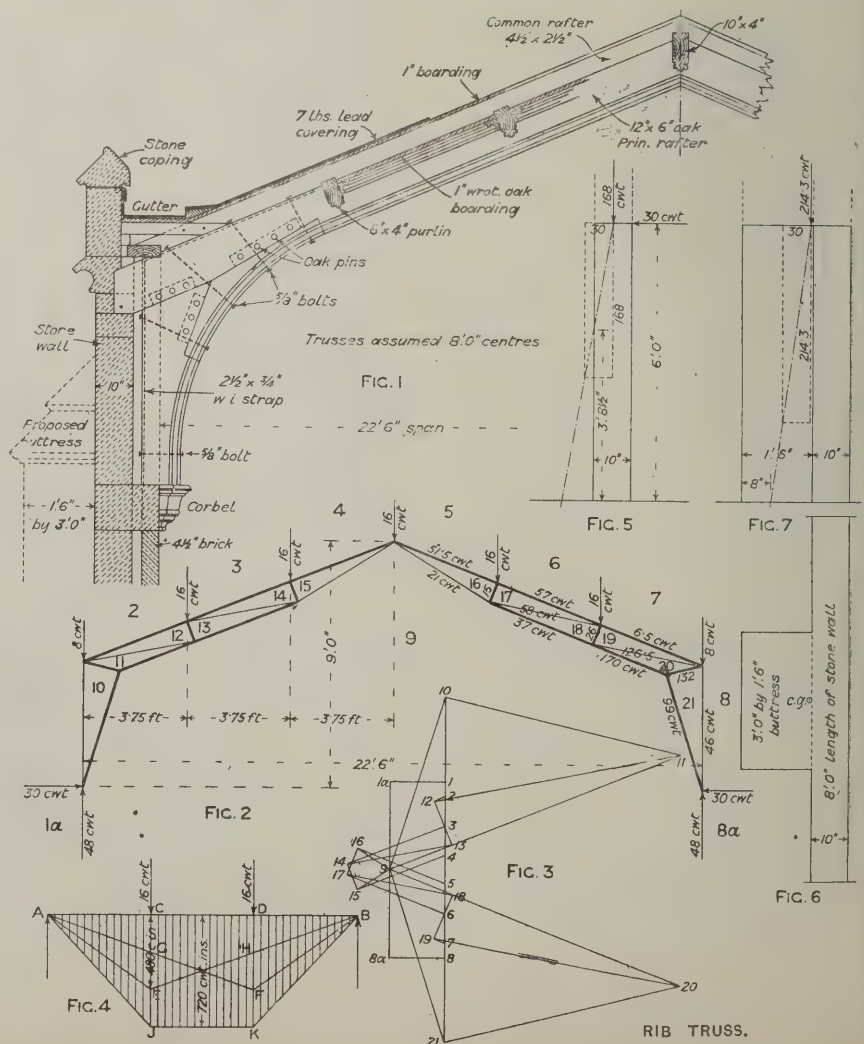
safety of 6. For the stability of the wall the height from ground level to level of corbel has been assumed as 6 ft. (as shown in Fig. 5). For the weight of wall, 8 ft. long \times 14 ft. total height $\times \frac{1}{2}$ ft. thick \times 144 lbs. per cub. ft. \div 112 lbs. in 1 cwt. = 120 cwt., and 120 cwt. + 48 cwt. vertical load from truss = 168 cwt. acting vertically down the wall. Combining this with the outward thrust of 30 cwt., the resultant cuts the face of the wall at a height of 3 ft. 8 ins. above the base, so that the wall is not sufficiently strong, and buttresses will have to be used. Assuming a buttress 18 ins. by 3 ft. wide on face (as shown in Fig. 6, plan, and Fig. 7, elevation), then the additional weight to be added for the buttress will be 3 ft. \times 1 ft. 6 ins. \times 8 ft. high \times 144 lbs. per cub. ft. \div 112 lbs. = say 46.3 cwt., making a total vertical weight of $168 + 46.3 = 214.3$ cwt. Setting this down through the centre of gravity of the section of wall and buttress, and combining with the horizontal thrust of 30 cwt. the resultant when produced cuts the base of the buttress at a distance of 8 ins. from the outer edge.

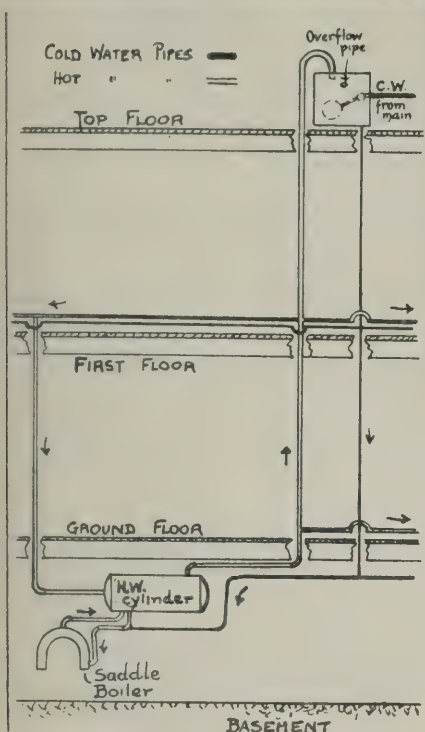
Then $\frac{2}{3} \frac{W}{d} = \frac{2}{3} \times \frac{214.3}{8.12} = 95.25$ cwt. = say $4\frac{1}{2}$ tons per sq. ft. maximum compression on buttress. The 4 ins. inside brick-lining to stone wall has not been taken into account in the above calculations for stability as it practically adds nothing. HENRY ADAMS.

Liability for Re-making of Roads.

MONKWEARMOUTH.—J. E. writes: "Twenty-five years ago a public corporation prevailed upon the commissioners and landowners to give up many acres of land for a park and to form roads adjacent to same. This was done in macadam to the corporation specification, and under their inspection these roads have been lighted, cleaned and repaired up to the present at the expense of the ratepayers. Now the corporation give notice to the owners of houses adjacent to these roads to re-make them in pursuance with the Public Health Act, 1875, and claim that they have never taken the roads over. Do you know of any House of Lords' decision whereby a public authority, having maintained and cleaned a road and collected the borough and district rates from the adjacent owners, can compel the owners to make good what has been destroyed by the public at large?"

In the absence of any other material facts than those before me, such as a local private Act of Parliament, the corporation appear to have absolutely no case whatever in support of their claim. A presumption of dedication arises from the maintenance and repair of the road in past years by the corporation. The corporation after repairing, &c., for twenty years are not entitled to say that they have not taken it over, even if certain technical formalities have not been observed in regard to dedication. The courts would have scant sympathy with the corporation if they tried to make the donors of a public park, &c., liable in such a case as this. I should advise the owners to place the matter in the hands of an experienced solicitor with instructions to resist the demand until they showed a better right than they appear to have. I am unable to find any recent decisions in point. S. P. J. M.





Hot-water Supply Arrangements.

BRISTOL. — CONSTANT READER writes: "Kindly give me a few particulars on heating by hot water. I should like to know whether a circulating cylinder fixed as sketch (not reproduced) will work satisfactorily. My flow and return are $1\frac{1}{2}$ ins. and the draw-offs $\frac{1}{2}$ in., and I have a long way to carry my pipes. Which is the right position to attach them? Please also give me the names and prices of authoritative books on this subject."

The sketch reproduced above will give you an idea of how the work can be done. A special cylinder may have to be ordered, and its ends had better be dome-shaped, with a pipe connecting to each. The pipe from the top side should be $1\frac{1}{4}$ bore right to the end in the cold-water cistern, which must have enough space in it when full of cold water to hold a few gallons of hot. The cylinder will work as well horizontally as vertically. If a draw-off tap be more than 20 ft. from the main hot-water pipe, a return pipe should be fitted, as shown on the left-hand side of the sketch. If cost be an obstacle, the return pipe need be only $\frac{1}{2}$ in. bore. This extra pipe completes the circuit of flow and return, and brings about a continuous flow of hot water in the main hot-water pipes; every tap then lets off hot water at once. The circuit, or the ring as it may be called, can sometimes be made by connecting the ends of two branch pipes. The best book on the subject is, perhaps, Mr. Walter Jones's "Heating by Hot-water, Ventilation and Hot-water Supply," price 6s.; but you will find much information on various methods of heating buildings, hot-water supply and ventilation in "Specification" No 9, price 2s. 6d., shortly to be published. In any case, you must keep records of your work by noting the amount of hot water drawn off and the total amount in boiler, pipes and reservoir; the amount of heating surface in the boiler, the area of the fire-grate and the weight of fuel burnt; also the temperatures of the cold water and of the hot water drawn off.

O. WHEELER.

Load on Roof Truss.

CARDIFF. — STUDENT writes: "For my study of iron roof construction I am using some of Prof. Henry Adams's building construction plates. On one, illustrating stress diagrams for iron roofs, he says ' $\frac{1}{2}$ cwt. per ft. super. of actual surface is sufficient to allow for

all contingencies.' Does this include wind-pressure, or is it only dead load? If it does not include wind-pressure, can you tell me the simplest method of obtaining the live load, say, for a roof of 35 degs. pitch?"

The $\frac{1}{2}$ cwt. per ft. super. is sufficient to allow for weight of truss, covering, wind-pressure, snow and other contingencies on straight rafter roofs; but when a braced "sickle" or "crescent"-shaped iron roof truss is in question it is necessary to take account of the wind separately, as the stresses may vary from tension to compression in some of the members, and due allowance must be made for them.

HENRY ADAMS.

Boiler Flue in Floor.

LONDON. — C. L. G. writes: "In a block of flats I am constructing the hot water is supplied by a vertical boiler in the basement. The position of the boiler is shown on sketch (not reproduced). The flue has to be taken to a shaft at A, the distance between boiler and A being about 15 ft. The question is, can I place the flue before the level of the basement floor? Would it be liable to be choked by soot, or could this be obviated by (say) a pit for collecting purposes? For several reasons the flue cannot pass under the floor above."

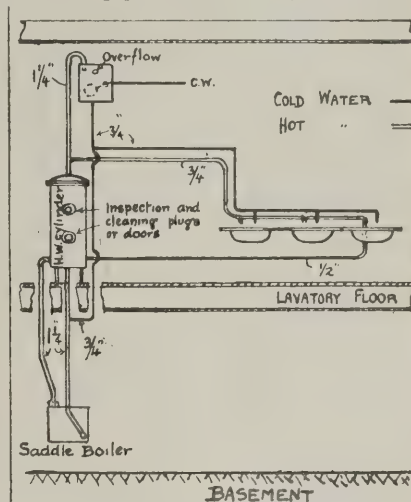
This will work satisfactorily if the flue rises all the way from the down pipe to the chimney. The slope should not be less than that of the decimal rule for slope of drains. The scale sketch below shows what is needed for a good job. The doors must be double to each opening, or else have a well-fitting plate inside to prevent leaks of air from stopping the draught. The down-cast pipe and its bend from the boiler will be of cast-iron, and be swept from the boiler through the fuel door; while the pipe in the floor may be of cast-iron, or plain fireclay if this be strong enough to bear the traffic or load over it. The floor on both sides of the flue will get hot, and an intercepting trench had better be made along each side and covered by a brick. An iron pipe laid in and covered with sand between the two trenches, the whole being covered with paving flags, will make a good job. A wood or asphalt covering to the floor will get warped or damaged by the heat. The only damper needed will be the air-slides in the furnace and ashpit doors. This arrangement will also work with a saddle boiler that has no winding flues, but if they wind, the flues must start from the boiler top and rise steadily all the way up to the chimney.

O. WHEELER.

Hot-water Supply to Lavatory Basins.

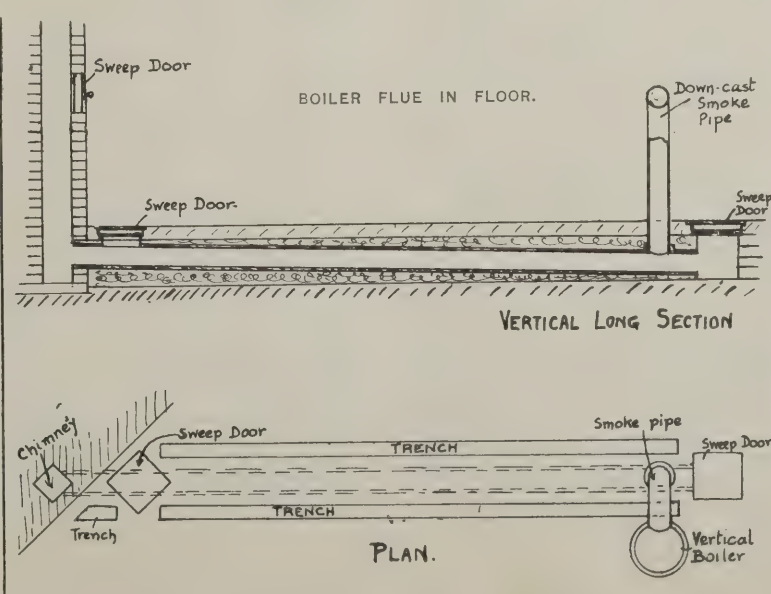
BRISTOL. — CONSTANT READER writes: "Please explain how to carry hot water to a set of lavatory basins. I have a saddle boiler, circulating cylinder and cold water tank, $1\frac{1}{2}$ in. flow and return, and $\frac{3}{4}$ in. draw-off pipes."

The accompanying sketch will give you some idea of the run and lay of the pipes; the waste pipes and the supports for the basins are not shown, nor are the brickwork and chimney of the boiler. The cleaning holes in the sides of the hot reservoir are only needed for very hard or very muddy water, and if the pipes can be easily disconnected



from the top this latter can be bolted on so as to be removed bodily for cleaning. The pipe for cold water to the boiler can be connected to the side of the hot reservoir, if preferred, below the hot return from the basins. The capacity of the hot-water reservoir depends on the number and size of basins; twice that of the basins is a good rule when the use is regular at all hours, and three or more times when many users come at once at long intervals. The capacity of the boiler may be one-fifth that of the reservoir for regular use and one-third for interval use. The size of pipe marked on the sketch will do for four medium-sized bowls, but for six bowls all in use together the pipes should be $1\frac{1}{2}$ in., 1 in. and $\frac{3}{4}$ in. bore, and larger pipes between boiler and reservoir always help the quicker heating of the cold water. Before ordering the reservoir make a drawing or sketch of it in its place, and mark the pipe branches, &c., in the positions easiest for the man to joint them.

O. WHEELER.



Drying-room for Joinery.

NEWCASTLE - ON - TYNE. — J. H. writes: "Please give me an idea as to constructing a drying-room for joiner-work, either with or without a small fan, or refer me to any books giving such information."

! To properly instruct you as to drying timber would require a small book. You will, however, find some information in Mr. Powis Bale's "Saw Mills, their Arrangement and Management."

10 per cent. Commission on p.c. or Provisional Sums.

MARITZBURG. — CONTRACT writes: "In a recent contract in which the R.I.B.A. conditions were used (where quantities do not form part of a contract) a builder claimed 10 per cent. commission on p.c. and provisional sums, together with all trade discounts. The proprietor had ordered the goods from England, which exceeded the amounts of the p.c. and provisional sums, but the proprietor met the bills for same, the contractor never having to pay out any money to meet the amounts, which were deducted from the contract in final settlement, and the contractor took no objection to the proprietor's action in ordering and paying for the goods. Can you tell me, in any contract where it states that the builder has to provide a certain sum for, say, tiles or any other goods, whether the builder has to expend the full amount or whether any allowance should be made to him? A recent case has been taken to arbitration in which the conditions of contract state 'the contractors are not to vary or deviate from the drawings or specifications, nor execute any extra work whatever, unless upon the authority of the architects,' and in which the contractor agreed to complete the work for a lump sum, in which provisional sums were included: having expended the provisional amounts to the full and made payments on same, for goods which were ordered by the client, he claimed 10 per cent. commission as his profit over and above the provisional amounts included in the contract. Now, as the contract does not provide for any such commission (which is an extra), and clearly states that no extras will be allowed unless upon the authority of the architects, I fail to see how the arbitrator, in any lump sum contract, could award such an extra, and have always understood that the builder included his profit in his tender. This question is of vital importance to the profession, and has caused a considerable stir."

In this case I am of opinion that the arbitrator was clearly wrong in his award, unless it was proved before him that a universal custom existed in the building trade (which was also within the knowledge of the "proprietor") to allow 10 per cent. commission in such a case as the one under notice. There are no recent cases exactly on all-fours with this, for the simple reason that the matter is too obvious to be fought. S. P. J. M.

Acetylene for Country-house Lighting.

BURNLEY. — J. R. L. writes: "(1) I should be glad of any information respecting the use of acetylene gas for country houses. Can it be used for cooking stoves of the usual type, and can you name the publisher and price of any reliable work on the subject? (2) What is the Lusol illuminant recently adopted by some of the Continental cities in preference to either coal-gas in any form, electricity or acetylene? Is there any definite information on the subject?"

In reply to the foregoing, Messrs. Stode & Co., of 48, Osnaburgh Street, Regent's Park, N.W., have been kind enough to supply the following particulars: "Acetylene gas is the best illuminant for country house lighting where one does not wish to entail the expense of putting down an electric-lighting plant. The cost of the light is also much cheaper, and will compare with coal-gas at 3s. 6d.

per 1,000 cub. ft. We are supplying at the present time stoves for cooking and heating by acetylene gas. Up to the present time there has been a little difficulty in getting a good acetylene gas cooking stove, but this difficulty has now been overcome, and our apparatus will give excellent results. Professor Lewis has published the most reliable work on acetylene gas (price 31s. 6d.). He goes into the whole subject very extensively—in fact, rather more deeply than the ordinary man requires. We might mention that to make an acetylene gas installation thoroughly satisfactory the whole of the pipes and fittings have to be specially fitted to stand a high pressure, as acetylene gas is very penetrating, and pipes and fittings that would be sound for coal-gas might not be sound for acetylene gas. It is also essential that a pure gas should be generated, or the gas thoroughly purified, otherwise the impurities in the gas have an action on the pipes and fittings and also cause an unpleasant haze in the room where the gas is burnt. We have no information in regard to the Lusol illuminant."

[Prof. Lewis's standard work on acetylene can be obtained post free from our offices for the price named; also "Acetylene" by Frederick Dye (6s.) and "Acetylene Gas" by W. Doman (3s. 6d.).]

Forming a Bowling Green.

DINGWALL. — X. Y. Z. writes: "I am interested in the formation of a bowling green measuring 42yds. square, with a 6ft. footpath, &c., all round. The site is on made ground averaging 2ft. 6ins. deep, overlying soft swampy ground 15ft. to 16ft. deep. The materials available are stones for bottoming, sand, gaslime, soil (boulder), clayey earth, engine ashes, but no sods. Kindly advise me."

The essential point for consideration is that the bowling green should be always firm and dry enough for use. I therefore suggest that you pay particular attention to the subsoil drainage, putting in, say, four parallel drains either of "level drain" pipes of not less bore than 3ins., or you should make stone drains if pipes are not procurable. In forming the green itself I should prefer to use 10ins. or 12ins. of sand and engine ashes for foundation (with a layer of an inch or two of mould over) rather than the other materials you mention. The whole would in the ordinary way be raked smooth and covered with turf cut 36ins. by 12ins. by 1in. (or 1½ins.) thickness; but if you have no turf a thick seeding—1lb. of seed to every 50 sq. yds. of fine grasses (such as is prepared by the best seedsmen for lawns)—must be sown, slightly raked in and covered with soil. It cannot be used the first year. F. S. I.

Book on Turkish Baths.

LIVERPOOL. — O. E. S. writes: "Please give name and price of a book with plans and particulars of modern Turkish baths."

We only know of R. O. Allsop's "Turkish Baths," price 6s. post free from our offices.

Stone-faced Walls.

MANCHESTER — SUBSCRIBER writes: "Is it advisable to form, say, a 2in. cavity in the external walls of a small house, where the facing is of sandstone and the interior of brick? Would it be satisfactory to make such a wall, on the top floor, 11ins. thick, with a 4½in. stone facing, a 2in. cavity and 4½ins. of brickwork?"

Certainly it is advisable—especially on west and south exposures—to take precautions against driving wet, and a cavity wall, if properly built, is as good as any other method of damp prevention. You will, however, find that it is impossible to build a stone wall of so slight a thickness as you propose, and I should suggest instead of the cavity that you should build a solid wall—sandstone outside

and brick inside, bonded together by "White's Hygeian Rock Composition." The cavity need not be thicker than ½in., and is formed by building in a roin. board of that thickness, removing it at every third course for the insertion of the composition, which is poured into the cavity in a boiling state. The cost of the composition for two labourers' cottages which I have just completed has been £15. F. S. I.

Solution to keep out Damp.

SHREWSBURY. — G. D. L. writes: "Which is the best colourless fluid for applying to a brick wall to keep out damp?"

We do not know of a colourless solution that is efficient for the purpose.

Book on Estimating.

HONG KONG. — RULER writes: "Kindly recommend a good book on estimating, especially for architects, with plenty of prices and costs per ft. cube."

"Estimating" by George Stephenson (6s. 6d.), "How to Estimate" by John T. Rea (10s.). These books can be obtained post free from our offices for the prices stated.

Damp Wall of Bedroom.

LYTHAM. — J. W. T. writes: "The wall of a bedroom always shows damp after rain. The wall faces south-west. The west wall, which is battened, never shows damp. The walls are solid 14ins. The damp does not show in the bedroom above nor in the room below. Do you think if the wall were pointed the damp trouble would be cured? If not, kindly suggest a remedy."

West and south-west walls are always particularly liable to be damp, as they naturally are most exposed to the driving rains. Pointing may very probably be successful in the case you mention, but I have found tile-hanging to be of greater efficacy in such a case; and in recently finished protection works I have successfully carried out the same idea by means of galvanized corrugated iron sheets fixed vertically to the face of the walls by means of wooden battens. Of course this was only done in a case where the property was of little value and very much "out of the way." F. S. I.

Architectural and Technical Publishers.

BARNESLEY. — YOUNG ARCHITECT writes: "Kindly give names of leading technical and architectural publishers in addition to Batsford; also a few names and addresses of reliable second-hand booksellers who make a feature of these classes of works."

Publishers:—Messrs. E. & F. N. Spon, Ltd., 125, Strand, London, W.C.; Crosby Lockwood & Son, 7, Stationers' Hall Court, Ludgate Hill, E.C.; Longmans, Green & Co., 39, Paternoster Row, E.C.; Chapman & Hall, Ltd., 11, Henrietta Street, Covent Garden, W.C.; Charles Griffin & Co., Ltd., 12, Exeter Street, Strand, W.C.; Whittaker & Co., 2, White Hart Street, Paternoster Square, E.C.; Macmillan & Co., Ltd., St. Martin's Street, W.C.; Scott, Greenwood & Co., 19, Ludgate Hill, E.C.; Gresham Publishing Co., 34, Southampton Street, Strand, W.C.; and Cassell & Co., Ltd., La Belle Sauvage Yard, Ludgate Hill, E.C. Most of the second-hand booksellers deal in architectural books to some extent, but Mr. Batsford is the chief source of supply for old works, and indeed for modern books.

Liquid Cements.

NORTHAMPTON. — NEMO writes: "Please give the names of some liquid cements, and the makers of same."

There are many kinds of cements, and what will suit one thing will not suit another. A liquid cement like "Seccotine" may serve your purpose. If not, you will probably find what you want in Spon's "Workshop Recipes."

LOSS OF HEAT FROM BUILDINGS.**How to Calculate for It.**

MR. A. H. Barker read a paper on "Calorimetric Methods of Determining Heat Losses from Buildings and Radiators" at a recent meeting of the Institution of Heating and Ventilating Engineers. The latter part of Mr. Barker's paper related particularly to the title, but the first part of the paper was of general interest, and the following is a summary of this portion:—

The problems presented to the heating engineer are in their very essence dual in character. He has first to determine in the case of each room treated what is the number of British thermal units lost to that room when maintained under the conditions required by the specification, and, secondly, how best to supply that amount of heat to the room.

Engineers are too apt to take what may appropriately be termed too cast-iron a view of the matter and to make the first question, How much heating surface is required in each room? Hence we find formulæ or rules of thumb appropriating so much heating surface to so much glass, and so much to the area of wall surface, and so forth.

It appears to me that in losing sight of the really dual character of the problem in this way engineers lay themselves open to the risk of serious loss, either by providing far more plant than is necessary or by incurring the still more serious expense of rectifying their errors at a later stage.

Both from a scientific and practical standpoint the actual amount of radiating surface is in fact a secondary consideration—secondary in the sense that the required degree of heat can be secured in a room by an amount of surface considerably less than it would be advisable to put in, and that the heat delivered into a room is a quantity far more dependent on the power of the boiler and the arrangement of mains than it is on the heating surface of the radiator in the room.

Conditions Specified.

In nine cases out of ten a specification in this country demands an internal temperature of 60 degs. with an outside temperature of 32 degs. To allow a little margin for safety, it is well to reckon a rise of 30 degs. No mention is made in most cases of the amount of interchange of air required, and even if this were done, who is going to estimate or determine how much air actually passes into or out of a room? Neither is any mention made of the substance or thickness of the walls, nor the character of the roof, nor of many other vital matters, and even if they were given exactly we have not the data for allowing for them.

I am not for the moment speaking of rooms in which there are special means of ventilation provided, but of ordinary rooms provided with the usual doors, windows and fireplaces. But even when special means are present the accurate determination even of the amount of air passing up a flue is by no means as easy as it seems, and a comparatively small error makes a large difference in the calculation for total heat required.

I doubt very much indeed whether any anemometric observations as carried out in practice give anything like a close approximation to the actual quantity of air passing.

Air passing through Walls.

But even assuming that by means of an anemometer it were possible to determine practically and with some approach to accuracy the total quantity of air passing up the flue, there still remains the wholly unknown quantity of air passing in and out through the substances of the walls.

It appears, therefore, obvious that to determine the heat losses with any approach to accuracy by means of calculations and the

ordinary coefficients of heat lost per sq. ft. of glass is of necessity impossible, because factors having a large influence on the result are of necessity impossible of determination.

Position affects Efficiency of Radiators.

It is to be feared that it is a common practice among engineers to determine the amount of heating surface required in a room either from the contents alone or from the glass, roof or wall area without any enquiry either as to what is to be the character of the heating surface, how it is to be fixed, or, more than all, what is to be its temperature. All these matters are of such extreme practical importance that it is by no means an infrequent experience to find in the same installation two radiators of the same surface, whereof one is giving off three times the amount of heat given off by the other. Yet these radiators would be cheerfully put in two equal rooms both requiring the same amount of heat. When a radiator is fixed close to a wall the wall in a few hours becomes heated to a considerable temperature, and this warm wall protects the radiator to a large extent from loss of heat in the back. When a radiator is fixed in a recess the case is still worse. And if the radiator is surrounded by a plinth preventing an access of air to the back the effect is still more marked.

When the radiators are fixed in front of a fresh-air opening the amount of heat lost depends entirely on the amount of air passing over the surface of the radiator.

The question of the temperature at which radiators are maintained is indeed one of the chief factors in the success or failure of a heating apparatus. Personally I have a very great objection to occupying a room heated by radiators at a higher temperature than 140 degs., and I much prefer 120 degs. I believe that a great part of the prejudice against heating apparatus in this country arises from the overheating of radiators, causing the smell with which we are all familiar and giving rise to

The Complaint that radiator-heated Rooms are Stuffy.

Now it is certain that all the heat transmitted by the furnace to the water in the boiler must be dissipated in the building, and that the temperature of the radiator will rise to such a point that all that heat is so dissipated, and the crucial point is so to arrange the mains that it is dissipated at the points where it is required and in such a proportion that no room will be overheated and no room will be too cold.

It is thus clear that the power of our apparatus is represented by

The Power of the Boiler.

provided that the surface of the radiators and the disposition of the mains is such that the radiators are maintained at the temperature at which they will give off in the building all the heat transmitted by the boiler plates to the water. If not, the water in the boiler will boil. If they are so maintained the water cannot boil however hard it is fired.

Now since the heat required to be given off at the radiators is the same as the amount given off by the building when maintained at the required temperature, it is clear that the power of the boiler must be the same as the heat lost from the building. So that the power of the boiler should be calculated quite irrespective of the amount of radiating surface, which is, as I have shown, only a secondary matter.

Also the mains should be calculated irrespective of the surface of the radiators they are to supply.

The amount of radiator surface is only a secondary matter, and determines the degree of comfort and not the temperature in the rooms.

I consider that our chief need at the present time is a more accurate knowledge of heat lost from a room, and I have myself formed the opinion from considerable experience that it can only be roughly calculated from existing data, and that the chief element of uncertainty is the amount of heat passing away by irregular ventilation. It is to this point that attention is required.

CONCILIATION IN THE BUILDING TRADE.

SPEAKING at the annual dinner of the Yorkshire Federation of Building Trade Employers, held at Leeds last week, Mr. S. Smethurst (Oldham) in proposing success to the National Federation said the organization was growing in importance every year, and there could be no doubt that very shortly it would include the cream of the trade. Defensive in its aims, it was founded on a broad basis of representation, and was financially sound. Great hopes were entertained that the result of the new conciliation scheme about to be inaugurated would be the impossibility of further strikes or lock-outs. The scheme had been favourably received in Lancashire, and there was reason for believing that it would be received with equal favour in other parts of the country. If a subject of dispute arose it went first to the local conciliation courts, consisting of local masters and local trade unionists. If these could not agree, it went to the district committee, similarly composed though representing a larger area; while if still no settlement could be arrived at, the matter went to the nearest "centre," the Northern Centre, including the seven northern counties; and if still the negotiations failed, the matter went to the National Conciliation Committee, including employers and trade unionists from the whole country. During the whole of these negotiations there was to be no cessation of work.

Mr. W. Shepherd (London), president of the National Federation, responded. It was true, he said, that the masters' federation was mainly meant for defensive purposes. If it had not been for the strength of that organization such a scheme of conciliation as had been indicated would not have been possible. It was only when two parties became organized and strong that they began to respect one another—that conciliation became possible. They stood for freedom of contract and for equitable and just treatment. When it was realized that, taking the country as a whole, building was the largest industry in England after agriculture, one felt that there was very little litigation and very little friction amongst builders. With regard to the progress of labour, it behoved that Federation to watch what was going on around them. He was ready to acknowledge that the labour representatives who had come to the front had a high conception of their duties and a keen sense of their responsibilities, and it was for employers to watch the trend of events.

Obituary.

Mr. F. Wentworth-Sheilds, M.I.C.E. of Sholing, sewerage engineer to the Itchen Urban District Council, died recently, aged 85.

Mr. W. J. Muckley, for many years headmaster of the schools of art at Manchester and Wolverhampton, died worth £10,876.

The late Mr. H. H. Collins, F.R.I.B.A., of London, left estate which has been proved at £35,460. He bequeathed to the Architects' Benevolent Society two shares in the Architectural Union Co.

NEW LONDON BUILDINGS.

AT yesterday's meeting of the London County Council the Building Act Committee reported the following applications under the London Building Act, 1894, their recommendations as to consent or refusal being appended in *italics* :—

Five shops on the south-east side of Staplehurst Road, two houses on the south-west side of Leahurst Road, and one house on the north-east side of Fernbrook Road, Lewisham, on the application of P. Roche. (*Consent.*)

One-storey shops and a one-storey addition at the rear of No. 379, Bethnal Green Road, Bethnal Green, to abut upon Teesdale Street, on the further application of C. M. Shiner, on behalf of W. A. Balls. (*Consent.*)

Extension of the periods within which to erect buildings with bay windows and one-storey shops on a site abutting upon the west side of Peckham Rye and south side of East Dulwich Road, Camberwell, on the application of A. Keen, on behalf of Miss Chamberlain. (*Consent.*)

Retention of a showcase on the forecourt of No. 451, Holloway Road, Holloway, on the application of the International Tract Society, Ltd. (*Consent.*)

Retention of two two-storey shops in front of Nos. 2 and 2A, The Grove, Hammersmith, on the application of L. V. Hunt, on behalf of J. Bedford. (*Refusal.*)

Iron and glass shelter in front of No. 20, Upper Hamilton Terrace, Marylebone, on the application of G. A. Sexton, on behalf of J. Peters. (*Consent.*)

Retention of a projecting sign in front of No. 392, Oxford Street, Marylebone, on the application of W. Castle, Ltd. (*Consent.*)

Retention of a conservatory at the flank and a summer house at the rear of No. 20, Wyndham Road, Camberwell, abutting upon Elmwood Road, on the application of A. E. Percy. (*Consent.*)

Alterations to the iron and glass shelter at the entrance to the Empire Theatre, Leicester Square, on the application of F. T. Verity. (*Consent.*)

Erection of bay windows to Nos. 34 and 40, Glenhouse Road, Eltham, on the application of J. J. Bassett, on behalf of A. Cameron-Corbett. (*Consent.*)

Projecting one-storey shop in front of No. 131, Victoria Street, Westminster, and a projecting one-storey shop at the rear to abut upon Ashley Place on the application of W. Woodward. (*Consent.*)

Addition and a urinal at the "Hanover Arms" public-house, No. 32, Wells Road, Sydenham, with external walls at less than the prescribed distance from the centre of the roadway of such street, on the application of A. J. Style, on behalf of the Dartford Brewery Co., Ltd. (*Consent.*)

An addition to No. 90, St. Ann's Hill, Wandsworth, abutting upon the western side of Allfarthing Lane, on the application of W. West, on behalf of F. R. Turtle. (*Refusal.*)

Projecting one-storey shop in front of Nos. 151 and 153, Upper Kennington Lane, Kennington, on the application of J. A. J. Woodward & Sons, on behalf of the executors of the late George Broom. (*Refusal.*)

Bay windows and porches to twenty-six houses on the south side of Oxford Gardens, Kennington, on the application of Trant, Brown & Humphreys, on behalf of Daley & Franklin. (*Refusal.*)

Retention of a signboard in front of No. 11, Walworth Road, Newington, on the application of F. F. Harris, on behalf of H. Samuel. (*Refusal.*)

Projecting piers and oriel windows in front of Nos. 59 and 60, Pall Mall, Strand, on the application of E. Guy Dawber, on behalf of the London and Lancashire Fire Insurance Co. (*Refusal.*)

One-storey shops in front of Nos. 170 to 182 (even numbers only) inclusive, Putney Bridge Road, Wandsworth, to abut also upon Merivale Road, on the application of W. Bartholomew, on behalf of Mrs. Bell and J. A. Graham. (*Refusal.*)

Projecting one-storey shops in front of Nos. 338 and 340, King Street, Hammersmith, on the application of J. F. Ward, on behalf of Mrs. Masterson. (*Refusal.*)

Retention of an iron and glass covered way to the entrance of No. 3, Douro Place, Victoria Road, Kensington, on the application of Miss F. A. Lee. (*Refusal.*)

Two buildings on the east side of Georgette Place, King George Street, Greenwich, with external walls at less than the prescribed distance from the centre of the roadway of Georgette Place, and with an irregular space at the rear of the northernmost of the two buildings, on the application of H. Adams. (*Consent.*)

Retention of a building at the rear of a stable on the west side of No. 35, Goldhawk Road, Hammersmith, abutting upon the east side of The Grove, on the application of W. B. Eyre. (*Consent.*)

Deviation from the plans approved on December 22nd, 1903, under sections 41 and 207 of the London Building Act, 1894, for the erection of an addition at the rear of a building on the north side of Farm Street, St. George, Hanover Square, so far as relates to the substitution of a men's mess-room on the first floor for the dwelling rooms shown on the approved plans and the construction of the flat roof of such mess-room of wood, covered externally with lead, in lieu of iron and concrete, on the application of J. W. Bradley, on behalf of the Council or the City of Westminster. (*Consent.*)

Deviation from the plans approved on November 7th, 1905, under section 203 of the London Building Act, 1894, for the construction and erection of iron, brick and concrete additions to the generating station, Townmead Road, Fulham, so far as relates to the formation of an opening in the wall of the store building, the removal of the brick partition in the basement between the store building and the boiler-house (the ground floor over the opening formed being supported by steel beams) and an alteration in the steel construction of the roof of the store building, on the application of A. J. Fuller, on behalf of the Council of the Metropolitan Borough of Fulham. (*Consent.*)

Additional rooms over the stables at the rear of No. 81, Eaton Square, St. George, Hanover Square, on the application of G. Trollop & Sons, on behalf of H. D. Brocklehurst. (*Refusal.*)

Iron and glass shelter in front of the hotel, "Maison Jules," Jermyn Street, Strand, on the application of G. D. Martin. (*Refusal.*)

Extension of the period within which the widening and adaptation of a street for carriage traffic of the northern portion of Romford Street, Mile End Old Town, was required to be clearly defined throughout by posts and rails or so otherwise as the Council might permit, and thrown open to the public as a highway, on the application of Rowland Plumbe. (*Consent.*)

Permission to define the roadways of the proposed streets, on the Highview Park Estate, Canterbury Grove, West Norwood (where not already defined by the erection of buildings or by a cutting 4ft. in depth) by posts 10ft. apart and a trench 1ft. in depth between and in line with such posts, in lieu of posts and rails as specified in condition (1) of the Council's resolution of December 21st, 1903, on the application of J. Wilson. (*Consent.*)

Modification of the provisions of that section with regard to open spaces about buildings, so far as relates to No. 2, Charles Street, Kensington, with an irregular space at the rear, and with a portion of such building extending above the diagonal line, on the application of A. B. Rumball. (*Consent.*)

Building on the northern side of Elmer Road, Catford, on the application of E. Wright, on behalf of H. Amey. (*Consent.*)

Retention of two showcases in front of No. 233, Southwark Park Road, Rotherhithe, on the application of E. Hoad. (*Consent.*)

Retention of an iron and glass shelter at the entrance to Nos. 37 and 38, Savile Row, St. James', on the application of H. Poole & Co. (*Consent.*)

Building at the rear of No. 431, North End Road, Fulham, to abut upon Eustace Road, on the application of T. J. Evans, on behalf of A. Dell. (*Refusal.*)

Buildings on the west side of Burgess Hill (late Belle Vue Crescent), Finchley Road, Hampstead, on the further application of Brown & Barrow, on behalf of the trustees of the Burgess Estate. (*Refusal.*)

Enclosing of the portico in front of No. 21, Hill Street, Berkeley Square, on the application of Keeble, Ltd., on behalf of Captain H. S. Clay. (*Refusal.*)

Buildings abutting upon Red Lion Court, Fleet Street, City, with external walls at less than the prescribed distance from the centre of Red Lion Court, on the application of Griffin & Wollard, on behalf of A. Rust. (*Consent.*)

Building on the south-eastern side of Barron's Place, Southwark, on the application of A. E. Chasemora, on behalf of W. Sumpton. (*Refusal.*)

One-storey shop on the south-west side of Cross Street, Woolwich, on the application of W. C. Poole, on behalf of J. T. Smith. (*Refusal.*)

Coal store on the western side of Ifley Road, Hammersmith, on the application of J. Dorey & Co., Ltd., on behalf of the trustees of the Godolphin and Lutyens Girls' school. (*Consent.*)

The Theatre and Music Halls Committee also reported the following :—

Plan submitted by Mr. R. H. Cox showing a proposal to remove the kitchen from the basement beneath the Strand entrance at the Café Vaucluse, Strand, and to use the space formerly occupied by the kitchen for the purposes of a new restaurant with separate means of exit to the Strand. (*Consent.*)

Drawing submitted by Messrs. F. Matcham & Co. showing the proposed spacing of the pit seating at the Holborn Empire (late Royal Music Hall), Holborn. (*Consent.*)

Plan submitted by the Town Clerk of the Metropolitan Borough of Lambeth showing the structural alteration recently made in the yard of the Lambeth Public Baths, Kennington Road, in connection with the installation of "Nuconomie s." (*Consent.*)

Plans submitted by A. O. Collard showing the proposed arrangements in connection with the Furniture Exhibition to be held at the London Exhibitions, Earl's

Court, from 14th to 24th February, 1906, and with the "Tyrolean Village" and the Teplitz Water Exhibit, which are to form part of the forthcoming Imperial Royal Austrian Exhibition. (*Consent.*)

Plans submitted by A. O. Collard showing the proposed arrangements in connection with the Engineering and Machinery Exhibition to be held at Olympia from 15th September to 17th October, 1905. (*Consent.*)

Plans submitted by Runtz & Ford showing a proposal to place four gas radiators in the stalls and balcony at the Pavilion Theatre, Mile End. (*Consent.*)

Plans with regard to the under mentioned premises were submitted to the Committee during the recess, and the arrangements shown therein appeared satisfactory :—

Eolian Hall, New Bond Street.—Plan showing extension to the platform.

Carlton Theatre, Greenwich.—New urinal accommodation for artistes.

Finsbury Town Hall, Rosebery Avenue.—New teak doors in corridor.

London Pavilion Music Hall, Piccadilly.—Plan showing a proposal to add to the attendants' room in the basement, the space formerly occupied by the attendants' lavatory, &c.

Woolwich Town Hall, Upper Market Street, Woolwich.—Arrangement of the seating in the galleries.

Plans submitted by W. Hunt showing how it is proposed to give effect to the suggestions made by the Council for the structural improvement of the Princess's Theatre, Oxford Street. (*Consent.*)

Plan submitted by E. J. Stubbs showing the proposed construction of screens and doors at the sides of the main entrance porch at the Royal Horticultural Hall, Vincent Square, Westminster. (*Consent.*)

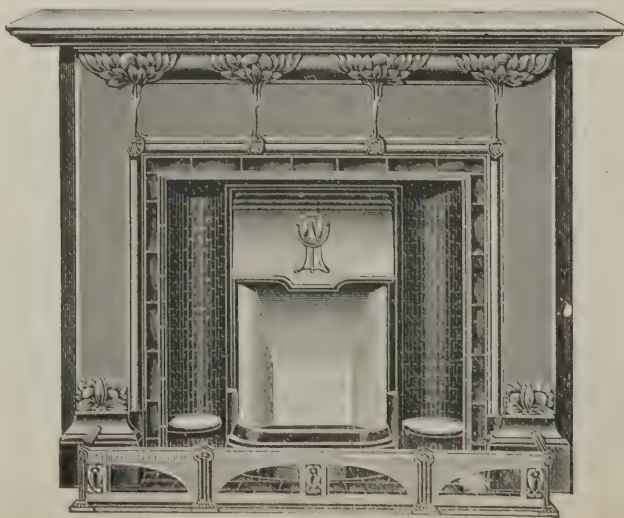
Plan submitted by Smee & Cobay showing the proposed conversion into dressing-rooms of certain store-rooms in the basement of the Royal Theatre, Dean Street, Soho. (*Consent.*)

Trade and Craft.

New Designs for Mantels.

The illustration of the "Westbourne" suite on this page is one of several new patterns being introduced by Messrs. Young & Marten, Ltd., the well-known building supply merchants, of Stratford, E. The design shown is very effective in execution, comprising a fine cast-iron mantel, primed white, with an opening of 40ins. by 38ins., jambs 10ins., shelf 5ft. 9ins. by 11ins., and height 52½ins. The interior has an adjustable canopy, barless fire, with a full-brick back in sections, while the hob surround is made up of 3in. by ½in. tiles, and the hearth to match. The total cost of this set is £15 18s. 6d., being £4 7s. 6d. for the mantel, £2 11s. for the interior, £8 for the surround, and £1 for the hearth. The curb shown is supplied for £2 in iron finished with Berlin black. This set will be found very suitable for good-class houses, and the design is one which will stand any amount of wear and tear. It will at once be seen what a very great advance this type of mantel and grate is upon the old relics of the mid-Victorian era, a few of which still survive. Messrs. Young & Marten make a speciality of wood suites, which are very much in vogue just now, and for smaller class property they find a very large demand for the "Ilford"

suite. The mantel of this suite can be supplied in fumed oak or polished mahogany; the interior has an adjustable canopy with bronzed-copper inlaid panel; the fire-box is fitted with a solid brick back in four sections; the bottom grate has a barless fire; and on either side are tileslab panels. At Messrs. Young & Marten's showrooms at Stratford are displayed many other suites embodying every grade of quality and design. Their No. 28 illustrated trade catalogue also affords a further large range of patterns, with prices attached to each part of all the suites shown, so that it should be of particular service to builders.



THE "WESTBOURNE" SUITE, BY YOUNG AND MARTEN, LTD.

CARRON COMPANY'S

INCORPORATED BY
ROYAL CHARTER 1773



“ESTO” FIRE GRATES.

THE “Esto” Fire is acknowledged to be the most perfect type for effecting complete combustion and saving fuel. The bottom grate forms a “well”-shaped cavity, which by practical experience is found to be the best contrivance for combustion.

THE illustration shows Carron Company's latest pattern “Esto” Fire, which is now made with a guard bar above fret. This bar obviates any danger caused by falling fuel, and makes the Grate more efficient without detracting from its fuel-saving properties and appearance.

The new design “Esto” Grate is supplied with open (as illustrated) or semi-low combustion fire. The bottom grating of the latter type is fitted with a sloping fire brick on front side to retard combustion and retain heat. Unless specially ordered the open fire is furnished.

The “Esto” Fire can be fitted to a large selection of Interiors, Registers, and Mantel Registers.

Write for No. 11 Radiant Fire List.

Works—CARRON, Stirlingshire.

Agencies and Showrooms:—LONDON (City)—15, Upper Thames Street, E.C.; (West End)—23, Princes Street, Cavendish Square, W.; LIVERPOOL—30, Red Cross Street; GLASGOW—125, Buchanan Street; MANCHESTER—24, Brazenose Street; BRISTOL—10, Victoria Street; NEWCASTLE-ON-TYNE—13, Prudhoe Street; BIRMINGHAM—Stephenson Street; DUBLIN—44, Grafton Street, SOUTHAMPTON—Town Quay (The French Prison).

Electrical Notes.

Battery Rooms.

Architects are often called upon nowadays to include in their schemes a room for the accommodation of storage batteries, either for lighting or power purposes. It is relevant therefore to refer to the paper on the subject which Mr. F. W. Crawter read before the Electrical Contractors' Association recently. The floor of the room, he said, should be of concrete, either rendered on the surface, or, better, finished with a 2in. layer of asphalt; with regard to this latter, however, some objection had been raised on account of the bearers sinking into it with very heavy cells, and as an alternative brick might be used. Tiles were not to be favoured unless laid in pitch, because when cement was used the acid got underneath the tiles and caused the floor to bulge and loosen. Very warm situations were unsuitable for battery rooms. Sometimes the room had a plaster ceiling, in which case care should be taken to see that this was in good condition and not likely to flake off and fall into the cells, as the addition of matter containing lime was most undesirable. In the discussion following the reading of the paper one speaker, referring to the need for proper drainage provision, instanced a case where an architect had emptied the drainage into a lake, with the result that all the fish therein were poisoned.

Electricity in Cement Works.

It is not so very long ago that electricity was regarded by works managers as an interesting form of power, very admirable for small purposes, but hardly likely to be adaptable for heavy work for a considerable time to come. Now, however, a great change has taken place, and electricity is being in-

creasingly employed for driving machinery of all kinds. It has invaded the building industry—conservative enough in all conscience—and the electric crane hoisting girders into position is becoming a familiar sight, whilst soon we may hope to see mortar mills and mixers all driven by this eminently convenient power. As another instance of its application to heavy machinery we may instance the new cement works of Messrs. Hall & Co. (Croydon), Ltd., at Beddington, near Mitcham, Surrey. Here the machinery in the mixing and kiln houses and the coal and cement mills are driven off a main shafting connected by ropes to a 700-i.h.p. Musgrave engine, but as an alternative, and in order to avoid stoppages when the large engine is shut down, the kilns and coal mills can also be driven by two Westinghouse motors of 100-h.p. each, while a 15-h.p. motor operates one of the slurry mixers. It is an essential that the plant shall operate continuously, night and day, not even being shut down at week-ends: and for this reason the main shafting is capable of being driven both by the engine and the motors, a friction clutch being arranged to enable either to be thrown out when desired.

Electrical Lighting of Workshops.

The electrical lighting of workshops is a matter requiring very careful consideration on the part of the architect and the electrical engineer. Mr. A. E. Edwards, M.I.M.E., dealt with it in a paper which he read recently before the Coventry Engineering Society. The best treatment for the walls, he said, was to whitewash them, so as to gain as much reflecting service as possible, while all machinery should be painted a grey colour. Sharp shadows should be avoided by using suitable globes for the lamps. It was important to use a good dynamo and to secure a regular output. If a gas-engine were

employed to drive the dynamo it should have a heavy flywheel and should run at a high speed. A flywheel on the dynamo was absolutely unnecessary. Mr. Edwards strongly condemned the practice of putting two flywheels on different shafts and trying to get a belt to take the inevitable back-lash. As to whether it would pay to erect a private installation compared with supply from an outside source, that would depend very much on the length of time for which the lights were required. It certainly would not pay on an installation of fewer than 300 lights, unless the lighting hours were more than ordinary.

Tantalum Lamps.

In the "Electrical Review" we notice an interesting letter in regard to the life of these lamps when running in series, written by Mr. W. Fennell, of the electricity department at Wednesbury. Mr. Fennell says: "The cause of premature failures is the uneven current consumption, even when the lamps are ordered specially for running in series. By adopting the following course I have obtained good results:—Wire two lamp-holders in series, and put a voltmeter across one. On receipt of a batch of lamps, sort them out so that with each pair the same reading on the voltmeter is obtained when the lamps are crossed over. Then tie the two wrappers together, and see that the lamps are used together. When one lamp of a pair fails, take both out and put the partly-used one into stock until several are said by; then sort out the old ones as before, and use them in pairs for renewals. The same, of course, applies to all lamps run in series. . . . If the makers would send out the lamps properly paired for series running, it would help the ordinary consumer to appreciate the lamps at their proper value on high-voltage circuits. . . ."



TO H.M. THE KING.

The Edison & Swan



TO H.R.H. THE PRINCE OF WALES.

United Electric Light Company, Limited.

36 & 37, QUEEN STREET, CHEAPSIDE, LONDON, E.C.

And at Birmingham, Belfast, Cardiff, Dublin, Dundee, Glasgow, Hull, Leeds, Liverpool, Manchester, Newcastle-on-Tyne, Sydney, N.S.W.

USE ONLY
"ROYAL
EDISWAN"
ELECTRIC LAMPS.
BEST & CHEAPEST
IN THE END.

Coming Events.

Wednesday, January 31.

NORTHERN ARCHITECTURAL ASSOCIATION.—Mr. A. W. S. Cross on "Rome in the Augustan Age," at 7.30 p.m.
SOCIETY OF ARTS.—Mr. T. Adams on "The Garden City and the Cheap Cottage," at 8 p.m.
ARCHITECTURAL ASSOCIATION (Discussion Section).—Mr. A. C. Dickie on "Internal Steps and Stairs and their Treatment," at 7.30 p.m.

Thursday, February 1.

BIRMINGHAM BUILDERS' EXCHANGE.—Mr. H. Browning Button on the "Underground Slate Quarries of North Wales," at 6 p.m.
CHEMICAL SOCIETY.—Ordinary Meeting, Burlington House, at 8.30 p.m.
CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—Mr. F. L. Watson on "Destructor By-products," at 8 p.m.

Friday, February 2.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—Mr. H. V. Lanchester, F.R.I.B.A., on "Cardiff Municipal Buildings."
ARCHITECTURAL ASSOCIATION.—Students' Smoking Concert, Gaiety Restaurant, at 8 p.m.
JUNIOR INSTITUTION OF ENGINEERS.—Mr. Kenelm Edgcombe, M.I.E.E., on "Some Recent Electrical Engineering Measuring Instruments," at the Westminster Palace Hotel, at 8 p.m.

Saturday, February 3.

SANITARY INSPECTORS' ASSOCIATION.—Annual Dinner.
CLERKS OF WORKS' ASSOCIATION.—Annual Dinner at the Criterion, at 6.15 p.m.

Monday, February 5.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.—Announcement of Royal Gold Medallist, President's Address to Students, Presentation of Prizes, at 8 p.m.
LIVERPOOL ARCHITECTURAL SOCIETY.—Prof. C. H. Reilly on "Michaelangelo's Work at San Lorenzo and in the Sistine Chapel."
ROYAL ACADEMY.—Mr. T. G. Jackson, R.A., on "Reason in Architecture."
SOCIETY OF ENGINEERS.—Presidential Address at 7.30 p.m.

Tuesday, February 6.

ARCHITECTURAL ASSOCIATION OF IRELAND.—Mr. G. G. Lynes on "Water-colour Sketching," at 8 p.m.

Wednesday, February 7.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Mr. A. R. Myers on "Theory of Construction," at 8 p.m. (Associates' Paper).
NORTHERN ARCHITECTURAL ASSOCIATION.—Council Meeting at 5 p.m.

Thursday, February 8.

ROYAL ACADEMY.—Mr. T. G. Jackson, R.A., on "Reason in Architecture."

Friday, February 9.

ARCHITECTURAL ASSOCIATION.—Rev. G. H. West on "Differences between English and French Gothic Art," at 7.30 p.m.

A NEW LEEDS BUILDING.

THE new block of offices which has been built at a cost of £11,000 from designs by Mr. William H. Thorp, F.R.I.B.A., for the Phoenix Fire Insurance Co. in South Parade, Leeds, comprises on the ground floor a large general office 28ft. 6ins. by 23ft. 6ins., secretary's private office 14ft. by 12ft., and typists' office 15ft. 6ins. by 12ft., the remainder of the building being planned to accommodate ten suites of offices with requisite lavatory accommodation. Glazed brickwork and tiles have been used largely on the interior, the former supplied by the Leeds Fireclay Co. and the latter by Mr. Alfred Whitehead, of Prudential Buildings, Leeds. The whole of the walls of the Phoenix suite of offices are lined with a deep tone of ivory-white tiles, and all corridors and staircases are provided with celadon green glazed tile dados 5ft. high. In addition to a wide staircase of concrete steps by Stuart's Granolithic Stone Co., Ltd., a passenger lift by Messrs. Waygood & Co. gives access to the various floors of the building. The building work was carried out by Leeds contractors; the iron palisading and grille over the entrance by Mr. Nelson Dawson, of Chiswick Mall; bronze cartouches, electric light fittings, &c., by the Bromsgrove Guild of Handicraft; stained and leaded glass by Messrs. Pape & Co., of Leeds; and plaster enrichments of ceilings by Mr. G. P. Bankart. The heating system is by Messrs. W. Richardson & Co., of Darlington. The fittings and furniture in the Phoenix suite were specially designed by the architect. They are carried out in polished teak and stained and polished kauripine. Messrs. Elgood & Co., of Leicester, supplied locks and ironmongery.

Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

DURING THE WEEK ending January 26th thirty failures in the building and timber trades in England and Wales were gazetted.

J. W. HILL, architect, Bridgwater. Liabilities £277; deficiency £137.

J. W. LUCAS, builder and contractor, Bournemouth. Adj. Jan. 10th.

J. SUGDEN, builder, Liverpool. P.E., Liverpool C.C., Jan. 29th, at 11.

A. J. GARDNER, builder, Teddington (late Twickenham). Adj. Jan. 12th.

W. J. WATTS, builder and contractor, Worthing and Grays (late Southend-on-Sea). Adj. Jan. 8th.

C. SEWELL, plumber, Abertillery. P.E., Newport Town Hall, Feb. 8th, at 11.

A. H. GOODALL, architect and surveyor, Nottingham. Gross liabilities £8,950; assets £89.

W. H. LISTER, builder's manager (late builder), Leeds. P.E. Leeds C.C., Feb. 5th, at 11.

T. B. LAMB, builder, &c., Fulwood. Gross liabilities £11,671; expected to rank £1,735; assets £1,242.

H. W. RAMSDEN & Co., decorators, Hulme. P.E., Manchester C.C., Feb. 5th, at 10.

WHITMORE & GAUNTLETT, builders, Liphook. P.E., Portsmouth C.C., Feb. 12th, at 11.

J. FLETCHER, builder, Horwich. P.E., Bolton C.C., Feb. 14th, at 3.

H. B. SOUTHERN, builder, Bolton. P.E., Bolton C.C., Feb. 14th, at 3.

H. MURCH, builder, Notting Hill. P.E., London Bankruptcy Court, Feb. 23rd, at 11.30. Adj. Jan. 18th.

J. D. WILKINS, builder and contractor, Aberdare. P.E., Aberdare Temperance Hall, March 12th, at 10.30.

W. COOZE, painter and decorator, Newmarket. P.E., Cambridge Guildhall, Feb. 14th, at 11.

H. DODD, builder and contractor, Liverpool. Adj. Jan. 20th.

HARDMAN & Co., decorators' merchants, Blackburn. P.E., Blackburn C.C., Feb. 7th, at 10.30.

W. EATON, builder and contractor, Liverpool. Liabilities £1,106; assets £557.

J. C. COOKE & Son, painters and decorators, West Bromwich. R.O. Jan. 18th.

H. GALLETT, builder and contractor, Sutton Coldfield. R.O. Jan. 19th.

H. H. BULLOCK, plumber, Colchester. First meeting, 36, Princes Street, Ipswich, Jan. 31st, at 2.30. P.E., Colchester Law Courts, Feb. 23rd, at 11.30.

E. A. CHASE, builder, Bristol. First meeting, O.R.'s, Bristol, Jan. 31st, at 11.45. P.E., Guildhall, Bristol, March 2nd, at 12.

J. R. SHORLAND, builder, Margotfield. First meeting, O.R.'s, Bristol, Jan. 31st, at 11.30. P.E., Bristol Guildhall, March 2nd, at 12.

P. A. MILES, builder, Westgate-on-Sea. First meeting, O.R.'s, Canterbury, Feb. 1st, at 12.30. P.E., Canterbury Guildhall, Feb. 15th, at 10.

A. B. H. FUTTER, contractor, Great Yarmouth. First meeting, O.R.'s, Norwich, Feb. 1st, at 12. P.E., Yarmouth Town Hall, Feb. 6th, at 11.

A. ASHFORD, builder, London. Liabilities £305; estimated assets £137. P.E., London Bankruptcy Court, Feb. 21st.

W. BELCHER, brick merchant, London. Liabilities £18,000. The assets, estimated to produce £8,289, only realized £35, though a further £200 may be received.

R. BALDWIN, builder, Small Heath. First meeting, 191, Corporation Street, Birmingham, Feb. 2nd, at 12. P.E., Birmingham C.C., Feb. 21st, at 2.

W. KIRKPATRICK, granite and stone mason, Manchester. First meeting, O.R.'s, Manchester, Jan. 31st, at 2.30. P.E., Salford C.C., Feb. 12th, at 11.

New Companies.

EBBW VALLEY BUILDING CO., LTD. Capital: £15,000.

LARGER LONDON LAND CO., LTD. Capital: £10,000.

FREDERICK MILLER & Co., LTD., builders' merchants, &c., Shepherd's Bush, W. Capital: £2,000.

HUMBER SLATE WORKS CO., LTD., Hull. Capital: £2,000.

R. J. PARVIN, LTD., to take over as a going concern the business of glass, lead, zinc, varnish, oil and colour merchants carried on as the "Exors." of the late R. J. Parvin. Capital: £25,000.

FENNING & Co., LTD., to acquire and carry on the business of granite, marble and stone merchants and agents carried on by Daniel Dunkin Fenning & Co., at 3, Salters' Hall Court, Cannon Street, E.C. Capital: £30,000.

CLEE HILL GRANITE CO., LTD., to take over the business of a quarry-master, &c., heretofore carried on by T. Lee Roberts at Clee Hill and Ludlow, Salop. Capital: £50,000.

MRS. GERETH, LTD., to adopt an agreement with Rosina G. Bartlett for the acquisition of the business of a house decorator and furnisher carried on by her at 95, New Bond Street, W., as Mrs. Gereth, and to carry on the said business. Capital: £1,000.

HERMANN LICHTENSTEIN & Co., LTD., to acquire and carry on the business of marble, stone, granite and cement merchants carried on by H. Lichtenstein at 256, Green Street, as Hermann Lichtenstein & Co., and at 92, Curtain Road, both of London, as the London Marble Depot. Capital: £10,000.

DERBY PLASTER CO., LTD., to acquire the business carried on by Fegg & Co., Ltd., at Derby and Chellaston, to adopt an agreement between the said company of the one part and F. Swindell and W. D. Winterbottom of the other part, and to carry on the business of plaster and cement manufacturers, &c. Capital: £10,000.

Current Market Prices.

FORAGE.

		£ s. d.	£ s. d.
Beans	per qr.	1 13 0	1 15 0
Clover, best	per load	3 12 0	4 0 0
Hay, good	do.	3 5 0	3 17 0
Sainfoin mixture	do.	3 5 0	3 15 0
Straw	do.	1 8 0	1 14 0

OILS AND PAINTS.

Castor Oil, French	per cwt.	1 1 10	1 2 0
Colza Oil, English	do.	1 5 6	—
Copperas	per ton	2 0 0	—
Lard Oil	per cwt.	2 15 0	2 17 0
Lead, white, ground, carbonate	per ton	16 0 0	—
Do. red	do.	15 0 0	0 19 0
Linseed Oil, barrels	per cwt.	1 2 0	—
Petroleum, American	per gal.	0 0 6½	0 0 6½
Do. Russian	do.	0 0 5½	0 0 5½
Pitch	per barrel	0 8 0	—
Shellac, orange	per cwt.	9 0 0	—
Soda, crystals	per ton	3 2 6	3 5 0
Tallow, Town	per cwt.	1 7 0	1 7 6
Tar, Stockholm	per barrel	1 5 0	—
Turpentine	per cwt.	2 8 0	—

METALS.

Copper, sheet, strong	per ton	93 0 0	—
Iron, Staffs., bar	do.	7 5 0	9 0 0
Do. Galvanized Corrugated sheet	do.	12 7 6	12 10 0
Lead, pig, Soft Foreign	do.	16 16 3	16 17 6
Do. English common brands	do.	17 5 0	—
Do. sheet English, 3lb. per sq. ft. and upwards	do.	18 0 0	—
Do. pipe	do.	18 10 0	—
Nails, cut clasp, 3in. to 6in.	do.	9 5 0	—
Do. floor brads	do.	9 0 0	—
Steel, Staffs., Girders and Angles	do.	7 0 0	7 5 0
Do. Mild bars	do.	7 5 0	7 10 0
Tin, Foreign	do.	164 0 0	164 10 6
Do. English ingots	do.	166 10 0	163 10 0
Zinc, sheet, Silesian	do.	31 5 0	—
Do. Vieille Montaigne	do.	31 15 0	—
Do. Spelter	do.	27 10 0	28 2 6

TIMBER.

Soft Woods.

Fir, Dantzic and Memel	per load	2 15 0	5 0 0
Pine, Quebec, Yellow	do.	4 2 6	7 10 0
Do. Pitch, American	do.	2 19 0	5 0 0
Laths, log, Dantzic	per cu. fath.	4 0 0	6 0 0
Deals, Archangel, White,			

Do. do. do. 1st, 3 x 11	per std.	14 15 0	—
Do. do. do. 1st, 3 x 9	do.	12 10 0	—
Do. do. do. 1st, 3 x 8	do.	12 15 0	—
Do. do. do. 2nd, 3 x 11	do.	11 10 0	—
Do. do. do. 2nd, 3 x 9	do.	10 15 0	—
Do. do. do. 2nd, 3 x 8	do.	10 15 0	—

Do. do. do. 3 x 11	do.	17 10 0	—
Do. Montreal, Red	do.	10 5 0	—
Do. Pine, 2nd, 3 x 11	do.	10 5 0	—
Do. do. Bright Pine, 2nd, 3 x 9	do.	15 5 0	—
Do. Soroka, Yellow, 3rd, 3 x 9	do.	10 15 0	—

Do. Gambley, Yellow, Unsorted, 3 x 9	do.	9 0 0	—
Do. do. do. 3 x 8	do.	8 15 0	—
Do. do. do. 3 x 7	do.	8 5 0	—
Do. do. do. 3 x 6	do.	8 0 0	—

Do. Petchora, Yellow, 2nd, 3 x 9	do.	15 10 0	15 15 0
Do. Raïssa, Yellow, 2nd, 3 x 9	do.	12 5 0	—
Do. St. Petersburg, Yellow, Unsorted, 3 x 9	do.	9 15 0	—

Do. Quebec, Spruce, Unsorted, 3 x 9	do.	9 10 0	—
Do. Abo, Yellow, Unsorted, 3 x 8	do.	8 10 0	—
Do. do. do. 2½ x 8	do.	8 15 0	—

Do. St. John, N.B. Spruce, Unsorted, 1st, and 3rd, 3 x 6	do.	7 10 0	—
Do. do. do. do. 1st, 3rd & 3rd, 2½ x 7	do.	8 0 0	—

Do. Borgo, Yellow, Unsorted, 3 x 4½	do.	7 10 0	—
Battens, all kinds	do.	6 10 0	9 10 0
Flooring Boards tin. prepared, 1st...	persquare	0 11 0	0 11 9

Do. 2nd	do.	0 9 3	0 10 3
Do. 3rd, &c.	do.	0 7 6	0 10 3

HARD WOODS.

Ash, Quebec	per load	4 0 0	7 15 0
Birch, New Brunswick	do.	2 7 6	4 10 0
Do. Quebec do.	do.	2 12 6	5 0 0

Box, Turkey	per ton	7 0 0	20 0 0
Cedar, Cuba	per ft. sup.	0 0 3	0 0 4
Do. Honduras	do.	0 0 73½	—
Do. Tobasco	do.	0 0 58½	—
Do. Brazilian	do.	0 0 43½	—

Elm, Quebec	per load	4 5 0	8 10 0
Jarrah, plank	per ft. cu.	0 2 6	0 3 0

Mahogany, Average Price for Cargo, Honduras	per ft. sup.	0 0 53½	0 0 53½
Do. Tobasco	do.	0 0 55½	—
Do. Cuba	do.	0 0 53½	0 0 53½
Do. African	do.	0 0 48½	—
Do. Lagos	do.	0 0 34½	—

Oak, Wainscot	per log.	3 15 0	7 5 0
Teak, Indian, logs	per load	10 0 0	19 0 0
Do. do. planks	do.	13 0 0	20 0 0

Whitewood, American, logs	per ft. cu.	0 1 3	0 1 0
Do. do. planks and boards	do.	0 1 3	0 3 0

Complete List of Contracts Open.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:			
Feb. 1	London, S.E.—Waiting-room	Borough Council	H. C. J. Edwards, Borough Engineer, 346 Kennington Road, S.E.
" 1	Norwich—Dwarf Stone Wall	Corporation	A. E. Collins, City Engineer, Guildhall, Norwich.
" 2	Portsmouth-by-the-Sea—School	Education Committee	F. J. Wood, County Surveyor, County Hall, Lewes.
" 2	Chiddingly—School	Education Committee	F. J. Wood, County Surveyor, County Hall, Lewes.
" 2	Plumpton—Additions, &c.	Education Committee	F. J. Wood, County Surveyor, County Hall, Lewes.
" 2	Croesgoch—Villa	Corporation	J. W. Reynolds, Barry Island.
" 2	Leicester—Conveniences	Gas Committee	E. George Mawbey, Borough Surveyor, Town Hall, Leicester.
" 2	Manchester—Excavating, &c.	Rural District Council	C. Nickson, Superintendent Gas Department, Town Hall, Manchester.
" 2	Ulverston—Reconstruction of Culvert	Education Committee	Surveyor, Town Hall, Ulverston.
" 3	Carlin How—School	Urban District Council	Bottomley, Son & Wilburn, Architects, 28 Albert Road, Middlesbrough.
" 3	Haviatt—Farmhouse	Guardians	G. Alves, Surveyor, Glastonbury.
" 3	Wreay—Alterations	Urban District Council	W. Walton, Leeds Road, Club, Harrogate.
" 3	Windhill—Jann Works	Guardians	S. Jackson & Son, Architects, Tanfield Chambers, Bradford.
" 3	Lemington—Lodge	Canon O'Callaghan	T. Gregory, Council Offices, Newburn.
" 3	Guildford—Walling, &c.	Corporation	E. L. Lunn, Architect, 36 High Street, Guildford.
" 3	Feltwell—School	Education Committee	J. Harrison, The School House, Feltwell.
" 3	Charleville—Alterations to Chapel	Managers	S. F. Hynes, Architect, 21 South Mall, Cork.
" 3	Bury—Portland Cement and Lime	Education Committee	A. W. Brodley, Borough Engineer, Bury.
" 3	Brinsworth—Works	Managers	County Hall, Wakefield.
" 3	Glasgow—Reconstructing	Education Committee	J. Miller, Architect, 15 Blythswood Square, Glasgow.
" 3	Garforth—School	Education Committee	J. Vickers-Edwards, County Architect, Wakefield.
" 3	Templenewsom—School Alterations	Ditto	Ditto
" 3	Thrybergh—School	Ditto	Ditto
" 3	Wath-upon-Deane—School	Ditto	Ditto
" 3	Rawmarsh Rye-croft—Alterations	Ditto	Ditto
" 3	Wallasey—Bricks and Lime	Works Committee	W. H. Travers, Surveyor, Public Offices, Egremont, Cheshire.
" 3	Kingston-on-Thames—Pulling Down	Directors	A. Mason, Architect, Broughton Chambers, Victoria Road, Surbiton.
" 3	Brentwood—School Buildings	Urban District Council	Chancellor & Son, Architects, Chelmsford.
" 3	Tottenham—School	Education Committee	C. E. T. Laurence, Architect, 22 Buckingham Street, W.C.
" 3	Southwich—Public Offices	Urban District Council	G. W. Warr, Surveyor, Council Offices, Southwich.
" 3	Llansamlet, Chapel, &c.	Methodists	Rees Llewellyn, Architect, Birchgrove House, Birchgrove, Llansamlet.
" 3	Beverley—Concrete Wall	Corporation	J. Gould Smith, Borough Surveyor, Guildhall, Beverley.
" 3	London, E.—Conveniences	Borough Council	W. W. Jameson, Borough Engineer, 15 Great Alie Street, White-chapel, E.
" 5	Taunton—Premises	Co-operative Society	F. W. Roberts, Architect, 2 Hammet Street, Taunton.
" 5	Workington—Walls, &c.	Corporation	W. L. Eaglesfield, Borough Surveyor, Town Hall, Workington.
" 5	Mansfield—Cottage	Water Department	R. F. Vallance, Architect, Mansfield.
" 5	Sunderland—Pavilion, &c.	Rural District Council	T. Young, Surveyor to Rural District Council, Sunderland.
" 6	Coventry—Engine and Pump-house	Corporation	T. & C. Hawkesley, Engineers, 30 Great George Street, S.W.
" 6	Morley—Extensions	Marshall & Son, Ltd.	Buttery & Bird, Architects, Exchange Buildings, Queen Street, Morley.
" 6	Swansea—Cells	Corporation	Borough Surveyor, 13 Somerset Place, Swansea.
" 7	Kensington—Lime, Cement, Bricks, &c.	Council	Town Hall, Kensington.
" 7	Kensington—Jobbing Builders' Work	Council	County Surveyor, County Hall, Wakefield.
" 7	Mexborough—Strengthening Arch	County Council	Giles, Gough, & Trollope, Architects, 28 Craven St., Charing Cross, W.C.
" 7	Cheddleton—Asylum Extensions	County Council	H. G. Bishop, Architect, Bury Street, Stowmarket.
" 8	Haughley—Classroom &c.	Managers	W. Welburn, Town Hall, Middleton.
" 9	Middleton—Conveniences	Corporation	R. Price, Holly Cottage, Glyndyfrdwy Llangollen.
" 9	Glyndyfrdwy—Chapel, &c.	Baptists	Graham Balfour, Education Offices, Stafford.
" 10	Glynne—School	Education Committee	W. Stubbs, Borough Engineer, Municipal Offices, Blackburn.
" 10	Blackburn—Lime, Bricks and Cement	Corporation	A. Ainsworth Hunt, Architect, Sudbury, Suffolk.
" 12	Bretterham—School	Urban District Council	A. C. Lee, Clerk to Council, Manor House, Cheshunt.
" 12	Cheshunt—Hospital	Lunacy Board	T. Graham Abercrombie, Architect, County Place, Paisley.
" 12	Dykebar—Asylum	Trustees	J. A. Saner, Engineer, Weaver Navigation, Northwich.
" 12	Northwich—Building Materials	Parish Church	The Rectory, Golborne.
" 13	Golborne—Enlargement of Organ Chamber	Education Committee	H. Littler, Architect, 10 Ribblesdale Place, Preston.
" 13	Fleetwood—School	District Committee	Paterson Road Surveyor, Beattock.
" 13	Boreland—Rebuilding Bridge	Guardians	J. O'Neill, Clerk, North Brunswick Street, Dublin.
" 13	Dublin—Mortuary, &c.	Guardians	North, Croft, Neighbour & Nicholson, 9 Regent Street, S.W.
" 14	London, N.W.—Workhouse Buildings	Guardians	Stuart Hill, Architect, 106 Cannon Street, E.C.
" 14	Enfield—Additional Storey	Education Committee	H. Littler, Architect, 16 Ribblesdale Place, Preston.
" 15	Droylsden—Two Schools	County Council	W. H. Leete, County Architect, Shire Hall, Bedford.
" 17	Bedford—Extension	Guardians	C. W. Bevis, Architect, Elm Grove Chambers, Southsea.
" 17	Portsmouth—Extension	Urban District Council	F. Stevens, Clerk, Council Offices, Beckenham.
" 19	Beckenham—Bricks, Cement, &c.	Education Committee	Chatters & Smithson, Architects, 17 Regent Street, Cheltenham.
" 22	Cheltenham—School	Guardians	F. Holland, Architect, 11 Parkinson's Chambers, Huskerigate, Bradford.
" 26	Bradford—Pump-room, &c.	Rev. R. Usher	G. L. W. Blount, Architect, 39 High Street, Salisbury.
No date	West Knoyle—Teacher's Cottage	E. Thomas	W. Griffiths, Architect, Llanelly.
"	Llanelly—Two Houses	Wesleysians	Garside & Pennington, Architects, Pontefract.
"	Healing—Church and Schools	Presbyterians	Settle & Brundrit, Architects, Ramsden Square, Barrow-in-Furness.
"	Barrow-in-Furness—Church		Bland & Brown, Architects, North Park Road, Harrogate.
"	Harrogate—Pair of Houses		F. W. Roberts, Architect, 2 Hammond Street, Taunton.
"	Taunton—Six Houses		
ENGINEERING:			
Feb. 1	Warrington—Tar Extractor	Gas Committee	W. S. Haddock, Engineer, Gas Offices, Warrington.
" 2	Arlsey—Reservoir	Gas and Water Co.	T. H. Martin, Engineer and Manager, Station Road, New Barnet.
" 2	Reigate—Hot-water Works	Guardians	Dolby & Williamson, Engineers, 8 Princes Street, Westminster, S.W.
" 3	Broadstairs—Station Governors	Gas Co.	F. Higginson, Engineer and Secretary, Gas Office, Broadstairs.
" 3	Chelmsford—Lighting	Hospital Board	A. S. Duffield, Clerk, 96 High Street, Chelmsford.
" 3	Manchester—Water-Meters	Waterworks Committee	Secretary, Waterworks Offices, Town Hall, Manchester.
" 5	London, S.W.—Electric Plant, &c.	Borough Council	Chief Engineer, Electricity Department, Lombard Street, Battersea.
" 5	Rawmarsh—Condenser	Urban District Council	E. C. Watson, C.E., Gasworks, Rawmarsh.
" 5	Wolverhampton—Aerial ropeway	Corporation	E. A. B. Woodward, Waterworks Engineer, Town Hall, Wolverhampton.
" 6	Sheffield—Retort Mouthpieces, &c.	Gaslight Co.	J. W. Morrison, Engineer, Commercial Street, Sheffield.
" 6	London, E.C.—Locomotives	South Indian Railway Co.	South Indian Railway Co., 55 Gracechurch Street, London.
" 6	Coventry—Gas-engines, &c.	Corporation	Waterworks Engineer, 9 Hay Lane, Coventry.
" 7	Hammersmith—Arc Lamps, Globes, Carbons, &c.	Borough Council	G. Gilbert Bell, Borough Electrical Engineer, 85 Fulham Palace Road, S.W.
" 8	London, E.C.—Girder Bridges	Assam-Bengal Railway	F. A. Lyall, Secretary, Bishopsgate House, 56 Bishopsgate Street Within, E.C.
" 8	Wigan—Drying Apparatus	Guardians	Master, Workhouse, Frog Lane, Wigan.
" 9	Dublin—Sewage Liming Station	Improvements Committee	G. Chatterton, Engineer, 6 The Sanctuary, Westminster, S.W.
" 12	Hull—Telephone Equipment	Town Council	A. R. Bennett, Queen Anne's Chambers, Westminster, London, S.W.
" 12	Glasgow—Electrical Cable, &c.	Trustees	G. H. Baxton, Engineer, 16 Robertson Street, Glasgow.
" 12	Epsom—Gas-engines, &c.	Urban District Council	W. Vaux Graham, Engineer, 5 Queen Anne's Gate, Westminster, S.W.
" 12	Portsmouth—Reservoir, &c.	Urban District Council	J. Taylor, Sons & Santo Crump, Engineers, 27 Great George Street, Westminster, S.W.
" 12	Barnes—Steam Dynamo and Switchboard	Urban District Council	C. S. Davidson, Engineer, Electricity Works, High St., Mortlake, S.W.
" 13	Pontypriid—Steam Dynamo	Urban District Council	J. Colenso Jones, Clerk, Council Offices, Pontypriid.
" 15	Antwerp—Heating Apparatus	Theatre	Hôtel de Villa, Antwerp.
" 16	Cardiff—Cooling Towers	Corporation	A. Ellis, Engineer, Central Offices, The Hayes, Cardiff.
" 20	London, S.W.—Gas-engines	County Council	Maurice Fitzmaurice, Chief Engineer, County Hall, Spring Gardens, S.W.
" 20	Rotherham—Retorts, &c.	Gasworks Committee	J. S. Naylor, Engineer, Gasworks, Rotherham.
Mar. 20	Sunderland—Extension Electricity Station	Corporation	J. F. C. Snell, Borough Electrical Engineer, Town Hall, Sunderland.
" 2	Sunderland—Feed-pump, Cooling-tower, &c.	Corporation	J. F. C. Snell, Borough Electrical Engineer, Town Hall, Sunderland.
" 15	Pretoria—Refuse destructor	Municipality	Mosenthal, Sons & Co., 72 Basinghall Street, London, E.C.
May 1	Talcahuano, Chili—Dock		Direccion de Material, Valparaiso.
No date	Edinburgh—Sinking Well		No. 546, Robertson & Scott, 25 Hanover Street, Edinburgh.

(Continued on p. xvi.)

BERKSHIRE. Wokingham.**E. C. HUGHES,**

Builder and Contractor,

Albion Works, Wokingham.

Recent Work:

CHILDREN'S HOMES, Farnborough.
£13,600.Messrs. HOLMAN & GOODRHAM, Archts., London.
HOTEL and SHOPS, Henley-on-Thames.
£12,700.W. THEOBALD, Esq., Architect, London.
POLICE STATION and COURT ROOMS,
Wokingham. £5,600.J. MORRIS & SON, Architects, Reading.
ALTERATIONS and ADDITIONS at The
Copple, Shipplake. £6,000. For Justice
Sir W. G. F. Phillimore, Bart.W. F. CAVE, Esq., Architect, London.
WORKHOUSE ALTERATIONS and
ADDITIONS, Easthampstead. £6,500.
CHAS. SMITH & SON, Architects, Reading.**Educational.****R. I. B. A., SOCIETY OF ARCHITECTS
AND CIVIL SERVICE TECHNICAL
EXAMINATIONS,** preparation by correspondence or
residence. 29 first places.—G. A. T. MIDDLETON,
19, Craven Street, Strand.**QUANTITIES.**—A course of Correspondence
Lectures in this subject (on the London
system) is now ready. Also Lectures in Estimating
—For particulars apply Box 632, BUILDERS' JOURNAL
Office, 6, Great New Street, Fetter Lane, E.C.**R. I. B. A. EXAMS.**—Personal and Correspondence
tuition; courses of any duration.
Apply for Syllabus to Mr. A. G. BOND, B.A., Oxon.,
A.R.I.B.A., 115, Gower Street, London, W.C. (late
Howgate and Bond).**WANTED** Practical (evening) Lessons in
Carpentering and Cabinetmaking. Must be
near address.—Apply "W.," 5 Flat, 34, Colville Square,
W.; by letter only.**STRUCTURAL STEELWORK**Can you Design your own Steelwork? Do you know
how to properly proportion your columns, stanchions,
and girders? We guarantee to teach you how to do this
in a few lessons by our System of Correspondence
Tuition in Architectural Steelwork.—Apply to us for free
Booklet J (4th edition), MIDLAND ENGINEERING BUREAU,
STRAND, DERBY.**PRactical DESIGNING OF STEEL
CONSTRUCTIONAL WORK** taught by Correspondence,
individually or in classes. Elementary and
advanced courses arranged for Architects, Engineers, &c.
Write for Prospectus B., EMBANKMENT ENGINEERING
INSTITUTE, 156, Temple Chambers, Temple Avenue, E.C.**THE SOCIETY OF ARCHITECTS.**An EXAMINATION to qualify for MEMBERSHIP
will be held on APRIL 10th, 11th, and 12th, 1906.SYLLABUS on application to the SECRETARY, at
Staple Inn Buildings, Holborn, W.C.

Telegrams: "Crypt, London." Telephone: 1852, Holborn.

**THE INSTITUTE OF SANITARY
ENGINEERS, Ltd.**EXAMINATIONS IN PRACTICAL SANITARY
SCIENCE AND ENGINEERING, and qualifying for
admission to the Institute, and Students' Examinations,
will be held on May 25th and 26th, 1906, in LONDON,
MANCHESTER, DUBLIN, and CARDIFF.STUDENTS' LECTURES. Lectures, preparing
Candidates for Examinations in Sanitary Engineering,
are given on Tuesday evenings during the winter months.Further particulars as to Membership Examinations,
Students' Classes, &c., may be obtained at the Offices of
the Institute,

19, BLOOMSBURY SQUARE, LONDON, W.C.

Property & Land Sales.**PECKHAM.**

(Close to Rye Lane and Electric Tramway route.)

STIMSON & SONS will SELL by Auction,
at the Mart, on THURSDAY, FEBRUARY 8th,
at TWO, 20,500 ft. of FREEHOLD LAND, upon which
at present stands Four Houses, Nos. 23, 25, 27 and 29,
Albert Road, Peckham, at the junction of Queen's Road
and High Street, forming a valuable corner site, suitable
for the erection of small villas or a block of dwellings.Particulars of the Solicitors, Messrs. MILLS, CURRY &
GASKELL, 11, Queen Victoria Street, E.C., and of the
Auctioneers, 8, Moorgate Street, E.C., and 2, New Kent
Road, S.E.**AN ISLAND** in London, forming a building
site, to be LET, with 550 ft. frontage to two streets
and 110 ft. frontage to two other streets, near a well-
known railway terminus. Ground rent 1s. per foot,
subject to tenant paying half a year's ground rent com-
mission to Messrs. MAY & ROWDEN, Surveyors,
39, Maddox Street, W., in the event of his taking the
land.—For further particulars kindly call at their Offices.**Contracts Open.****HERTFORDSHIRE COUNTY
COUNCIL.**
GARDEN FIELDS COUNTY COUNCIL SCHOOL,
ST. ALBANS.The Education Committee are prepared to receive
TENDERS for the carrying out of ADDITIONS and
ALTERATIONS to the Garden Fields County Council
School, St. Albans.Persons desirous of tendering for the work may see
the Drawings, Specification, Agreement, &c., at the
County Surveyor's Office, Hatfield, on and after Monday,
February 5th, 1906, between the hours of 10 a.m. and
4 p.m., except on Saturday, when they will be on view
from 10 a.m. to 12 noon.A copy of the Schedule of Works and Prices (Quan-
tities), and a Form of Tender, can be obtained at the
County Surveyor's Office upon payment of Two Guineas,
which sum will be returned to the tenderer upon receipt
of a bona fide tender and the documents which have
been supplied to him.Sealed tenders, endorsed "Tender for alterations and
additions to Garden Fields C.C. School, St. Albans,"
must be delivered to the undersigned at his Offices not
later than 5 p.m. on MONDAY, February 19th, 1906.Such security for the due execution of the works as
the Council may require must be given by the Contractor.
The lowest or any tender will not necessarily be
accepted.

URBAN A. SMITH,

County Surveyor.

County Surveyor's Office, Hatfield,
26th January, 1906.**CHEL TENHAM EDUCATION
COMMITTEE.**
TO BUILDERS.Tenders are invited for the ERECTION of new
SCHOOL BUILDINGS, to accommodate 1,100 children,
for the Naunton Park District of Cheltenham, in accordance
with Plans, Specifications, and Conditions of Contract,
to be seen at the Offices of Messrs. CHATTERS
and SMITHSON, Architects, 17, Regent St., Cheltenham.Early application is requested for bills of quantities,
which will be supplied by the Architects upon receipt of
a deposit of £2 2s., to be returned upon receiving a
bona fide Tender.Tenders, sealed and endorsed, must be delivered to
the undersigned by TWELVE o'clock, on THURSDAY,
the 22nd FEBRUARY next.No pledge is given by the Committee to accept the
lowest or any tender.

WILLIAM PRESTON,

Education Offices,
Rodney Road, Cheltenham. Secretary.**REIGATE UNION.**TENDERS are hereby invited for additional
HEATING and HOT-WATER WORKS, including
steam boiler, calorifiers, &c., at the Reigate Workhouse,
in accordance with plans and specifications and quantities
prepared by Messrs. DOLBY & WILLIAMSON, Con-
sulting Engineers, 8, Princes Street, Westminster, S.W.Each person desiring to Tender will be required to
deposit the sum of three guineas, and the person whose
Tender is accepted will be required to find satisfactory
sureties.The Guardians do not bind themselves to accept the
lowest or any Tender.All applications are to be made to the undersigned
immediately, and Tenders must be received by him on
or before the 2nd day of FEBRUARY 1906.

(Signed) FRANK C. MORRISON,

Clerk to the Guardians of Reigate Union,
Reigate, Surrey.**EMPLOYMENT REGISTER.***Too late for Classification.*1601.—BOOKKEEPER wants evening work, Builders'
books and accounts, P.C., balance sheets and
audits, &c.; 20 yrs. exp.; terms low.1602.—PLUMBER, sanitary work, lead-laying or
jobbing; mod. wages.1605.—ARCHITECT and SURVEYOR'S ASSISTANT:
12 yrs. exp.; good draughtsman; wkg. and
detail drawings, surveys, specifications;
mod. s.1606.—ARCHITECT'S ASSISTANT (23); improver,
London preferred; good refs.1607.—ARCHITECT and SURVEYOR'S JUNIOR ASSIS-
TANT (24); 5 yrs. exp., wkg. drawings, details,
surveying, first-class adv. construction; good
refs.; mod. s.1612.—CARPENTER and JOINER (young); varied exp.;
capable.1613.—GENERAL or WORKING FOREMAN (41);
trade, bricklayer; good manager.1614.—PAPERHANGER, PAINTER; good colourist and
manager, piecework, with or without
materials, or day-work.1615.—DRAWINGS from rough sketches, designs,
details, specifications, drain plans and
quantities; mod. terms.1616.—ARCHITECT and SURVEYOR'S ASSISTANT; good
designer, wkg. and detail drawings, sur-
veying, and levelling.1617.—GENERAL FOREMAN (45); capable, good man-
ager; exp. in all branches; carpenter and
joiner by trade; good refs.

See p. xx for the Employment Register.

**THE VALUE OF
OUR EMPLOYMENT
REGISTER.**THIS REGISTER was commenced as a serious
endeavour on our part to meet a need that is
continually felt both by EMPLOYERS and EM-
PLOYED, and we are pleased at the practical
appreciation that has been shown by our readers
since THE REGISTER was first started.Nothing is more trying than to be out of
employment, but the difficulty of the position is
terribly augmented when money has constantly
to be paid for advertisements in order to find
other occupation.On the other hand an Employer who has just
obtained an important contract most likely needs
you; and has a post to fill that you are wanting,
but neither of you can find each other.THE REGISTER serves this purpose and so
meets both cases. For those wanting employ-
ment it is an inexpensive means of keeping their
names and qualifications before the right people,
and for the Employer it is a ready means of
finding just the man he wants, without delay.We are encouraged to find how
largely our columns have been instru-
mental in meeting the requirements of
both parties in the manner indicated
above, and we thank those advertisers
who have written expressing their
pleasure and indebtedness to THE
REGISTER.Many have found it an invaluable
aid in getting appointments, and we
would urge all those who are out of
work, or want to change their situa-
tions, in fact, all who have a "want,"
to make use of these columns and
thus make THE REGISTER a record
of still more value to Employers and
Employed.For 3s. we give 3 insertion
(four lines), in our "Appts.
Wanted" Columns, and also 6
insertions in the "EMPLOYMENT
REGISTER" (see page xx).**THE TITLE PAGE
AND
INDEX FOR VOL. XXII.**
(July to December, 1905)**THE BUILDERS' JOURNAL**can be obtained free, upon application to the
Publisher, 6, Great New Street, Fetter Lane,
E.C., enclosing 1d. stamp to cover postage of
same.**5 O'CLOCK P.M. MONDAY IS THE LATEST TIME FOR RECEIVING "WANT" ADVERTISEMENTS.****OFFICE: 6, GREAT NEW STREET, FETTER LANE, E.C.**

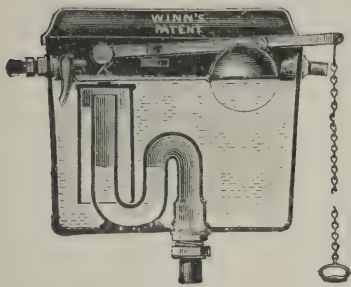
Complete List of Contracts Open.—continued.

DATE OF DELIVERY.		WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
IRON AND STEEL:				
Feb.	2	Christiania—Posts, &c.	State Railways ...	Commercial Intelligence Branch, Board of Trade, 73 Basinghall Street, Hotel de Ville, Brussels.
"	2	Belgium—Iron Gasfittings ...	Works Committee ..	W. H. Travers, Engineer, Public Offices, Egremont, Cheshire.
"	3	Wallasey—Iron and Steel ...	Corporation...	Financial Commission's Office, Sofia, Bulgaria.
"	3	Bulgaria—Iron Pipes, &c....	Metropolitan Water Board	A. W. Bradley, Borough Engineer, Bury.
"	3	Bury—Iron Castings, Ironmongery	Council ...	A. B. Pilling, Clerk, Savoy Court, Strand, W.C.
"	5	London, W.C.—Iron Pipes, Castings, Sluice Valves, &c.	East Indian Railway	Town Clerk, Town Hall, Kensington.
"	7	Kennington—Iron Goods ...	Board of Public Works ...	C. W. Young, Secretary, Nicholas Lane, E.C.
"	7	London, E.C.—Steel Rails, &c.	Corporation...	H. Williams, Office of Public Works, Dublin.
"	8	Dublin—Ironmongery ...	Trustees ...	W. Stubbs, Borough Engineer, Municipal Offices, Blackburn.
"	10	Blackburn—Iron Castings, Tools, &c.	Guardians ...	J. A. Saner, Engineer, Weaver Navigation, Northwich.
"	12	Northwich—Iron and Steel Bars, Ironmongery, &c.	Urban District Council ...	J. O'Neill, Clerk, Boardroom, North Brunswick Street, Dublin.
"	14	Dublin—Iron Staircases ...		Commercial Intelligence Branch, Board of Trade, 73 Basinghall Street, E.C.
"	15	Trondhjem—Steel Rails, &c.		F. Stevens, Clerk, Council Offices, Beckenham.
"	19	Beckenham—Ironwork ...		
PAINTING AND PLUMBING:				
Feb.	3	Bury—Oil, Paints, &c.	Corporation...	A. W. Bradley, Borough Engineer, Bury.
"	5	Manchester—Painting ...	Lancashire and Yorkshire Rail-way Co.	Engineer's Office, Hunt's Bank, Manchester.
"	5	London, W.C.—Paints, &c.	Metropolitan Water Board	Metropolitan Water Board Offices, Savoy Court, Strand, W.C.
"	5	London, W.C.—Plumbing Work	Metropolitan Water Board	Metropolitan Water Board Offices, Savoy Court, Strand, W.C.
"	7	Bishop Auckland—Painting, &c....	Hospital Board ...	S. Adams, Clerk, Union Offices, Bishop Auckland.
"	8	Dublin—Plumbing and Gasfitting	Board of Public Works ...	H. Williams, Office of Public Works, Dublin.
"	10	Blackburn—Paints, &c.	Corporation...	W. Stubbs, Borough Engineer, Municipal Offices, Blackburn.
"	14	Dublin—Plumbing Work ...	Guardians ...	J. O'Neill, Clerk, Boardroom, North Brunswick Street, Dublin.
ROADS AND CARTAGE:				
Feb.	1	Isle of Ely—Materials ...	County Council ...	H. Farr Simpson, County Surveyor, Northern Division, Wisbech.
"	1	Edinburgh—Streets... ..	Governors ...	Anderson, Superintendent of Works, 20 York Place, Edinburgh.
"	1	Gravesend—Making-up ...	Town Council ...	Borough Surveyor's Office Town Hall, Gravesend.
"	1	Huddersfield—Paving and Flagging	Corporation...	Borough Engineer, 1 Peel Street, Huddersfield.
"	3	Sutton—Street-making ...	Urban District Council ...	C. Chambers Smith, Surveyor, Municipal Offices, Sutton.
"	3	Canterbury—Materials ...	Roads and Survey Committee ...	A. C. Turley, City Surveyor, Guildhall Street, Canterbury.
"	3	Dunston—Forming Streets, &c.	Urban District Council ...	J. B. Renton, Surveyor, Council Offices, Whickham.
"	3	Bury—Setts, Curbs, Flags, &c.	Corporation...	A. W. Bradley, Borough Engineer, Bury.
"	3	Wallasey—Granite, Concrete Flags, Macadam	Works Committee ...	W. H. Travers, Surveyor, Public Offices, Egremont, Cheshire.
"	3	Wallasey—Street and Passage Gulleys...	Works Committee ...	W. H. Travers, Surveyor, Public Offices, Egremont, Cheshire.
"	5	Southwich—Street Works, &c.	Urban District Council ...	G. W. Warr, Surveyor, Council Offices, Southwich.
"	5	Royal Parks—Road Materials ...	H. M. Office of Works ...	H. M. Office of Works, Storey's Gate, S.W.
"	5	Steining—Materials ...	Rural District Council ...	E. Cripps, Council Offices, New Shoreham, Sussex.
"	6	London, S.E.—Kerbing and Cartage, &c.	Borough Council ...	Surveyor's Department, Town Hall, Catford.
"	6	Middleton—Street Works ...	Corporation...	W. Welburn, Town Hall, Middleton.
"	7	Kensington—Granite, Gravel, &c.	Council ...	Town Clerk, Town Hall, Kensington.
"	7	Kensington—Horse Hire ...	Council ...	Town Clerk, Town Hall, Kensington.
"	7	Birkenhead—Road Materials ...	Corporation...	C. Brownrigg, Surveyor, Town Hall, Birkenhead.
"	8	Islington—New Street ...	Trustees ...	H. Porter, Surveyor, 16 Russell Square, W.C.
"	9	Aberavon—Roads and Sewers ...	Messrs. Thomas ...	T. Gibb, Post Office Chambers, Port Talbot.
"	10	Blackburn—Flags, Granite, &c.	Corporation...	W. Stubbs, Borough Engineer, Municipal Offices, Blackburn.
"	12	Loughton—Making-up, &c.	Urban District Council ...	H. White, District Surveyor, Loughton.
"	13	Baildon—Road Repairs ...	Urban District Council ...	T. Waddingham, Surveyor, Westgate, Baildon.
"	14	Bexley Heath—Materials ...	Urban District Council ...	W. T. Howse, Surveyor, Council Offices, Bexley Heath.
"	17	Heswall—Road ...	District Council ...	T. Davies, 33 Kingsland Road, Birkenhead.
"	19	Beckenham—Granite, Flints, Gravel, &c.	Urban District Council ...	F. Stevens, Clerk, Council Offices, Beckenham.
"	19	London, E.C.—Horse Hire ...	Metropolitan Asylums Board	Metropolitan Asylums Board Offices, Embankment, E.C.
"	19	Bradford—Paving, Flagging, &c.	Corporation...	City Surveyor's Office, Town Hall, Bradford.
SANITARY:				
Feb.	1	Blayden-on-Tyne—Scavenging ...	Urban District Council ...	R. Higgins, Sanitary Inspector, Blaydon-on-Tyne.
"	3	Wilton—Drainage Works ...	Corporation...	J. Taylor, Sons & Santo Crimp, Engineers, 27 Great George Street, Westminster, S.W.
"	3	Bury—Earthenware Pipes ...	Corporation...	A. W. Bradley, Borough Engineer, Bury.
"	5	Eastry—Drainage Works ...	Guardians ...	F. S. Coke, Clerk, Workhouse, Eastry.
"	5	Sleetburn—Sewage Works ...	Urban District Council ...	Surveyor's Office, Langley Moor, Durham.
"	5	Prestwich—Sewer ...	Urban District Council ...	Surveyor, Council Offices, Chester Bank, Prestwich.
"	5	Bolton-upon-Dearne—Sewer ...	Urban District Council ...	Surveyor, Council Buildings, Station Road, Bolton-upon-Dearne.
"	5	Wolverhampton—Re-construction of Drains	Hospital ...	North Eastern Sanitary Inspection Association, 9 Albert Square, Manchester.
"	7	Royston—Sewerage Works ...	Urban District Council ...	T. W. Wits, Surveyor, Town Hall, Royston.
"	7	Sparkhill—Sewers ...	Rural District Council ...	A. W. Smith, Surveyor, Council House, Sparkhill, near Birmingham.
"	8	Islington—Sewer ...	Trustees ...	H. Porter, Surveyor, 16 Russell Square, W.C.
"	10	Northfleet—Latrines ...	Education Committee ...	F. Mitchell, 49 Windmill Street, Gravesend.
"	10	Blackburn—Earthenware Pipes, &c.	Corporation...	W. Stubbs, Borough Engineer, Municipal Offices, Blackburn.
"	10	Blackburn—Sewerage and Private Drainage Works	Corporation...	W. Stubbs, Borough Engineer, Municipal Offices, Blackburn.
"	19	Beckenham—Disinfectants and Stoneware Goods ...	Urban District Council ...	F. Stevens, Clerk, Council Offices, Beckenham.
TIMBER:				
Feb.	1	Cairo—Teak Wood ...	Coastguard Administration	Director of Stores, Arsenal, Alexandria.
"	3	Glasgow—Wood Blocks ...	Corporation...	Public Works Office, City Chambers, Glasgow.
"	3	Bury—Timber ...	Corporation...	A. W. Bradley, Borough Engineer, Bury.
"	6	Tynemouth—Cresotated Timber Fencing	Corporation...	J. F. Smillie, Borough Surveyor, Tynemouth.
"	10	Blackburn—Timber...	Corporation...	W. Stubbs, Borough Engineer, Municipal Offices, Blackburn.

List of Competitions Open.

DATE OF DELIVERY.	DESIGNS REQUIRED.	AMOUNT OF PREMIUM.	DEPOSIT REQUIRED FOR CONDITIONS, &c.	FROM WHOM PARTICULARS MAY BE OBTAINED.
Feb.	Wrexham—Schools (W. E. Willink, Assessor) ...	£50, £30	—	Clerk to Education Committee, Wrexham.
Mar.	Greenock—School ...	—	—	A. F. Niven, Municipal Buildings, Greenock.
"	Bangor—Free Library ...	£25 and £15	—	W. H. Worrall, Municipal Offices, Bangor, North Wales.
"	Swadincote—Free Library ...	£25, £15, £10	—	W. A. Musson, Clerk, Council Offices, Swadincote.
"	Birmingham—Council House Extension (Sketch Plans).	—	£1 1s.	Town Clerk, Council House, Birmingham.

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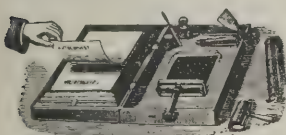
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(See displayed Advt. in issue for January 24, p. ii.)

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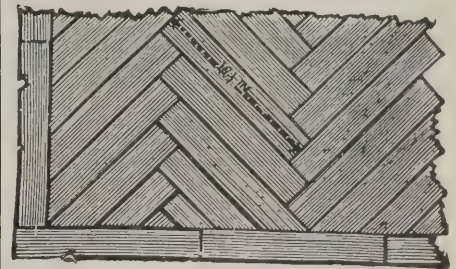
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17 1/2 x 3 x 1 1/2	6 9	6 3	9 3



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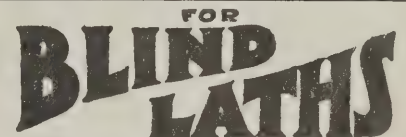
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Tenders.

Addressed postcards on which lists of tenders may be stated will be sent post free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Fetter Lane, E.C. Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Braintree.—For the erection of a secondary school. Messrs. Chancellor & Son, architects, 20, Finsbury Circus, London and Chelmsford:—

W. Manders ...	£10,244	15	9
J. Smith & Son ...	8,985	0	0
F. Johnson ...	8,934	0	0
J. Gowers ...	8,930	0	0
Wall & Co. ...	8,880	0	0
W. Parmenter ...	8,863	0	0
Coulson & Lofis ...	8,859	0	0
A. Brown & Son ...	8,831	0	0
W. H. Henkins ...	8,627	0	0
F. Bennett ...	8,525	0	0
Grimwood & Sons ...	8,523	0	0
Mason & Son ...	8,400	0	0
H. Potter & Son ...	8,389	0	0
F. & E. Davey ...	8,368	0	0
Everett & Son ...	8,320	0	0
Reading & Lon ...	8,300	0	0
C. Roper ...	8,275	0	0
R. Elvey ...	8,119	11	0
F. C. Thurman ...	8,097	0	0
W. Roberts ...	8,053	0	0
J. Barker & Co. ...	8,015	0	0
Parran & Son ...	7,945	0	0
J. McKay ...	7,779	0	0

Bury St. Edmunds.—For improvements and additions to the shirehall, for the West Suffolk County Council:—

Linzell, Newmarket ...	£11,887
Parkington & Son, Ipswich ...	11,808
F. C. Shurman, Walton ...	11,498
Bell & Sons, Cambridge ...	11,313
Hinnells & Son, Bury St. Edmunds ...	10,950
F. Bennett, Ipswich ...	10,900
Scales & Robins, Cambridge ...	10,865
G. Grimwood & Sons, Ipswich ...	10,773
Coulson & Lofis, Cambridge ...	10,500
Kerridge & Shaw, Cambridge ...	10,496
Mason & Sons, Haverhill ...	10,340

* Accepted.

Castleford (Yorks).—Accepted for works of improvement in Snaithorne Avenue, for the Urban District Council. Mr. W. Green, surveyor:—

J. L. Rodgers & Sons, Albion Street	£1,050	9	7
-------------------------------------	--------	---	---

Coatham.—For the erection of the Aldwyn Road Council school, for the Berkshire Education Committee:—

Holliday & Greenwood ...	£6,867	0	0	£249	0	0
Jenkins & Sons ...	6,780	0	0	277	0	0
Bosher & Son ...	6,560	12	0	272	10	3
Crosby & Co. ...	6,379	0	0	270	0	0
J. Barker & Co. ...	6,266	0	0	254	0	0
F. Bissley ...	6,135	0	0	240	0	0
H. Flint ...	6,116	7	9	316	0	0
Batten Brothers ...	6,090	0	0	280	0	0
Marriott & Salter ...	6,065	1	7	256	1	4
H. Harris ...	6,040	7	9	249	8	0
J. K. Cooper & Sons ...	6,019	0	0	242	0	0
C. Wells ...	6,011	0	0	269	0	0
J. Lovell ...	5,973	0	0	281	0	0
W. E. Theaker ...	5,959	10	0	209	10	0
A. Jackman ...	5,950	0	0	238	0	0
Silver & Sons ...	5,895	0	0	265	0	0
W. Creed ...	5,851	0	0	240	0	0
W. Watson ...	5,796	0	0	246	0	0
C. Cox & Son ...	5,779	0	0	255	0	0
G. H. Hughes ...	5,748	0	0	247	0	0
A. Faulks ...	5,695	0	0	240	0	0
C. H. Hunt & Son ...	5,673	0	0	270	0	0
H. D. Bowyer ...	5,619	0	0	250	0	0
G. H. Gibson,* High Wycombe ...	5,520	0	0	268	0	0

* Accepted.

Croydon.—For foundations for engine-room, &c., at the Stroud Green Well (contract No. 2), for the Corporation:—

C. J. Jerrard, South Norwood ...	£4,150	0	0
W. Hall ...	2,880	0	0
J. White ...	2,854	14	6
J. W. G. Tugwell, Wallington ...	2,781	0	0
E. Iles, Mitcham ...	2,737	0	0
Webster & Son, Peckham, S.E. ...	2,672	14	0
Dowra & Son, London, N. ...	2,480	7	2
W. H. Hyde, South Norwood ...	2,466	0	0
Kavanagh & Co., Surbiton ...	2,459	15	0
Rowland Brothers, Horsham ...	2,199	0	0
J. & C. Bowyer, Upper Norwood ...	2,197	0	0
Wilkinson Brothers, London, N. ...	2,154	10	0
T. Pearce, Thornton Heath ...	2,110	0	0
F. & G. Foster, South Norwood ...	2,108	0	0
Marriott & Salter, Caterham ...	2,032	16	1
Smith & Sons,* South Norwood ...	1,994	0	0
W. Potter ...	1,994	0	4
W. Roberts ...	1,895	0	0

* Accepted. [Rest of Croydon.]

Ely.—Accepted for the erection of an infectious diseases hospital, for the Llandaff and Dinas Powis District Council:—

Knox & Wells, Bangor Street, Cardiff	£9,203
--------------------------------------	--------

Heston.—For alterations and additions to Heston Schools, for the Heston and Isleworth Urban District Education Committee. Plans, specifications and quantities by Mr. A. Lanceot Lang, architect, Hounslow:—

W. R. Gray, Heston ...	£4,928	10	0
C. Emmett, Hounslow ...	3,825	17	11
T. Hiscock, Hounslow ...	3,297	0	0
H. Haynes, Wembley ...	3,289	0	0
Hughes & Stirling, London ...	3,275	0	0
Elbridge & Son, Richmond ...	3,238	0	0
Vigor & Co., Westminster ...	3,180	0	0
Speechley & Smith, Richmond ...	3,180	0	0
F. D. Hidden, Brentford ...	3,096	2	0
J. Barker & Co., Kensington ...	3,089	0	0
Myall & Upton, Clacton ...	3,076	0	0
Wisdom Brothers, Isleworth ...	2,999	15	0
Hawkins & Co., Ashford ...	2,992	10	0
A. & B. Hanson, Southall ...	2,990	0	0
A. M. Abbott, Mill Hill Park ...	2,989	0	0
F. G. Foster, Norwood Junction ...	2,933	0	0
W. J. D. Ekins, Ealing ...	2,930	0	0
W. H. Hyde, Norwood Junction ...	2,927	0	0
G. H. Gibson, High Wycombe ...	2,893	0	0
L. F. Lamplough, Notting Hill ...	2,879	0	0
Burfoot & Son,* Eaton Wick, Windsor ...	2,834	0	0

* Recommended for acceptance.

Leyton.—For the construction of nine miles of double tramway track, and for all materials connected therewith, for the Urban District Council. Mr. William Dawson, M.I.C.E., surveyor:—

G. Hay & Co., Westminster ...	£179,837	11	10
R. C. Brebner & Co., Edinburgh ...	172,531	14	0
Smith & Co., Rotherham ...	168,794	10	10
Playfair & Toole, Southampton ...	167,976	0	0
G. Trenham, Birmingham ...	166,657	13	10
F. Osman, Southampton ...	165,947	17	4
Smith & Co., Westminster ...	159,186	6	0
J. Ewart, London, S.W. ...	158,658	4	0
W. Wise & Co., Clapham, S.W. ...	157,553	11	5
T. Adams, Wood Green, N. ...	155,050	18	3
A. Faisey & Co., Leytonstone ...	154,823	4	1
J. & W. S. Briscoe, Stockport ...	152,245	1	7
Pethick Brothers, Barking ...	151,170	5	9
D. T. Jackson, Barking ...	150,734	15	2
G. Law, Kidderminster ...	148,676	14	6
A. Krauss & Son, Bristol ...	146,764	0	0
G. Wimpey & Co., London, W. ...	146,173	11	1
J. G. White & Co., London, E.C. ...	143,672	15	7
Dick, Kerr & Co., London, E.C. ...	140,540	16	3
R. W. Blackwell & Co., London, E.C. ...	138,862	3	0

G. J. Anderson, Poplar ...	£138,144	9	9
British Electric Equipment Co., London, W.C. ...	137,612	16	7
Underwood & Brothers, Dukinfield ...	135,163	9	5
W. Griffiths & Co., London, E.C. ...	130,724	19	11
T. C. Starkey, Hull ...	128,445	13	9
W. Manders,* Leyton ...	127,485	10	5
C. A. Zadig & Co.,† London, E.C. ...	115,866	8	0

[Surveyor's estimate, £136,520.]
* Accepted. † Withdrawn.

London.—For the erection of municipal buildings Brixton Hill, S.E., for the Lambeth Borough Council, Messrs. S. Warwick & H. A. Hall, A.A.R.I.B.A., architects, 13, South Square, Gray's Inn, W.C. Quantities by Mr. Charles W. Bowles, 9, Staple Inn, Holborn Bars, W.C.:—

	A.	B.
Holland & Hannen ...	£42,980	£2,250
Dove Brothers, Ltd. ...	42,825	2,000
Leslie & Co., Ltd. ...	42,472	1,877
Asby & Horner ...	42,187	2,000
T. Rider & Son ...	41,698	1,326
G. Trollope & Sons and Colls & Sons, Ltd. ...	41,540	1,282
Higgs & Hill, Ltd. ...	41,484	1,780
Holliday & Greenwood, Ltd. ...	41,377	2,072
Prestige & Co. ...	41,310	1,883
Patman & Fotheringham, Ltd. ...	41,223	2,100
J. Simpson & Son ...	40,797	1,784
B. E. Nightingale ...	40,678	1,402
H. L. Holloway ...	40,621	1,972
F. & H. F. Higgs ...	40,400	1,260
J. Carmichael ...	40,063	1,873
Holloway Brothers, Ltd. ...	39,920	1,860
J. Mowlem & Co., Ltd. ...	39,890	1,478
C. Wall, Ltd. ...	39,550	1,420
L. Whitehead & Co. ...	39,525	1,838
Kilby & Gayford ...	39,433	1,829
W. Wallis ...	39,393	1,960
J. Greenwood, Ltd.* ...	38,274	1,570

[Architects' approximate estimate, £38,000.]

A.—Extra for stone fronts and tower.
B.—Extra for Norwegian granite, plinth and entrance steps.
* Accepted.

London, S.E.—For the execution of the roadwork and platelaying in connection with the construction for the underground conduit system of electrical traction of the authorized tramways from Camberwell Green, via Denmark Hill, Champion Park, Grove Lane, Dog Kennel Hill, Grove Vale and Lordship Lane to the junction of Lordship Lane and Crystal Palace Road, for the London County Council:—

W. Griffiths & Co., Ltd., London ...	£92,894	14	5
J. G. White & Co., Ltd., London ...	92,460	2	4
Muirhead, Greig & Matthews, London ...	89,992	10	10
Dick, Kerr & Co., Ltd., London ...	89,663	3	3
J. Mowlem & Co., Ltd., London ...	86,548	0	0
A. Krauss & Son, Bristol ...	84,078	7	0
R. W. Blackwell & Co., Ltd.,* London ...	82,620	11	11

[Engineer's estimate, £88,109 6s. 11d.]

* Recommended for acceptance.

Malpas (Newport).—Recommended for acceptance for the erection of twelve cottages for the Malpas Parish and Rural District Councils:—

T. Huxley, Malpas ...	£2,150
-----------------------	--------

Plymouth.—In the list of tenders for the How Street dwellings given on p. xvi of our issue for last week the amount of Messrs. Pearn Brothers' tender was erroneously given as £9,833, instead of £6,833. We regret the mistake.

Ystradgynlais.—Accepted for the erection and completion of a new chapel at Ystradgynlais, R.S.O., Breconshire, for the Trustees of Ynys Calvinistic Methodist Chapel:—

E. Thomas & Son, Seven Sisters, Neath ...	£1,923
---	--------

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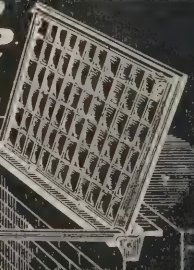
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February 7, 1906. Vol. 23, No. 574.

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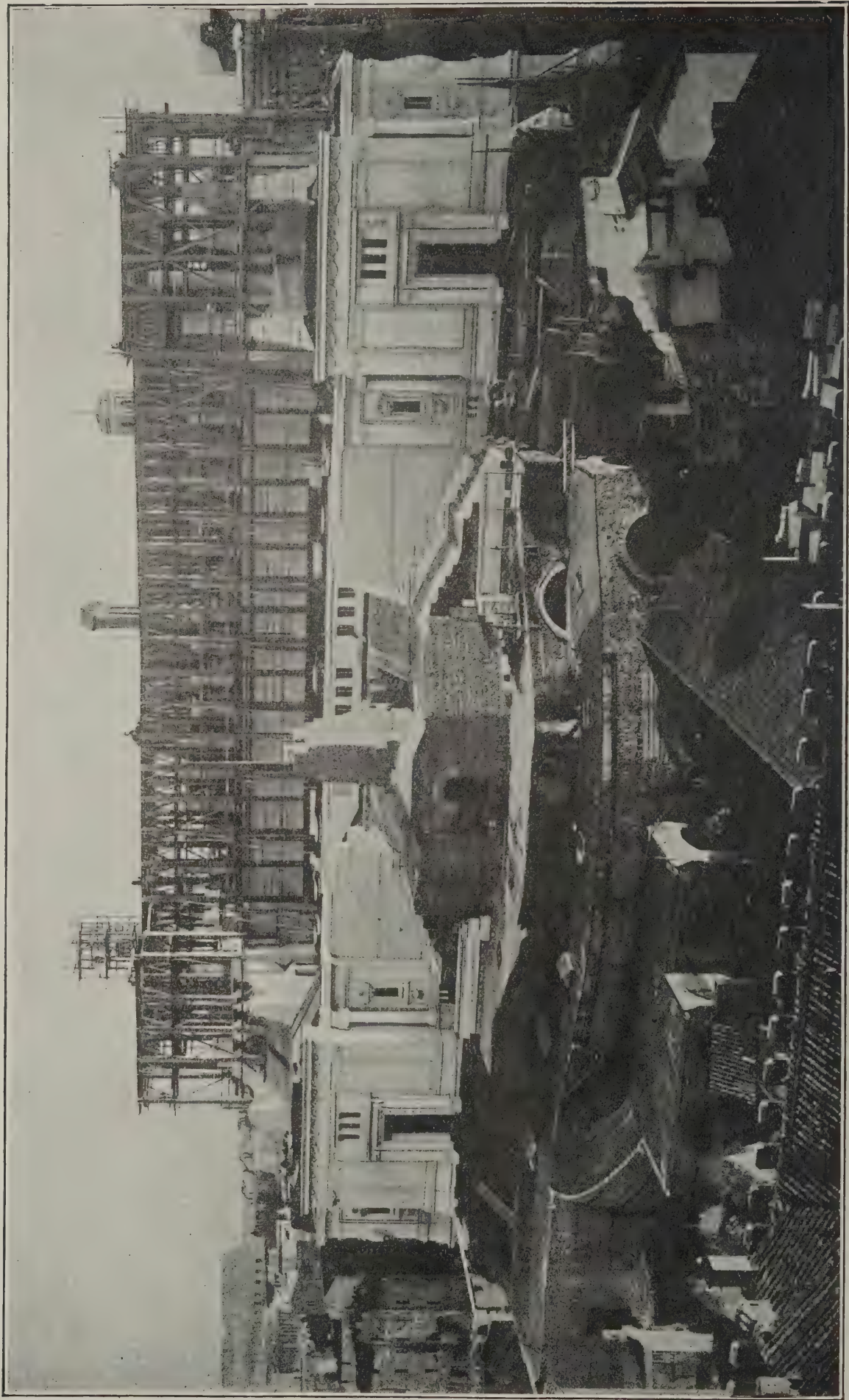
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Curly Gables. To the list of stock features in modern architectural practice which have been pilloried in these columns at one time and another we think the overuse of the curly gable should be added. The fronts of buildings are disturbed quite enough as a rule without any playful fancy in gables. The curly form has the distinction of antiquity, but we are inclined to regard it more or less with suspicion. It never was a particularly logical use of material. A gable coping requires to be protected against the penetration of water and the consequent disintegration by frost, but the curved and twisting outline of the Dutch gable does not carry off the water quickly enough. These Dutch gables, however, were built of bricks, and the same necessity for care in this respect did not arise as with stone copings. If the mortar which kept the bricks in place was disintegrated it could easily be re-pointed, or the brickwork reset. But with stone the material, once loosened, is irretrievably damaged, and the forms copied to-day from the brick gables of the past are unsuitable with stone coping. Apart from this, moreover, the effect of the gable upon the general design of a modern building is more often than not distressing. Whereas the gable end of the Netherlands usually gave relief to a somewhat plain street front of a house of narrow width, modern frontages are wider and generally embrace many more decorative features, containing two or three gables. The curly

gable thus creates an unhappy effect. It quarrels with the rest of the front and destroys all restfulness or austerity; the building becoming overloaded. There is a further development in the use of segmental gables. From a practical point of view this form may rank next in efficiency to the straight pointed gable, but we feel that it was more appropriate in its original position—namely, at the end of a barrel roof—than as now commonly employed. The outlines produced by pitched roofs of many little gables and gablets running against segmental gables are not particularly pleasing, and the gables of flattened curve or hog-backed gables are the ugliest and most ludicrous of recent architectural inventions.

Transport and Local Materials. The complexity of modern building would startle any architect or builder born 100 years ago if he could return to-day. The immense development which has taken place is almost directly due to the improvements in our means of transport. These means have been still further improved within the last two or three years. Possibilities are opened out which will no doubt result in much greater facilities for building, and it is to be hoped they will result in the use of local materials once again. Formerly almost the only building material which was imported was Caen stone, used in Westminster Abbey and other notable Gothic buildings. The reason why this stone was used in preference to local materials was the same as that which leads to the use of foreign materials to-day in preference to native—namely, the cost of bringing materials from the local source of supply to the large commercial towns which had arisen at the mouths of rivers or on rich plain lands. Other countries early used brick, but England for her important buildings seems to have preferred stone. As these buildings were chiefly erected close to the rivers or seashore, it was easy and convenient to bring a soft easily-worked stone such as Caen instead of resorting to local stone, which it would have been difficult to transport many miles over the ill-made roads or across open lands by horse labour. Trade was then restricted. First of all canals; and then railways, opened up further fields of supply of building materials and enabled a much greater variety to be used in obedience to increased demand. The cheapness of water carriage still enables materials far removed in origin to compete with local ones. This is regrettable not only because it leads to loss of employment among workmen in England, but because it is destructive of that local character which is so charming in the buildings of the past. Architects often endeavour to put their faces against the use of materials from many different districts far removed from the district in which a building is to be erected, but in this commercial age their clients generally require to buy their materials in the cheapest

market. We have two typical instances to-day—namely, the granite and marble industries. We bring marbles from Norway, Belgium, France, Italy, Portugal, Algeria and America, while granite comes to us from Norway and Sweden; yet we have in Devonshire, Cornwall and Ireland many marbles as fine, if not finer, than those abroad, while the Irish and Cornish granites and the granites of Scotland are all that we could desire if obtainable. The foreign marble and granites have been developed by their easy water carriage and the cheapness of the labour until now they have built up a connection, and established machinery, which enables them to prevent our local material being profitably worked in competition, but there is no doubt that the time is soon coming when the shorter distances of supply will render them economical. This will be effected by motor traction and improved roads. We have a good deal of timber, more particularly oak, which could be used if it could be easily brought to the towns, and motor traction has already been advocated for rendering afforestation a profitable industry in Great Britain. Still more so does this apply to stone, granite and marble. The competition of motor traction will it is to be hoped remove the anomalies in railway rates which at present partially cripple many British industries. Machinery and power are becoming cheaper and more used by the smaller consumer, and we look forward to the time when materials will be obtainable best and cheapest from quarries and saw-mills and stone and woodworking shops in the immediate locality, so that our buildings may once more become more typical of the soil, more local in character and truly evolutionary. The question of using local materials not only affects us, but the world over; every nation now strives to be self-centred and every town takes pride in its industries, history and associations. Architects must sympathize with these endeavours, and will look sympathetically upon the recent departure of the Bombay Port Trust, who have decided to use Indian granite for the new docks now under construction. Formerly Aberdeen and other granites were imported for such works, but the 60,000 cub. ft. now required will be drawn from Indian quarries, thus effecting a saving of £13,000. Samples of granite from Raichur, Khanapur, Karwar, Mangalore and Goa were sent over to this country to be tested, and proved to be equal to Aberdeen, Cornish and Norwegian (indeed, they are stated to have been better). This example serves to remind us that in the marble industry to which we have above referred we still neglect the famous marbles of India. American marbles we are now beginning to obtain, but the marbles of India with which so many stupendous and magnificent buildings have been constructed still remain beyond our pale.



THE MONUMENT TO VICTOR EMMANUEL II. IN COURSE OF CONSTRUCTION ON THE CAPITOLINE HILL AT ROME. THE LATE GIUSEPPE SACCONI, ARCHITECT.

This huge work has been in progress for twenty years, and is still a long way from completion. The cost down to the end of 1904 was £2,500,000. Count Sacconi, the architect, died last September, and Signori Placentini, Koch and Manfredi, have been appointed to carry on his design to completion. Detailed particulars and illustrations of the whole design will be found in *The Builders' Journal* for October 23rd and December 13th last. The brick core and base seen in the centre of the view above are for the statue and pedestal of Victor Emmanuel.

PRESERVATION OF IRON AND STEEL.

The Action of Cement and Plaster.

THE collapse of Charing Cross Station roof has caused considerable discussion on the preservation of iron and steel in buildings against corrosion, and alarmist statements have been made about the safety of metal structures and the impossibility of insuring efficient protection for a number of years without frequent repainting. We have already shown the illogical position of the architects who would prevent the use of iron and steel for structural purposes. In a few, however, of the great amount of theorizing on little or no evidence, we think it well to publish the following data of American experience which were collected some time ago by Mr. W. W. Kenly, A.M.Soc.C.E., and read at a discussion on the preservation of materials held by the American Society of Civil Engineers.

American Experience.

In 1897, in compliance with a request from former Superintendent of Buildings of New York City, the writer prepared a paper relative to the corrosion of metal in old bridges, and the chemical action which takes place between plastering materials and iron or steel when in contact.

The evidence given in that paper, parts of which are quoted below, was taken from papers and discussions before the American Society of Civil Engineers, and should be satisfactory and conclusive, as it represents the experience of some of the most distinguished members of this Society. In addition, the results of some tests conducted by the writer as to the corrosive effect of certain wall-plastering materials upon enclosed metals are given.

Conclusive Evidence.

The Transactions of the American Society of Civil Engineers have been carefully examined in reference to this subject, and it was found from these Transactions to be positively and absolutely established that iron and steel when embedded in cement-mortar are not corroded if the cement-mortar remains intact—that is, not cracked or broken to such an extent that the fissures become filled with water or subject to the action of the atmosphere.

The evidence is also positive and absolute that iron and steel are not corroded by lime-mortar.

The following is quoted from the Transactions:—

First.—“The caustic alkalis and alkaline earths prevent the oxidation of iron by neutralizing the acids. Iron, therefore, does not corrode in alkaline solutions or when embedded in lime.” *

Under Bilge Water.

Second.—“We have found cement to be a valuable protection for a ship against oxidation from bilge water. I have seen cases where these plates had been four or five years under the bilge water, when they were just as bright under the cement as when the ship was built. This has been the experience in the American and British navies, that cement applied to the surface of the plate in the bilge water under the engine-room and fire-room does protect it against oxidation.” †

Cement Wash an Efficient Protective.

Third.—“We uncovered about four lengths of the anchor chains in the Niagara Bridge, and the pins and bars there were entirely free from rust. In one place the bars and chains had been painted, and in picking off the cement that had covered them quite a chunk would come off, and underneath they

looked as bright as new. The bright end of a pin that had been filed twenty-five years before looked just as if it had been filed that day.”

“The cement that Mr. Roebling used was Thorold cement. On the tops of the towers the saddles and the cables lying in them were covered to a considerable depth with cement mortar, and when it was removed the wires were perfectly clean and bright. They are so still.” *

And from the same paper:—

Fourth.—“In 1876, when the bridge over the Kentucky River was built for the crossing of the Cincinnati Southern Railway several links of the anchorage of the Suspension Bridge, which was partly built by Roebling at the same place in 1855, were dug out and were found in a perfect state of preservation, not a spot of rust being apparent on the bars; but the mortar in which they were embedded was very compact and dry and of excellent quality.” †

Reinforced Concrete.

The following quotation is from the discussions on a recent paper entitled “On Painting the Louisville and Jeffersonville Bridge”:—

Fifth.—“The problem of the covering of iron with concrete or cement has probably been worked out more successfully in France than any other country. About a year ago the speaker made quite a study of concrete construction in buildings under several of the French systems—the Monier, the Melan, and others—and in every case the iron was covered directly with the cement, without paint or varnish or anything intervening.” ‡

From the discussion on a paper entitled “The Protection from Corrosion of Iron-work used as Covering for Railroad Tunnels”:—

Sixth.—“The cement mortar, I suppose, really does preserve the iron from the effects of rusting. Not long ago I heard Mr. Robert Moore describe the method of treating bolts for bridges, by which, instead of using lead and sulphur, Portland cement was used, and it was found that the bolts were much better preserved in every way against rust and against pulling.” §

Iron in Concrete Pipes.

“As to the adhesion of cement to iron, it is well known that iron pipes coated with cement are laid down by the mile. These have been taken up in many places, but not because of lack of adhesion of the cement. I have taken up pipes that had been laid many years, knocked off the cement, and found the iron as bright as new.” ||

The above record establishes the fact that cement mortar will protect iron and steel if the cement mortar is kept intact around the material.

Lime Mortar.

Now, as to the lime mortar. All natural cements are made of limestone. Lime such as used for building purposes contains exactly the same ingredients as cement, the only difference being that both vary in proportions of the ingredients, thus:—The lime used for building purposes, plastering, &c., is composed of 90 per cent. of carbonate of lime and the remaining 10 per cent. of what is called impurities, such as silica (sand), alumina (clay), manganese, &c., and a limestone makes a slightly hydraulic or eminently hydraulic cement according to the variations of the proportions of the impurities, thus: the eminently hydraulic cements contain about 65 per cent. of carbonate of lime and 35 per cent. of the impurities, such as silica, alumina, &c.

By quotations from the above Transactions

it was established that the ingredients in cement mortar do not cause corrosion; therefore, the same ingredients in lime mortar will not cause corrosion, as exactly the same materials are used in cement and lime mortar.

In support of this argument the following practical experience is submitted:—

First.—During the construction of the extension of the Sixth Avenue Elevated Railroad, Phoenix iron columns were used. These are closed columns, and are inaccessible to painting after being erected, and this has always been a serious objection to the use of the Phoenix column. In order to overcome this inability to paint the interior of these columns, and to protect the interior from corrosion, the columns, especially around the “S” curve from One Hundred and Tenth to One Hundred and Fourteenth Streets, were filled with ordinary lime mortar to prevent them from corroding on the interior surfaces. Mr. Edward Wegmann, now Division Engineer of the Croton Aqueduct, with headquarters at Katonah, New York, was the engineer in charge of this work.

After Twenty-five Years.

Second.—Mr. Prince, of the firm of Prince & Kinkel, ironworkers and contractors, of New York, says that he has taken down ironwork which had been erected over twenty-five years and which was covered directly with ordinary lime mortar, and the ironwork was as bright as when first erected, and entirely free from corrosion.

Third.—The statement of Mr. Theodore Cooper quoted before:—

“The caustic alkalis and alkaline earths prevent the oxidation of iron by neutralizing the acids. Iron, therefore, does not corrode in alkaline solutions or when embedded in lime.”

Fourth.—Mr. W. H. Burr, A.M.Soc.C.E., made a report as to the result of competitive tests at the Bowling Green building in August, 1896, on the Roebling wire partition. Lime plastering mortar, gauged with Atlas Portland cement was used. Mr. Burr says in his report: “The network was thoroughly embedded in the scratch coat, and I could discover no sensible corrosion of the wires.”

To quote again from a report made by Mr. A. J. Robinson, of the well-known firm of Robinson & Wallace, builders, of New York, being a report of the above-mentioned competitive test made on the Roebling wire partition: “I found no rust on the wire from lime-gauged machine mortar.”

Mr. Isaac E. Ditmars, architect, in a report on the same competitive test says: “I found the lime plastering mortar gauged with Portland cement did not appear to rust the wire.”

A Bridge Example.

Returning again to the Transactions of the American Society of Civil Engineers, we find in the paper on the “Restoration of the Cable Ends of the Covington and Cincinnati Suspension Bridge,” when the cables were removed, Mr. Bouscaren, engineer-in-charge, reports that the mortar in immediate contact with the wires was impregnated with iron rust, and formed a very hard crust around the strands. “The outside wires of the strands were, as a rule, bonded together in a matrix of rust, giving to the strands the appearance of solid bars, yet in a few spots the wires were bright and well preserved.”

In the discussion of this statement of Mr. Bouscaren, Mr. Theodore Cooper said as follows: “As far as this case goes, the faith of Mr. Roebling and other engineers in the preservative effects of cement mortar need not be shaken, for, from the author's description of the masonry and the wooden blocks and chips embedded therein, the cables were not embedded in cement mortar.” And, also, that “the conditions necessary to preserve

* L. L. Buck, vol. xxviii., p. 367.

† G. Bouscaren, vol. xxviii., p. 370.

‡ R. W. Lesley, vol. xxxix., p. 33.

§ Desmond Fitzgerald, vol. xxvii., p. 330.

|| J. P. Frizell, vol. xxvii., p. 330.

* Theodore Cooper, vol. xi., p. 425.

† H. S. Haines, vol. xxviii., p. 366.

iron from corrosion, as we understand them, are total exclusion of acid substance or any material which may by its own changes produce any acid action. That percolating through cement has any acids contained therein neutralized: this is the natural explanation of the preservative character of cement mortar. If, however, the cement covering be imperfect, so that any water can pass without this neutralizing of the acids, oxidation must be expected."

The Simplest Proof

that lime mortar and lime mortar gauged with cement do not corrode iron or steel is the fact that the operative plasterers leave their steel tools in the mortar overnight and for many consecutive hours, and on taking out the tools find they are not rusted.

Patent Plasters.

Having now discussed the corrosive effects of lime mortar and cement mortar upon iron and steel, we come to the discussion of the patent plasters, or so-called hard plasters. In a circular issued by one of the patent plaster companies, July, 1897, we find the following: "Our method of manufacture renders the patent plaster the only material that does not corrode iron, metal lath or nail heads." We will now see if this statement is correct. In August, 1896, a competitive test was made in the Bowling Green Building, Nos. 5-11, Broadway, between lime mortar gauged with Atlas Portland cement and the patent plaster, rendered on the Roebling wire partition. Mr. William H. Burr in a report on the results said:—

"I found that the patent plaster had induced active and serious corrosion of the wire holding it in all the numerous instances where I had opportunity to observe this effect. In all these examinations I found the patent plaster materially inferior in respect to qualities of hardness and tenacity, and lacking monolithic character, as well as possessing some quality which induces active corrosion of the wire partition. This latter effect might produce a serious result, in some instances at least, in a comparatively short time."

Mr. Burr stated that he could discover no sensible corrosion of the wires from cement-gauged lime mortar. The results of this examination exhibit the superior excellences of

Portland Cement as an Agent for giving Strength and Hardness to Wall Plaster, and it possesses the additional valuable quality of preserving the wire partition against corrosion, whereas some element in the patent plaster actively induces it.

In the report of Mr. A. J. Robinson on the competitive test on the Roebling wire partition, he states: "I found, where I could observe it, that the wire was badly corroded where the patent plaster had been used."

Dangerous Plasters.

The principal cementing material of the patent plasters, or so-called hard plasters, is "gypsum" or "plaster-of-Paris," known chemically as sulphate of lime, and according to a recent authority* its chemical analysis shows acid, 46 parts; lime, 32 parts; water, 22 parts.

In the discussion on the care and maintenance of bridges Mr. Theodore Cooper states as follows:—

"Ordinary commercial sulphur generally contains sulphuric and sulphurous acids, produced by the oxidation of the sulphur during its process of sublimation. These acids are the immediate corroding agents when the impure sulphur and iron are in contact."

"In general the rusting or corrosion of iron only takes place in the presence of an acid and moisture. In dry air at common temperatures, or under pure water free from air and carbonic acid, iron does not oxidize. Neither does it oxidize in dry carbonic acid

gas; nor to any great extent, if at all, in damp oxygen. But in the presence of moisture and many acids the corrosion takes place readily and continuously."

Thus, according to this authority, in the "presence of moisture and many acids the corrosion takes place readily and continuously." The patent plasters contain both the moisture and the acids necessary to start the corrosion.

One of the claims of the various patent plasters is that by the use of their material the plastering of a building can be done so much quicker from the fact that their mortar becomes hard, or "sets," in a few hours, and in many cases the white coat is applied the following day. Although the patent plasters "set" and become hard, they are not dried out, because it requires just as much water to put the patent plasters in a plastic condition ready to be applied to the iron lath or wire as it does to make lime mortar in the same condition, and it is the universal custom to allow the lime mortar to dry out thoroughly or become "bone dry." Thus, at the time the lime mortar is coated with the white coat the lime mortar in contact with the metal lath or iron wire is dry. On the contrary, the water in the patent plasters is not dried out, and there is moisture or water in the patent plasters in combination with the "sulphate of lime" and other acids used in the preparation of the patent plasters.

The Simplest Proof

that patent plasters corrode iron and steel is the fact that the operative plasterers find that when they leave their steel tools in the patent plasters overnight they are found to be corroded the next morning.

Mr. W. B. Corney, of the firm of W. B. Corney & Brother, plasterers, says that he had repaired a ceiling of a building situated on Sixth Avenue, New York, at about Thirteenth Street, and found that the metal lath was entirely corroded and gone, and there was nothing but a shell of plaster composing the ceiling. He further stated that the plaster was a patent plaster.

An Interesting Test.

A test was made at additions to the Metropolitan Life Insurance Company's Building on Twenty-third Street, New York City, to determine the corrosive effect of plastering materials upon metals. Pieces of cast-iron were broken, and a plastering material consisting of lime mortar and Portland cement was applied to the clean, bright fracture of one piece, and a sample of patent plaster was applied to the clean bright fracture of another piece. About a month after, the two samples of plastering material were removed, and the piece of cast-iron to which the cement-gauged lime mortar had been applied was as clean and bright as when first broken; but the second piece was corroded.

Obituary.

Mr. John P. Seddon, F.R.I.B.A., died last week. (See p. 80.)

Mr. Benjamin Hannen, head of Messrs. William Cubitt & Co., the well-known firm of contractors, died recently, aged 76.

Mr. George Miller, retired builder, of Coat-bridge, N.B., drowned himself last week by deliberately plunging his head in a tub of water. He was 63 years of age.

Mr. L. Ingleby Wood, architect, of Edinburgh, died last week. He produced a series of black-and-white studies of "Vanishing Edinburgh."

Mr. William Reid, of Fraserburgh, died recently, aged about 41. He was architect for Lord Saltoun. Many of the chief buildings erected in Fraserburgh in recent years were designed by him.

NOTES ON COMPETITIONS.

The Acton Municipal Buildings Farce.

The latest act of the farce of the proposed municipal buildings at Acton has just been played. The lowest tender for works which were expected to cost some £10,000 has come out at close upon £60,000. The ratepayers have condemned the whole scheme, and the district council has at last decided not to proceed with it. There is a universal feeling in the neighbourhood that everybody has been trifled with, and the chairman of the district council at its last meeting stated that he considered the council had been led astray. And so the fears entertained by those whose knowledge of the subject entitled them to an opinion that the most suitable design had not been selected out of the limited number submitted in competition have been justified by the result. As far as one can remember (it is over two years since the competition was held), the assessor awarded the first place to a design which showed the town hall upon the front, because he considered that position the most suitable, in spite of there being no requirement to that effect in the conditions. The frontal position was afterwards abandoned and the Town Hall relegated to a quieter spot, where in fact it had been shown by the majority of the unsuccessful competitors. The conditions gave the cost of the proposed building at 1s. per cub. ft. Some of the designs submitted could have been undoubtedly carried out for that sum, especially when it is borne in mind that there were those among the competitors who had erected municipal buildings at a similar price. It has been contended over and over again that it is a duty of the assessor to ascertain that the designs selected by him can be carried out for the stipulated sum. The neglect to do so is widespread in its evil effect, causing dissatisfaction amongst the unsuccessful competitors, endless trouble and frequent loss of the work to the successful, and general despair to the promoters. In this instance work which was to have cost 1s. per ft. came out at 1s. 6½d.—with what disastrous result has been already shown.

Ilford Library.

The Ilford District Council has referred back to the General Purposes Committee a recommendation that a competition should be held for the public library which it is proposed to erect opposite Ilford Station. A councillor stated that he considered the council's surveyor should prepare the plans, and that £300 would be saved thereby. The seconder of this proposition said he thought they would not get an architect to draw better plans than their own surveyor would do. If £300 is the amount estimated by the Ilford Council as the cost of a competition, the assessor and the competitors should fare well in fees and premiums. Ilford is not likely to require a library costing more than £6,000. The proposed site is a fine one at the apex of two roads, and occupies a prominent position opposite the station. It will be to the best interest of the district that the General Purposes Committee upholds its resolution.

New Church at Blackpool.

One of the quaintest competitions which has appeared for some time was advertised recently in the "Blackpool Gazette," where designs and estimates were invited for a proposed new church to be erected on the site of the St. Peter's Mission Church at South Shore. Particulars were to be obtained of the vicar, and were issued by him in the form of a letter containing a sketch plan and elevations from his own pen. The only conditions are that a church and schoolroom are required, that the nave is to have seating accommodation for 500, and that something good and cheap is wanted. There is such an

* Millar, "Plain and Decorative Plastering."

evident desire here to conduct a competition on the most economical lines, even at the cost of much time and labour on the part of the vicar, and his methods are so obviously the result of ignorance of what is best for himself and his parishioners that one is constrained to refrain from scoffing. The matter does not seriously affect architects, for no one with any self-respect would think of competing, but it does affect architecture in that the result will probably be another of those structures which disfigure so many neighbourhoods, and which lack alike proportion and all elements conducive to devotionism. The vicar is evidently unaware that these qualities are not incompatible with plainness and cheapness, at the hands of an architect in sympathy with his work, and he would be well advised to reconsider his method if he is desirous of obtaining a church worthy of the name.

Library, Pemberton.

The eight competitive plans submitted for a new library at Pemberton have been referred by the Library Committee to an assessor to place the first two in order of merit.

School at Greenock.

The council of the Edinburgh Architectural Association have written to the Greenock School Board protesting against the conditions in the competition for a new school at Cartburn.

Stockport Isolation Hospital.

Mr. G. H. Brady, Mr. C. A. Locke and Mr. A. G. Wilkinson—all of Stockport—have been awarded the first, second and third premiums respectively for the block to be added to the isolation hospital at Dialstone Lane, Stockport, at a cost of £2,000. There were nine competitors (invited), and the assessor was Dr. E. Seargeant, medical officer of health for Lancashire.

Assessor for Oldham Library.

Mr. G. H. Willoughby, F.R.I.B.A., of Manchester, has been appointed assessor in the competition for the Carnegie free library to be erected at Crompton, Oldham.

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Correspondents are particularly requested to be as brief as possible.

Damp-proof Floor: Underground Tank.

ST. ALBANS.—K. writes: "(1) In a ground-floor room of a house, on a bed of hard-rammed dry clay, a 6in. Portland cement concrete bed (1 to 5) is laid, in which 2in. by 2in. deal dovetail-section battens are bedded flush with the surface at 15in. centres. When quite dry the whole is twice coated with boiling gas-tar, and 1½in. grooved and tongued deal floor-boarding is nailed to the battens. Would this be damp-proof, and if so, is the boarding liable to dry-rot? (2) Does linoleum, laid upon a wooden floor as above or upon an ordinary wood-joint floor, cause the floor-boarding to rot? If so, is there any preventative—such as an under-lining to the linoleum? (3) Would a galvanized sheet-iron tank, buried in the earth as a rainwater store, be liable to quickly become unsound and leaky?"

(1) Though I should personally prefer a foundation of hard rubble in place of the clay, I see no reason why the proposed floor should not be both damp-proof and free from dry-rot. Special "breeze" bricks are more durable in such a position than deal dovetailed battens, and can be nailed to with equal ease. (2) Linoleum upon such a floor as the above or upon any wooden floor which is not very thoroughly ventilated on its underside will undoubtedly cause rapid

decay, because it is of such an impervious nature that it admits of no ventilation. (3) A galvanized sheet-iron tank would last a considerable time in such a position as you describe, but it is hardly designed for such a purpose. A properly constructed brick or concrete tank would cost a little more, but is more suited for the purpose; or, if you must use iron, covered "ship's tanks," 4ft. cub. of ½in. plate, can be purchased very cheaply and are to be preferred to the ordinary galvanized tank. F. S. I.

Claim for Interest on Unpaid Contract Balance.

LEX writes: "A builder contracts to erect and complete a building of considerable size, advances to be made in the usual way. The balance, a large one, has been withheld by reason of the architect not having given the final certificate, only because the client was unprepared to pay it. Can the contractor claim interest on the unpaid balance; if so, from how long after the building was completed; and does the R.I.B.A. recognize any custom in this respect? The date for payment of balance was not specially mentioned in this agreement."

Surely if the work was of considerable size there was a proper written contract, and if so, that must form the basis of any claim you have upon the building owner. The usual term for "retention money" is six months from the date of completion, and if that period has expired you have reasonable grounds for demanding a settlement—firstly from the architect (for final certificate, &c.), and secondly from the building owner. You cannot claim interest as you suggest, but you are entitled to the balancing amount of your contract if all the other conditions have been fulfilled. Let your solicitor see all the papers connected with the case before you take any action. F. S. I.

Calculations for Oval Sewer.

CONSTANT READER writes: "In calculating the discharge and velocity of circular sewers, (1) what is a simple formula for getting the length of the wetted perimeter at any depth of flow in the sewer, (2) the sectional area of sewage, (3) formula for velocity and discharge, (4) formulæ for calculating the size of opening required to pass a given number of gallons of water per minute? Having a regulating weir 18ins. wide fixed in a channel, what would be the height of opening required to pass, say, 130 gallons per minute?"

There is no simple formula for obtaining the correct length of wetted perimeter at any depth of flow, nor for finding the sectional area of a sewer. When flowing half-full the wetted perimeter will be approximately equal to 1.9 D, where D = diameter or width of standard sewer; and when flowing two-thirds full the wetted perimeter = 2.39 D. In the first case the sectional area of flow will equal 0.509 D² and in the second case 0.756 D². A useful formula for the calculation of the discharge from drains and sewers is that of Eytelwein, as follows: $Q = A \sqrt{x} \times 2f \times 55$, where Q = discharge in cubic feet per minute, A = sectional area of sewage flow, x = hydraulic mean depth (i.e., sectional area of sewage flow divided by wetted perimeter), f = fall in feet per mile, and 55 is a constant, but there are more accurate formulæ than this one, although they are more complicated. The velocity of flow in feet per minute may be found by dividing the discharge in cubic feet per minute by the area of flow in square feet. In answer to another question, Beardmore's rule for the practical discharge of water through ordinary sluices is $C = 300A \sqrt{H}$, where C = discharge in cubic feet per minute, A = area in square feet, H = head in feet. When the outlet is "drowned" the head will be the difference in level between water over inlet and outlet.

HENRY ADAMS.

The Influence of Aspect upon Design.

CHEETHAM. — STUDENT writes: "I am obliged to Prof. Henry Adams for his reply to my question concerning façade design on p. 37 of your issue for January 17th, but owing to the manner in which I put the question I have not yet elicited the information I desire. My question ran as follows: 'In what way should the aspect of a façade govern its æsthetic design?' This I now realize to be ambiguous. My query arose from reading the following words of Mr. John Belcher in the Institute Journal of February 11th, 1905: 'You should also have regard to the aspect of the building you are studying—whether it is situated in the narrow street, the broad thoroughfare or the open ground. Note how the projections and lights and shadows are determined on each frontage. Where the sun penetrates reflected light may be taken advantage of. Projections and shadows on a south front are by no means the same as they would be with a north aspect. How well Vanbrugh, amongst others, understood this! I mention Vanbrugh because his insistence on this point is so obvious.' What I desire is to elicit a few practical instances of how the aspect ought to determine the architectural treatment, and also some elucidation of the sentence that I have underlined. Possibly some of Vanbrugh's examples might be explained. This is a question in which much interest is taken not only by myself but by others also; and an explanation would be greatly appreciated."

Shadows are seldom studied in external design in this country, and the reason may be sought in the fact that the leaden skies and changing lights of northern climes would render any definite scheme on a large scale only fitfully seen. With clearer skies and greater intensity of light greater attention may be profitably paid to all the little details and to larger composition in shadows. On a north front the whole surface is in shadow, and thus definition is only obtained by reflected and diffused light, and thus greater projection and coarseness of detail will be necessary to give sharp and clear definition of parts that will be necessary on a south front. Mouldings need to be more prominent and hollows deeper, sculpture in higher relief, on a north face than on the south. Roughness of surface and intricacy of detail would be toned down by the duller lighting, whereas it would be distressful on a sunlit front. On a south front, too, in bright sunshine shade will be restful, and intricate forms such as sculptured friezes should be looked at in the shade, and simple geometric forms such as mouldings used in the light to give proportion, balance, rhythm and definition of parts and their purpose and importance. Heavy cornices or wide overhanging eaves are pleasing here, and shadows cast over windows have their utilitarian aspect, and porticos are often adopted to give shelter from the sun rather than from rain.

Architectural Censorship was the subject of a paper read recently by Mr. J. Campbell Reid before the Glasgow Technical College Architectural Craftsmen's Society. Mr. Reid advocated the appointment of small committees for each district of large towns, who would form an Architectural Court, before whom all plans for proposed buildings would be submitted after having been sanctioned by the Dean of Guild Court. These committees would refer any schemes opposed to architectural principles to the censor, who would be an architect or artist of repute appointed by the Government, and whose decision would be final. Mr. Reid also advocated the laying-out of new streets by architects, who would introduce more varied lines than those laid down by engineers and thus relieve the monotony of many of our thoroughfares.

THE ARCHITECTURE OF SOUTHERN FRANCE.

A paper on "The Architecture of Southern France" was read by Mr. A. Needham Wilson, A.R.I.B.A., before the last meeting of the Leeds and Yorkshire Architectural Society. Mr. Wilson said that a student visiting the south of France for the first time could not fail to be struck by the examples of Romanesque architecture more than by anything else, and in Provence he would be bewildered by the impression that no intermediate styles seemed to bridge the gap between the degenerate Romanesque and the late Gothic, or even the Renaissance. To deal with the subject as a whole would hardly come within the scope of a single paper. Therefore Mr. Wilson said he would deal in particular with

The Romanesque in Provence.

Viollet-le-Duc had said: "The few fragments of architecture which remain to us of the sixth and seventh centuries are but pale reflections of the Roman art, often as débris thrown together haphazard by unskilful workmen executing masonry or brickwork with much difficulty." In Provence, as well as in its vicinity, many buildings appeared to incorporate Roman fragments. They were told that these were slavish copies, but it would be wrong to jump to too hasty a conclusion on the point. There were such typical examples as the porches of Notre Dame at Avignon and at Aix in Provence which appeared to bear the stamp of Roman work, but a little consideration would tell us that they were but slavish copies. Coming nearer, we found a delicacy of execution which seemed to indicate that they

were either genuine Roman fragments or copies by craftsmen who were certainly not ignorant of traditional training; also the positions occupied by these fragments frequently indicated an incongruity of treatment quite incompatible with original work. One of the first problems which confronted the Provençals was the covering of their buildings. The country produced no suitable timber, but stone in plenty. The school of Provence contented itself with the simple pointed barrel-vault, over narrow low naves only, trusting to the massiveness of the walls to resist the thrust, or, where aisles were adopted, formed a kind of continuous flying buttress, raising the wall over the arcades sufficiently to be pierced with windows.

A.A. OLD DAY STUDENTS' CLUB.

THE fifth annual dinner of this club was held at the Florence Restaurant on January 26th, when thirty gentlemen were present, including Mr. E. Guy Dawber (who presided) and Mr. H. Tanner, junr., hon. secretary of the A.A., who was present as a guest of the club. In responding to the toast of the "A.A. and the Day School," Mr. H. P. G. Maule, the master, briefly ran over the history of the school from its inception in 1901, paying special attention to the numbers working there at different periods down to the present total of thirty-seven in the first year and eighteen in the second year. He drew attention to the fact that the scheme of work now followed was almost identical with that planned by Mr. A. T. Bolton at the beginning (Mr. Bolton's name being received with general

applause), and noted with pride that in the Institute studentships just awarded seven out of the eleven had been made to A.A. men. Mr. Dawber then rose to propose "The Club," to which toast Mr. Travers, the hon. secretary, replied. Other toasts were given, and a musical programme completed a most enjoyable evening.

"ENGINEERING GEOLOGY."

Building Stones.

IN the second of a series of lectures on "Engineering Geology" which he delivered recently before the Aberdeen Association of Civil Engineers Mr. George Gregory, junr., civil engineer, said it was stated that a proper knowledge of the physical properties of building stones could only be obtained by an examination of their structure under the microscope, but, unfortunately, this method of treatment had not found its way into practical books dealing with building stones. The study of petrology, as far as the practical determination of the relative values of building stones was concerned, was so easy that even a beginner could with the aid of a microscope distinguish the differences of structure and composition. Stones from the igneous rocks were of most interest to engineers, as from such were obtained the best materials for street-paving and macadam and the best and most durable stones for heavy engineering purposes. The derivative rocks, on the other hand, appealed most to the architect, as they furnished those materials which combine a high degree of durability with ease of working and facility for being shaped into sculpture and ornamental work.



CATAFALQUE AT THE SHEFFIELD CREMATORIUM.

DESIGNED BY C. M. HADFIELD, ARCHITECT, AND EXECUTED BY THE BROMSGROVE GUILD OF APPLIED ARTS.

This catafalque was designed with the twofold object of securing a seemly and dignified resting-place for the remains during the reading of the burial service and of forming a casing to the iron framework and mechanism used for drawing the coffin into the furnace chamber at the words of committal. The design was influenced by the style of the existing chapel and buildings, and was based on the type of late fifteenth-century altar tombs. The length is 13ft., width 4ft. and height 3ft. The work was executed throughout in cast bronze by the Bromsgrove Guild of Applied Arts to the design of Mr. C. M. Hadfield, architect, of Sheffield.

Law Cases.

Important Question for Scottish Builders.

—In the Edinburgh Court of Session recently an important case was heard by the Lord Justice Clerk, Lords Kyllachy, Stormonth Darling and Low. Miss Elizabeth Wilson and Mr. A. Walker, quarryman, of Stonehouse, contracted with Weir & Hamilton, builders and contractors, for the erection of certain tenements at Green Street, Stonehouse, according to plans and schedules prepared by an architect employed by the plaintiffs. In the schedules the architect stated the chimney stacks at a rate per square yard. This, it was alleged, was contrary to the prevailing practice in the West of Scotland, where the work in question was always scheduled per square foot. Of the six contractors who tendered for the work, three, observing the change, inserted in their price schedule a rate applicable to the square yard, but the other three, of whom the defendants were one, inserted a rate per square foot, acting on the erroneous assumption that this was what was wanted. The defendants were the successful tenderers, and on the completion of the work it was measured by the architect, who in his final measurement inserted a price per square foot for the work performed, thus paying the defendants at a rate nine times in excess of the price quoted by them per square yard. The appellants paid the contractors the sum brought out by the architect in his final measurement. Alleging that they had subsequently discovered from the reason just mentioned that an overpayment of £78 had been made, they brought an action asking for repetition of the money. The defendants alleged that the plaintiffs were aware of the mistake into which they had fallen by reason of the unusual method of scheduling the work in question, but, after proof, Sheriff-Substitute Thompson granted decree in favour of the plaintiffs, with expenses. On appeal, Sheriff Guthrie reversed, and assoilized the contractors. The plaintiffs, therefore, appealed to this Court, and after hearing counsel their Lordships affirmed the judgment of the sheriff, with expenses.

Building By-laws Prosecution. — At Newport Pagnell Divisional Petty Sessions recently George Henry Transfield, builder, Bradwell, was summoned by the Newport Pagnell Rural District Council for various offences against the Public Health Act, 1875, and the council's by-laws pursuant thereto. There were nine counts in all. The first five counts, which related to two lock-up shops in Queen Ann Street, Bradwell, were reduced to four. It was alleged by the prosecution that the plans submitted to the council were incomplete and not in accordance with the by-laws, and that the buildings actually built were not in accordance with those plans. The second information was that there had been no covered drain construction for the premises. The third count was in regard to the sanitary conveniences. The plans deposited with the council did show these conveniences, but the houses when built were without them. The fourth summons was in respect to the water-supply. Defendant applied for the usual certificate, but was refused because there was not a fit and proper supply of water available. Defendant, however, permitted the occupation of the premises. For the defendant it was submitted that there had been no substantial deviations from the plans, and that he was well within his rights in what he had done. He had not constructed a covered drain because he thought of taking advantage of the system of combined drainage which obtained in the village. With regard to the water-supply, there was a well within 15ft. of the house, which it was argued was within a reasonable distance as required by

the Act. Moreover, the inmates of the shops did not use the water for domestic purposes. The magistrates decided to dismiss the first three cases and impose a fine of 6d. and 8s. 6d. costs in the fourth (the water-supply). The Bench were asked to state a case on those dismissed, which was granted, and the remaining four summonses were withdrawn.

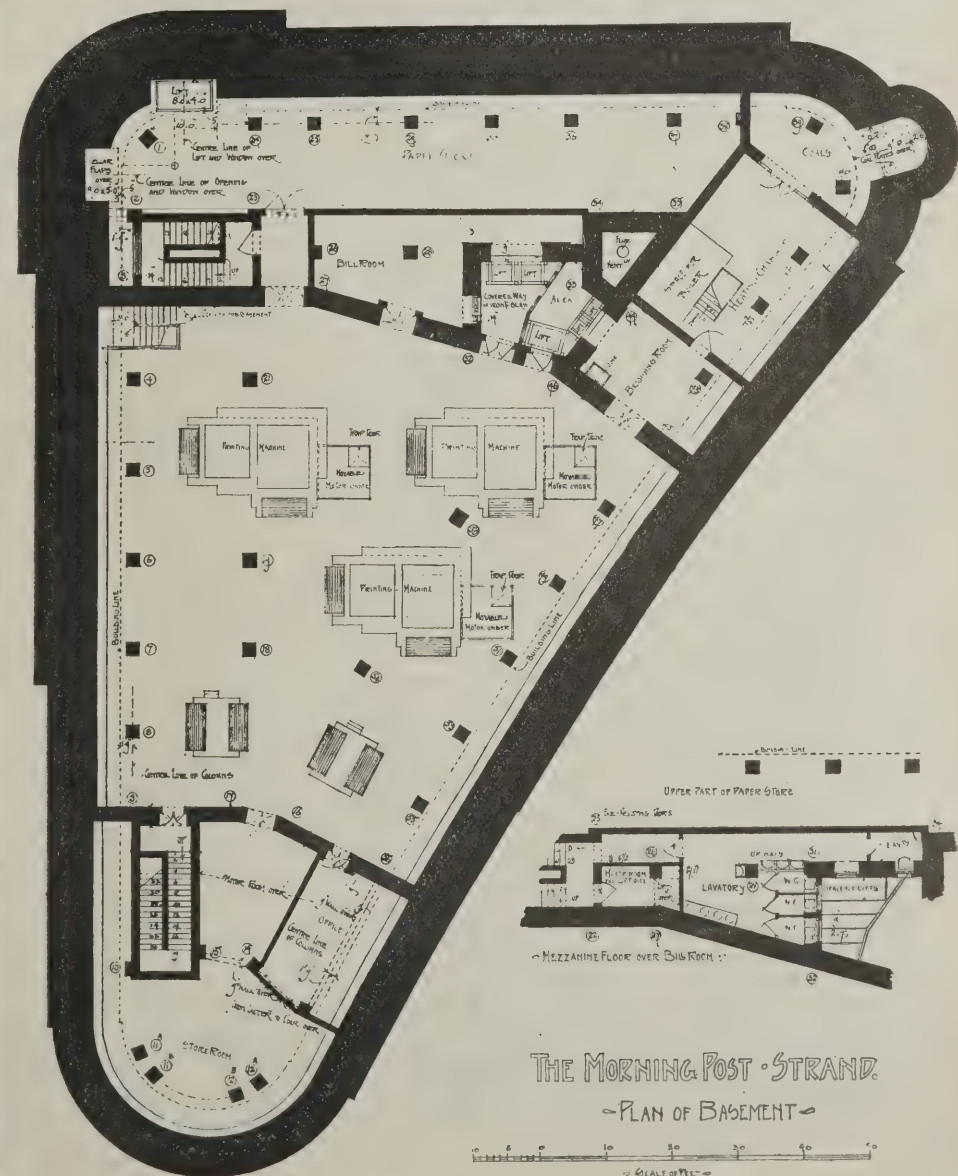
An Architect's Certificate in Court. — In the Scottish Law Courts recently a case was heard in which cross actions were brought by Messrs. Donaldson & Co., motor-car repairers, of Edinburgh, and Messrs J. R. & E. E. Pearson, architects, of Edinburgh, in respect of new motor-car works for Messrs. Donaldson, who sued for £128 10s. The builder had received a final certificate for £240 9s. Messrs. Donaldson paid £100 to account, but objected to pay the balance on the ground that the work was not in accordance with the contract, and that considerable deductions fell to be made from the architects' measurements. The builder sued Messrs. Donaldson, who consented to decree being pronounced against them for the sum sued for under deduction of £10. Messrs. Donaldson stated that they were legally bound to pay the builder, as he had received a certificate from the architects. They now sued Messrs. Pearson for the amount paid to the builder, which they held should not have been passed by the architects. The architects denied liability, and claimed from Messrs. Donaldson £40, balance of commission

alleged to be due; £10 10s. for preparing a second set of plans; and £2 2s. for revising and examining the feu charter. The judge found that Messrs. Donaldson were entitled to decree against the architects for £72 5s. 1d., and that Messrs. Pearson were entitled to decree for £40, leaving a difference of £52 5s. 1d., which Messrs. Pearson would have to pay.

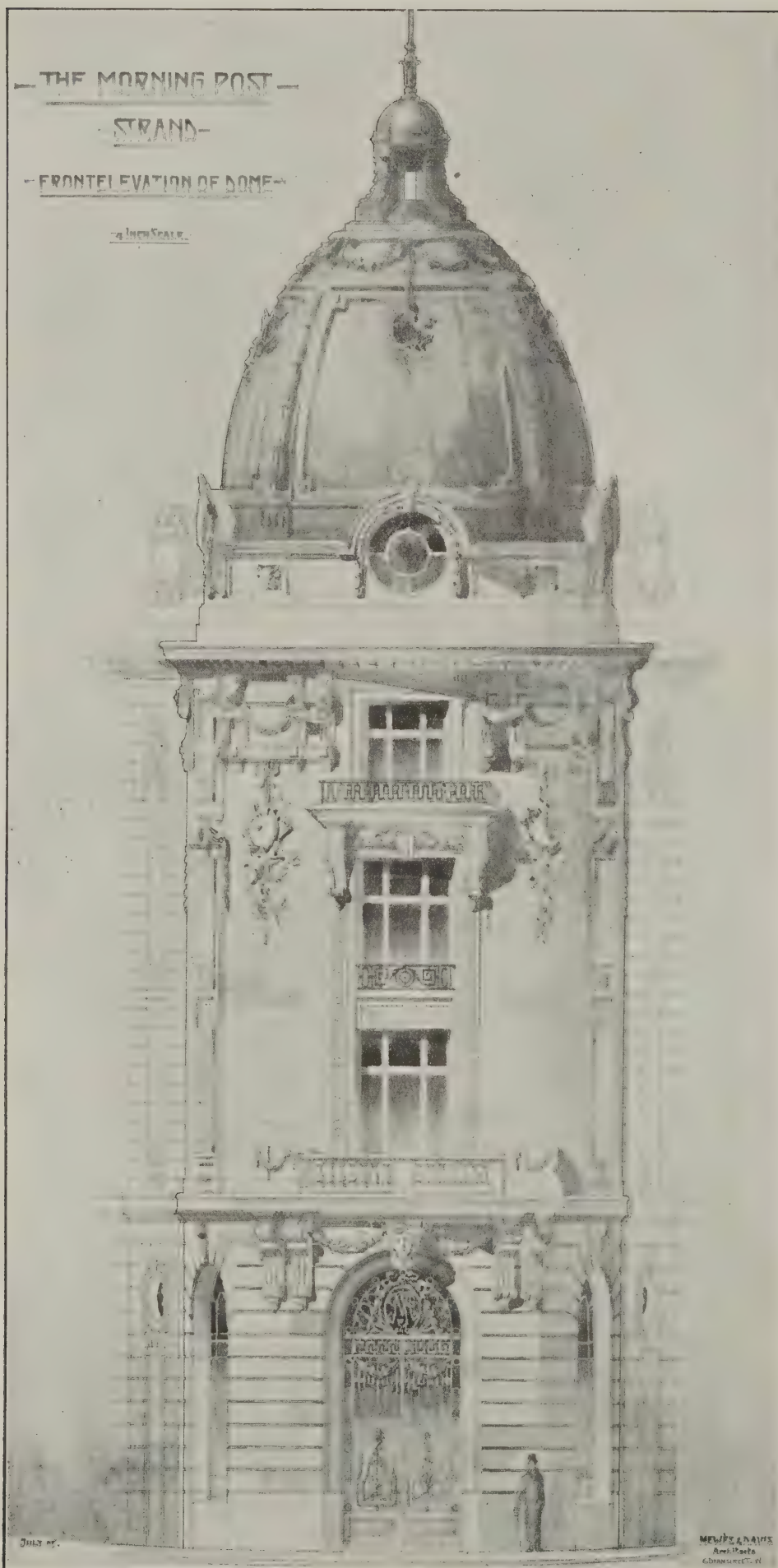
A new School at Sheffield, to accommodate 700 children, has been erected at a total cost of £15,220. It is a one-storey stone building, designed by Messrs. Holmes & Watson, of Sheffield.

A new Altar and Super-Altar in Holy Trinity Church, Tresillian, was dedicated recently. The altar is of carved oak, having the Agnus Dei in the centre, with alternate panels of vines and wheat on each side. The work was designed and carried out by Mr. Harry Hems, of Exeter.

New Schools at Dawpool, Cheshire, have been built to accommodate 104 children, with a master's residence attached. The main schoolroom is 50ft. by 22ft. and 20ft. high, with classroom 20ft. by 19ft. by 16ft. high. The building is faced with red bricks and terra-cotta, with red-tiled roofs, by Mr. Edwards, of Ruabon. Mr. J. Francis Doyle, of Liverpool, was the architect and Messrs. John Thomas & Sons, of Oxtou, were the builders.



OUR PLATES.



THE design for the new "Morning Post" building which is to be erected at the conjunction of the Aldwych crescent with the Strand has been prepared by Messrs. Mewès & Davis, architects, of 6, Dean Street, W. In the basement (see preceding page) will be the printing machinery. The principal feature of the ground floor, illustrated on page 79, is the large advertisement department, which is to be decorated in Louis Seize style. The first floor, the plan of which is also shown on page 79, will be occupied by the editorial offices, while the second and third floors are to be let out as offices. The fourth and fifth floors will be occupied by the composing department. The whole of the building will be of fire-resisting construction, on lines similar to those adopted at the Ritz Hotel. The three façades will be executed in grey Norwegian granite, to be supplied by Messrs. A. & F. Manuelle, of Gracechurch Street, E.C. The general contractors are the Waring White Building Co., who secured the job in a limited competition. The names of the tenderers and the various amounts are as follows:—

Pierce & Co., New York	-	£160,730
Foster & Dicksee	-	148,493
Trollope & Sons, Ltd.	-	845,850
Higgs & Hill	-	137,000
J. Carmichael	-	135,220
Holloway Brothers	-	132,400
Waring White Building Co.	-	129,279

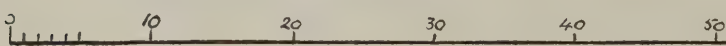
EGYPTIAN BRICKWORK.

EGYPTIAN brickwork was dealt with by Prof. Capper at the Manchester Municipal School of Technology last week. The Egyptians, he said, were masters of the art of brickwork. They were distinctly successful in adopting various expedients for the actual work of construction and for doing away with elaborate scaffolding. In the latter connection a rather ingenious theory had been advanced, namely, that it was the custom of Egyptian builders to erect their walls step-shape to the full height, and then working downwards to gradually fill up the spaces. This theory, he believed, was borne out by the appearance of the walls. A peculiar phenomenon in connection with many Egyptian walls also was the appearance of the curved lines or "sagging" in the brickwork. This, he said, had been attributed first to the fact that sunburnt bricks were employed instead of the kiln-made article, and, secondly, to the loose condition of the foundation. The Nile floods in all probability had also contributed to the "sag."

PHENE SPIERS TESTIMONIAL.

THE executive committee of this testimonial, having now closed their accounts, state that after paying all expenses there is a balance to the credit of the fund of £79, and that only 124 copies of "Architecture, East and West" remained unsold at Christmas last. The committee have handed over the balance of £79 to Mr. Spiers to deal with in any manner he thinks fit (though we understand that Mr. Spiers is going to devote the money to a useful architectural purpose), and have instructed Mr. Batsford to transfer the remainder of the edition of the book to Mr. Spiers' account. This settlement of the matter may be looked upon as highly satisfactory to all parties concerned.

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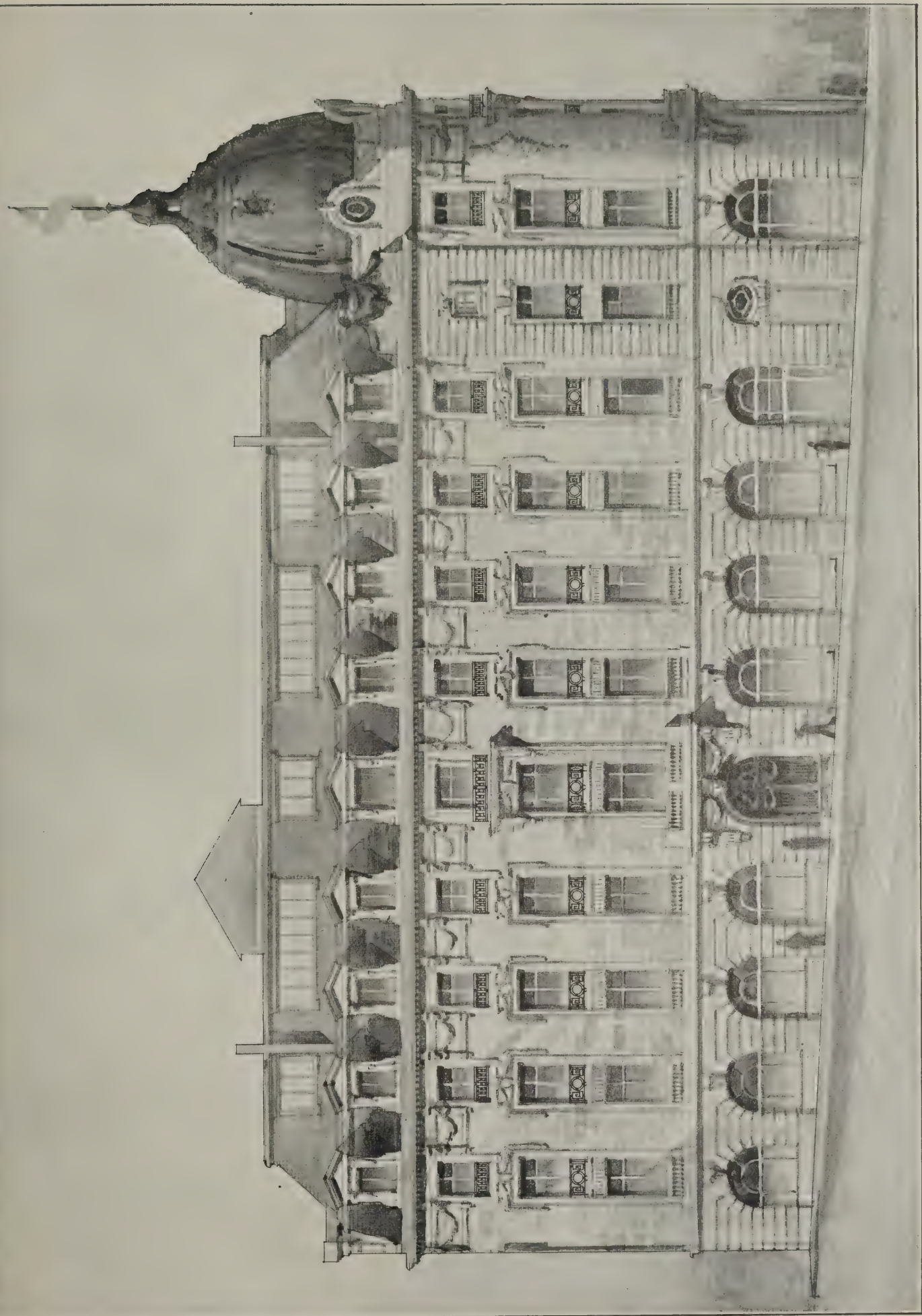


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THE NEW "MORNING POST" BUILDING LONDON: ELEVATION TO WELLINGTON STREET. MEWES AND DAVIS ARCHITECTS.

Notes and News.

The Year-Book of the Society of Architects for 1906 has just been issued, price 2s.

North-West Durham Master Builders' Association.—Mr. J. Eltringham has been elected president of this Association for the current year.

Sending-in Day for the next Academy.—Friday, March 30th, is the sending-in day for architectural works for the next Royal Academy exhibition, from 7 a.m. to 10 p.m. as hitherto.

The Carpenters' Company have arranged a series of lectures to be delivered at their hall in London Wall. Particulars as to dates and subjects will be found in our list of "Coming Events."

A new Cement, said to be waterproof, fire-proof, insoluble, a non-conductor of electricity and a substitute for white lead, has been invented by a Mr. C. W. Dopson. It is styled "Cæmentum."

Ilkley Town Hall.—The foundation-stones of the free library, public offices and assembly hall to be erected in Station Road, Ilkley, from designs by Mr. W. Bakewell, F.R.I.B.A., of Leeds, were laid on January 31st.

The removal of the Roof of Charing Cross Station, now proceeding regularly, involves taking down the thirteen principals, each weighing about 14 tons, twenty-four lattice girders, and eighteen purlins. Not the least difficult part of the work will be the removal of 85,000 sq. ft. of glass and zinc covering, weighing about 250 tons.

A Gigantic Hydraulic Testing Machine is being constructed by Messrs. W. & T. Avery, Ltd., for the Engineering Section of Birmingham University. It is designed for testing whole members of constructional work, such as complete girders, columns, roof principals, &c. The maximum capacity is 300 tons, the total length 70ft., and the weight of metal in the machine about 85 tons.

A.A. Students' Smoking Concert.—In the Georgian Hall of the Gaiety Restaurant last Friday a smoking concert was held by the students of the Architectural Association. A long and excellent programme was gone through, and not only was the evening very successful from a social standpoint, but as the outcome of it Mr. Wilfrid I. Travers, the hon. secretary, states that £15 will be handed over to the Architects' Benevolent Society.

The new North Riding County Council Building at Northallerton was formally opened last week. The building was illustrated in *THE BUILDERS' JOURNAL* for October 19th, 1904. Mr. Walter H. Brierley, F.S.A., of York, was the architect, and Messrs. J. Howe & Co., of West Hartlepool, were the contractors. The furnishings were carried out by Messrs. Goodall, Lamb & Heighway, of Manchester; and the electric-light fittings (designed by the architect) supplied by Messrs. Singer, of Frome. The total cost has been £33,000.

Welsh Slate Trade.—The foreign demand for slate has a little more brightness about it just now. Many causes are given for this. Some declare that it is temporary, and that it is due to the increased tariff which comes into force on the Continent in March. It is said that Germany proposes doubling the duty on foreign slate after March. The home demand, however, shows no improvement whatever. The question of prices hardly affects the sales at all, it being purely a matter of consumption. In fact, no improvement can be expected until the building trade sufficiently revives to embrace operations on a large scale and employment is more settled. Full time is being worked at all the quarries, except two or three of the small ones, but the number of men has been reduced in most of the works, whilst wages are 10 per cent. less than they were six months ago.

Commendatore Boni's Latest Investigations in the Roman Forum indicate that the Roman buildings of the first century are built of tiles, not bricks.

Mr. G. T. Forrest, of Wakefield, has been appointed architect to the Northumberland Education Committee at a salary of £250 per annum.

Mr. George Macfarlane, of the firm of Messrs. G. Macfarlane & Son, builders and contractors, Manchester, has been elected president of the National Federation of Building Trades' Employers of Great Britain and Ireland for the ensuing year.

The State Capitol at Albany, New York, which though not yet completed has cost £5,000,000, is in danger of collapse. There have been cracks in the walls for years, and the mammoth stone staircase and the entrances have recently been closed. There is a report that the entire building is settling.

The Cutting of Prices for Contracts.—At last week's annual dinner of the Bradford Master Builders' Association Mr. Paul Rhodes, president of the Yorkshire Federation of Building Trade Employers, said he hoped that something might be done by combination to put a stop to the senseless cutting of prices in contract work.

Payment of London District Surveyors by Salaries instead of by Fees.—This proposal of the Building Act Committee was discussed at last week's meeting of the London County Council, but, by fifty-nine votes to forty-nine, was referred back for further consideration. Full particulars of the scheme were given on p. 61 of our issue for last week.

"Builder's Baby," said Alderman Oddie at last week's meeting of the Blackburn Town Council, was the trade name for the irregular-shaped useless bits of land which were often left when building schemes were completed. One such piece had been offered to the Corporation for a recreation ground at twice the price asked for building purposes, but the council decided to await an amended offer.

A Museum of Irish Building Materials.—At the recent quarterly meeting of the Dublin Industrial Association reference was made in the secretary's report to the arrangements made by the Architectural Association of Ireland for starting a museum of building materials. This would be extremely useful to the building industry, and would serve as a trade exhibit to those whose desire it was to procure Irish building materials.

Great George Street Congregational Church, Liverpool, has been re-seated throughout with American oak seats of a specially comfortable character, and re-lighted, reheated and decorated throughout. The organ also has been renovated and decorated. Mr. J. Francis Doyle, of Liverpool, was the architect in charge of the work, the decorators being Messrs. S. R. Henshaw & Sons, of Liverpool.

Society of Engineers: President's Address.—Mr. Nicholas J. West delivered his presidential address to this Society on Monday evening. Reviewing the notable engineering achievements of the past year, he alluded to the erection of the bridge over the Victoria Falls in Rhodesia (by Sir Douglas Fox and partners), the boring of the Simplon Tunnel (which would shorten the distance between Calais and Milan by eighty miles), the enormous new dock at Salford, and the electrification of the Metropolitan and District Railway (the generating station for which, at Chelsea, was the largest of its kind in the world). Finally, he dealt with the question of engineering education, observing that the Institution of Civil Engineers were now moving in the matter, and as theirs was the opinion most likely to carry weight, they should be cordially supported by all engineers.

A new Episcopal Residence at Southwell is being built from designs by Mr. W. D. Caröe, F.R.I.B.A. The foundation-stone was laid last week by the Bishop of Southwell. The new house has been planned so as to incorporate the ancient hall which was restored by Bishop Trollope in 1884, as well as the old palace now in ruins.

A Scottish Garden City Scheme.—At the Greenock Dean of Guild Court last week Mr. Robert M'Alpine, railway contractor, made application for a warrant to proceed with the erection of four blocks of houses in the east end of Greenock. The plans provide for four single shops, twelve houses of three apartments, and 192 houses of two apartments, giving accommodation for about 1,000 persons in one large and three smaller blocks four storeys in height. The houses are intended for the working classes, and will be of advantage principally to artisans working in Port Glasgow.

New Infants' Schools at South Shields have been erected from designs by Mr. J. Walter Hanson, architect, of South Shields. The buildings are in Gilbert Street, and accommodate about 450 children. There is a central hall 71ft. by 26ft. by 19ft. high, with seven classrooms around, four of them being 23ft. 6ins. square, two 27ft. 10ins. by 19ft. 6ins., and one 21ft. by 23ft. The sanitary fittings have been supplied by Messrs. Adamsez, Ltd. Ventilation is on the plenum system by Mr. William Key, of Glasgow and London. The contractors for the schools were Messrs. Glen & Moffett, of Jarrow, the contract price being £5,516.

CONDITIONS OF CONTRACT.

SPEAKING last week at the annual dinner of the York Master-Builders' and Contractors' Association, Mr. F. Raney referred to the conditions of contract which had been adopted by the R.I.B.A. and the National Federation of Master-Builders. Whilst they agreed *in toto* to the principles laid down in that document, there was some slight difference of opinion as to the most suitable form which could be adopted for local requirements. Some of them felt that the agreements were drafted to meet the requirements of a section of the building traders who did not probably carry on their business on methods the same as was done in that locality. Locally, he and his colleagues would like to see a revision of that so as to have the conditions more adapted to local use, and he thought there should be a conference between them and representatives of the master-builders. One of the things that architects were agreed upon was that quantities should form part of the contract.

Federation in the Building Trade.

Mr. A. W. Sinclair, vice-president of the Yorkshire Federation of Master-Builders, congratulated the York master-builders in joining the larger federation eight years ago. Looking back, he wondered that so much had been done in that time for the building trade. They had now extraordinary power compared with what they had before they federated. During the last five years they had had no disputes of any moment, and the reason was that builders had become strong and powerful. There were about 3,600 builders in the Northern Counties Federation, and when occasion arose and the cause was a just one they acted in concert for their own rights. They repelled all unfair demands, and the men had been positively startled when they knew the power that was behind the employers. But it was one of the delightful things in connection with the federation that whilst they had great power, they had endeavoured to act fairly and squarely so far as they could with the men, realizing that what was good for one was good for the other.

R.I.B.A.

Royal Gold Medallist; President's Address to Students.

A MEETING of the Royal Institute of British Architects was held on Monday evening at 9, Conduit Street, W., the chair being occupied by the president, Mr. John Belcher, A.R.A.

Mr. Alex. Graham announced with regret the death of Mr. John P. Seddon, F.R.I.B.A., for many years a member of the council of the Institute and hon. secretary 1862-67. Mr. Seddon was 78 years of age. He was a Gothic architect who followed strictly in the school of Pugin. A vote of condolence and sympathy with his widow and family was passed.

It was announced that the council would submit the name of Sir Lawrence Alma-Tadema to His Majesty the King as the fit recipient of the Royal Gold Medal for 1906.

Criticisms of Students' Designs.

Mr. John W. Simpson, F.R.I.B.A., then read a criticism of the essays and drawings submitted for the Institute prizes and studentships this year. After observing that it would be valuable for the future if the sub-committees on whom the work of selection devolved were to have placed on permanent record their criticisms of each design submitted, Mr. Simpson said that as a whole the work sent in this year was of a high standard distinctly above the average.

For the essay prize six competitors had come forward, but the council were by no means satisfied with the literary quality of the work, which was not what it should be; this being perhaps due to the small amount of publicity the prize received. Mr. Simpson would not hazard as to how many of those present had ever read an Institute essay!

For the measured drawings prize both Mr. Coombes and Mr. Poley well deserved their success. Mr. Lovell's drawings, too, were careful, but the blacking-up of the full-size moulding profiles was to be regretted, as tints were preferable. Mr. Simpson took occasion to emphasize the importance of the choice of subject, and commended for study the splendid examples of Gothic to be found at our own doors. The need, moreover, was not for drawing only, but analysis of the design as well. The machine-like repetition of bricks in a wall and of sash bars in windows was to be deprecated.

In the Soane, Mr. George's fine production showed artistic qualities of a high degree, and was indeed the most learned parody of style we had had since Prof. Beresford Pite had startled us with his idea of what a Wesleyan club should be. Mr. Atkinson's design, honourably mentioned, was well drawn, but did not quite exhibit the necessary difference there should be between a public and a private building.

Mr. Gascoyne's studies for the Owen Jones were admirable and delicate renderings of Italian architecture, and the work of the other competitors was also very good.

For the Pugin, Mr. Drysdale had sent in delightful and effective sketches; indeed, all twelve entries were of a high standard.

Mr. Inigo Triggs had been successful for the Godwin Bursary, though there had been a doubt as to whether the laying-out of squares and public spaces might legitimately be counted as eligible for the prize.

Twenty-one designs had been sent in for the Tite, and of these the winning one, by Mr. Horsnell, was a really fine conception, though the drawing—more especially the pencil perspective—was unstudentlike and deficient.

Mr. Markham had been the sole competitor for the Arthur Cates prize, which he had won by good and honest work, while Mr. Nott's design for the Grissell was excellent. In this last connection Mr. Simpson remarked that

though this prize was primarily concerned with the study of construction, any construction which resulted in unlovely form was architecturally bad.

The president then delivered his address to students. Mr. Belcher said:—

I propose to put before you this evening a few suggestions as to the methods—or rather I should say, method—of constructive thought in design. As a matter of fact there is only one such method for any artist, whatever be the vehicle he choose to work in. The arts are all closely allied—at any rate in their methods—and the order of thought-development in each is one and the same. My friend Albert Gilbert, the sculptor, once insisted that there was another way, called

The "Fluke,"

and that he was sure from his observation a great many more designs were produced in that than in any other way. But surely this must be a libel! I will not venture on the statement that I have had no experience of that sort, but I am not anxious to talk about it, and it would not help you if I did. For the one thing the youthful aspirant needs most to have rubbed into him—in season and out of season, if necessary—is that without hard study and adequate thought he will never do anything really good.

The intelligent study of mental processes in design and the knowledge of the order of thought to be observed is not unimportant; for, though many follow this order instinctively and unconsciously, yet, seeing that our mental faculties are our armoury, it is good to know what weapons we have at our command and how and when to employ them.

I am not a philosopher—not even a psychologist; but I have observed and analysed mental processes both in myself and others; I have also gathered light from the analogy that exists in the arts generally—and so I hope that I may be able to say something on this point that will help you in your work. First of all, then, as a preliminary,

A Suitable Environment must be found.

Not necessarily a literal environment of persons, places and things, but at any rate of thought and mood. Environment is nowadays more a matter of character and temperament than of locality. Whithersoever a man betake himself it needs powers of self-government and mental concentration to escape the insistent shouts of commercialism and the prosaic business claims which are so apt to usurp an undue share of our attention. Yet, if the imagination is to be free for visions of beauty or even of dignity, if thought is to rise to the expression of noble purpose, the soul of the man must be able to take flight on occasion into the "serene" of the summer sky, leaving the earth and its cares to look after themselves for a time.

Psychologists tell us that moral education is dwarfed or even impossible unless a man has a certain amount of leisure time for the free play of his moral faculties. Certainly, too, the soul of the artist will perish within him unless he learn to withdraw himself at will into the higher realms of imaginative vision, where no sordid purpose or ignoble thought can live.

Given the right conditions, we may now proceed to analyse the working of thought in design. Let us remember, in the first place, that

Architecture "Speaks."

The power of speech—the noblest of gifts to man—is seen in all true art. In language words are symbols, and by their combination into sentences thought is conveyed, the punctuation of such sentences into primary and subordinate clauses, together with other qualities of proportion and rhythm, determining the value and relation of the several ideas expressed therein. Exactly the same in architecture—forms are combined to appeal

to the imagination and express purpose. One form of opening in a wall will convey the idea of ingress or egress, another the means of looking out or receiving light. This may be called the "simple sentence," or, if you like, the prose statement of architecture; but when we proceed to the higher forms of combination, to the moulding of these symbolic forms into sequences and rhythmic order, then we begin both to express and to appeal to the higher kind of poetical and imaginative thought.

The same laws or principles hold good for the work of the painter and sculptor, both these arts in their higher qualities possessing the power of conveying to and impressing upon the imagination much more than they actually portray.

In music we have the most ethereal medium for speaking to the heart of man. Just as poetry can convey more than prose, just as there are musical sounds too high-pitched for the ear of man to catch them, so there are thoughts and emotions "too deep for words"—for which music provides the only adequate vehicle of expression.

Architecture has been termed "frozen music." Like both music and poetry, it is subjective in its appeal; for the same arrangement of lines and colours will suggest fifty different things to fifty different persons. A fine and imaginative work will reveal to each individual some vein or mood of his own, and this above and beyond what was actually present in the mind and purpose of the architect. Every true work of art possesses an inherent energy which will sway the imagination of others and discover to them meanings of which the artist himself is unconscious.

The Imagination,

then, must be allowed a definite place both in the production of a design and in that reflection which it induces in the beholder.

A good design usually has a definite origin in a germ idea, from which, as from a bud unfolding itself, must be slowly and patiently evolved the true position and relation of the several objects and parts.

In connection with this process of evolution it is worth noting that in architecture as in language the most powerful effects are sometimes gained by the simplest means. That statement is strongest which is given in fewest words—provided the words be adequate and suitable. Why? Because the mind is quicker than the lips; because the imagination can picture more rapidly than words can paint. So in our art there are occasions when the dignified and simple statement is not only the most appropriate but also the most effective. Not that this kind of statement affords a ready escape from toil; dignity and simplicity come with experience and thought.

An essential element in the production of a design—whatever the idea and purpose of the work—is

"Feeling,"

by which either sympathy or repugnance is called into play. It is by feeling that an architect makes his selection and develops and encourages definite tastes of his own. Feeling is his own private artistic assessor, to judge in the competition of the many ideas and suggestions that present themselves before his mind's eye, as it were.

In the projection of a design on paper mental perspective plays an important part. Projected as it is on a plane surface, the relative distances of the several parts of a design can only be distinguished and appreciated at their proper value by an effort of thought. Time was, as you are doubtless well aware, when designs were produced in a kind of geometric perspective, that the author might see all round his subject; now we do this mentally or by developing each side simultaneously.

During the whole process of development

and selection the purpose of the work must be kept constantly in view, with the object of bringing out in stronger relief every feature and detail by which this purpose is to be conveyed.

The first "idea" relating to the purpose brings with it resemblances which stimulate the imagination. The interest thus awakened, backed by knowledge, provokes to further effort, in which original thought is both checked and stimulated by association and comparison, memory and imagination acting and re-acting on one another—both of them under the control of knowledge and recognized principles.

The Expansion of the Initial Thought will resemble the circling ripples produced by the stone thrown into still water—every advance leading on to some fresh development, some more extended idea.

With these expanding thoughts enter other considerations, such as questions of material and proportion of parts to the whole. Secondary causes also claim our attention as we proceed, viz., incidental local features and surroundings, contrasts, ornamentation, colour, texture, &c. These are the means which the thought of the designer marshals and controls to give expression to such intangible qualities as purpose, character, manner and disposition.

Architecture furnishes posterity—unconsciously, perhaps—with a picture of the prevailing manners, customs and conditions of life. More than that, it reveals, or it maybe betrays, the emotions and sentiments which have made each age famous or notorious. There are thoughts formulated ages ago which, having found expression in the work of the architect, are living forces to-day.

The student should be impressed with his responsibility, and so systematize his thoughts that his work may be a fitting and representative expression of the best thought of his day; for if he suffer his work to be infected with the haste and

Self-assertive Methods of Modern Life

these are bound to betray themselves in every line and detail of his design.

There is something much more subtle and mysterious in an architectural work than a mere orderly arrangement of materials. There is life and speech in it.

If a man's character may be read in his hand, certainly it may in his handiwork. The life may be noxious like that of a poisoned plant, or sweet and beautiful like that of a flower; or, again, it may resemble that of a noble tree—but life there is. The speech may be that of a Shelley or a Milton, or, on the other hand, of the most blatant type of "yellow" journal, but speak the architect's work must and will. It has a music, too, of its own—whether it be the music of one of Beethoven's sonatas or of the latest comic song.

When you realize this—and no one can be indeed an architect who does not realize it more or less—you will approach your work with that due sense of its dignity and importance in which alone you will be able to rise to the "height of the (proposed) argument"—if I may adapt one of Milton's phrases to my own purpose. A clear perception of the possibilities both of good and of evil that open before us when work is entrusted to us—in other words, a proper feeling of reverence—is indispensable if we would accomplish something noble or beautiful or even suited to its purpose.

If an architect is to speak truly—indeed, if he is to be coherent in his message—he must follow the recognized forms, the articulate phrasing, the grammatical order proper to his art. Thought-symbols, of whatever kind, are arranged in

Groups of Rhythmic Form

like musical phrases in relative keys. In architectural design this is effected by

divisional lines and grouping of parts, such divisions being regulated on principles akin to those which govern musical progression and a harmony built up of sounds.

Again, contrasts are obtained in music by the use of loud and soft passages, and effects by gradations of sound from pianissimo and fortissimo. So architecture makes use of "strength of tone," gradations being secured in this case by the measure or greatness of projections of the different parts; also by the varying plainness or delicacy of surface and detail.

I will not carry these analogies and definitions further. What I have already said is sufficient, I hope, to convince you that there are laws and principles governing good architecture, and that as nobody expects a harmony from a haphazard arrangement of musical notes, so neither will you do good work in your profession by chance combinations or random methods.

We have now come to a point when we can indeed analyse no further, for there is always

An Element of Mystery

in the best architecture—a sort of haunting personality that, ghostlike, vanishes just when we think we have it in our grasp.

This quality of "mystery"—so pre-eminent in Oriental buildings—is one to conjure with. Veiled under symbolic forms which hide as much as they reveal, it continually draws us on and as continually eludes us. The screening of parts provokes the mind to search further and deeper for that which is beyond the immediate range of vision.

Given the element of mystery—which is perhaps the "personal equation" of art—none but the trained mind can make effective use of it. The personal element is of little avail if we have not painstakingly learnt the methods and principles of our handicraft.

One of the commonest of pitfalls for youthful designers lies in certain fanciful ideas of originality. It is easy enough to be original after a fashion. Any mere novelty will serve to astonish or startle; but if we wish to appeal to the higher faculties we must be content to let our originality find expression within the lines on which those faculties themselves work.

The great German poet Goethe relates it as perhaps the greatest lesson of his early manhood—a sort of discovery that he made for himself, apparently—that if he would "find himself" and enter upon his inheritance he must recognize and submit to limitations. Originality does not involve a subversion of all that is orderly.

In music the gamut remains the same for one man as for another; certain combinations of sounds are pleasing, certain others displeasing, and will not change their character for anybody. So the architect can neither create new elements nor alter the emotional effects of combinations of elements; his hope lies in so training his powers of perception as that he can move freely and with a sure tread amongst the almost infinite variety of paths that open before him. Then he will find plenty of

Scope for Originality

without violating the canons of art or wandering into the realms of the unpleasing.

Sir Joshua Reynolds considered that "excellence is the direct result of trained perceptions." Certainly such perceptions are the foundation; any special powers or qualities that a young architect may be conscious of will find their place and expression at a later stage. You may rest assured they will not be thrust out or obscured; they will only shine all the more brightly for having submitted to limitations.

As I have said before, the character and mind of the designer will always reveal themselves in his work. The scholarly treatment of one man will appeal to the intellect, while the grace and charm which

distinguish another's work will rather sway the affections.

The highest achievement, seen only at rare intervals, lies in a combination of qualities well-balanced and under absolute control.

I have endeavoured this evening to show you that there is a certain order and development of thought in the evolution of a design.

Mere knowledge will not suffice. Something more is needed than a reproduction of the past or a mere application of mathematical formulæ. If a student labour with but little thought, he may attain to a dazzling skill, but he will neither stir the heart nor convince the mind. The search for the ideal lies ever upwards and onwards by the way of severe mental discipline. Let us remember, in the words of Philip James Bailey:—

We live in deeds, not years; in thoughts, not breaths;
In feelings, not in figures on a dial.
We do not live by heart-throbs; he lives most
Who feels most, thinks the noblest, acts the best.

A vote of thanks to the president for his address was proposed by Mr. Edmund Gosse and seconded by Prof. F. M. Simpson. Mr. Gosse divided into three classes the people who were or should be concerned with architecture—first, the large body who knew nothing about it and had not the smallest desire to know; secondly, that small division who had a love for architecture but no knowledge (in which division he counted himself); and, thirdly, the Fellows, Associates and Students of the Institute, who knew everything!

Mr. Belcher briefly replied, and announced that a special meeting would be held on February 13th, when a resolution would be put forward that a sum not exceeding £53,000 be spent on new premises for the Institute, including £15,900 for the site. The meeting then terminated.

THE LIVERPOOL TIMBER TRADE.

THE year opened with good prospects in the timber trade, owing to the continued activity in important trades of the northern counties which make large calls for timber. Building operations of a special kind, involving large contracts and a considerable use of timber for scaffolding and auxiliary work, were in progress in Liverpool and in the cotton manufacturing districts of Lancashire. Business, however, was interfered with somewhat by the elections. In Liverpool especially interest in the elections ran high. The disturbance arising from this cause followed the disturbance caused by the Dock Board election in December, in which the timber trade of Liverpool was interested through having a candidate, Mr. Holford Harrison, in the contest. The period of disturbance has therefore been of rather long duration. Yet business has had its vitality, and in spite of these distracting influences has gone on and has made a very fair start for the new year, all things being considered.

Among the later arrivals of timber have been consignments of prime whitewood boards, medium black walnut and wagon oak, by James Kennedy & Co., Ltd.; of pitch-pine planks, prime whitewood boards, walnut, elm and ash logs, pine deals, oak, battens, laths, &c., by Joseph Owen & Sons, Ltd.; of medium whitewood boards, tongued and grooved boards, oak planks and boards by John J. Swan; of teak logs, ash logs and boards by Remer & Co., Ltd.; of pitch-pine boards by Harrison, Robinson & Co.; of St. John's spruce and sawn pitch-pine by David Roberts, Son & Co., Ltd.; of St. John's spruce deals and scantling by C. Noel, Leigh & Co.; of white oak boards and medium walnut boards by James Kendall & Co.; and of whitewood boards, ebony,

lignum vitæ, hickory, &c., by Irvine & Sellars.

Mahogany.—The year opened with a much larger stock of African mahogany in hand at Liverpool than at the beginning of 1905, the stock of rin., stated in feet, being 999,000ft. At the beginning of 1903 the stock was only 295,000ft., but by the close of that year it had increased to 980,000ft. The year 1905 opened with 620,000ft. in hand, so that the present year began with a stock of African wood more than one-third greater than that held at the beginning of 1905. Next in quantity came Cuban wood, of which the stock amounted to 279,000ft. This is much the largest stock held at the beginning of any of the last four years, the stock at the beginning of last year being only 4,000ft. At the beginning of 1904 the stock was 134,000ft. The large stock of Cuban wood in hand on January 1st was due to the smaller consumption of this wood last year, and to the heavy importation in 1903-4. Of Mexican, Tobasco, Panama, Columbian and Nicaraguan woods the stocks on January 1st were light, totalling 62,000ft., which, however, was in excess of the stock held a year ago, when the total was but 25,000ft. Of St. Domingo wood a moderate stock of 4,000ft. was held at the beginning of the present year.

On January 25th Messrs. Alfred Dobell & Co. offered the large quantity of 931 logs of Lagos wood, of which 823, representing 587,052ft., were sold at prices ranging from 2½d. to 6d. and yielding an average price of 3½d. This wood was of good character and of useful sizes. A large number of African lots were sold, the prices per ft. super. ranging from 2d. to 1s. 6d. At their sale on the next day African sorts were again preponderant and brought prices ranging from 2½d. to 11d. per ft. super. The averages of the African lots ranged from 2½d. to 6½d. Some very fine St. Domingo wood was sold, among 550 logs of the class the record price of 2s. 5d. being paid for the choicest; four logs of Cuban were readily sold at 5½d. per ft. super.

The results of these first sales gave promise of active and satisfactory business in mahogany for the first quarter of the year.

Walnut.—The consumption of American walnut last year as nearly as possible equalled the quantity imported, but with the quantity brought forward from 1904 there remained a stock of 6,000 cub. ft. with which to begin the present year, this being 1,000ft. in excess of the quantity on hand at the beginning of 1905. The consumption of Italian and Circassian wood last year exceeded the importation, and the year closed practically without any stocks of these woods in hand. Cape Lopez wood, which was offered by auction on January 25th, brought from 2d. to 2½d. per ft. super. Furniture wood, offered as such at the same sale, brought 2d. per ft. super.

Teak.—The year opened with a stock in hand of 47,500 cub. ft. of wood, in logs and planks. A feature of last year's business in this wood was the coming forward of the large quantity of about 98,000 cub. ft. from Java, a new field of supply. Teak has sold more freely of late owing to the easier prices at which the wood has been obtainable. The increased interest shown in the wood has proved that more business may be done in it at prices which buyers regard as satisfactory.

Timber Trade Benevolent Society,

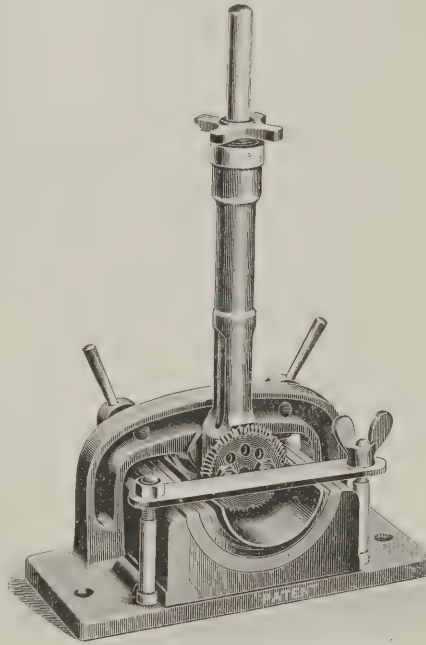
This society has found many warm supporters among members of the Liverpool timber trade, whose assistance has been afforded in different ways. The third annual concert in aid of the society was given in the Carlton Hall, Liverpool, on January 20th, and was well attended. Major William Taylor, treasurer of the Liverpool branch, presided. Mr. Alfred Dobell, president of the branch; Mr. J. Griffin, vice-president; Mr. John H.

Ashton, president of the Manchester branch; Mr. W. Oughtred, vice-president; and Mr. J. W. Burton, London, were among the company present. The local subscription list was stated to amount to £230.

Trade and Craft.

For Cutting Iron Gutters.

We call to mind, as an instance of the conservatism of British manufacturers, a recent case where an exceedingly novel tool for cutting boilers was introduced by an American agent; but although the traditional method of cutting with a file and a hammer and chisel is so laborious and slow, this particular agent experienced the greatest difficulty in getting makers to adopt, or even to consider, his patent tool. Instances of a similar kind might be repeated without number, for, as a nation, we are singularly tenacious of established methods, and singularly slow to adopt innovations. Maybe Messrs. Charles Winn & Co., of St. Thomas's Works, Granville Street, Birmingham, have experienced this in regard to the patent cutter for cast-iron gutters which they have introduced. Yet this tool should be of the greatest service to builders and others. From the accompanying illustration it will be seen to consist primarily of a hollow box-saddle, a cutter, and a handle



THE GRANVILLE GUTTER CUTTER.

for operating the cutter. The saddle is capable of taking the largest size gutter, and lose half-round packing pieces are supplied for dealing with the smaller sizes. The cutter is circular and is reversible to four different cutting positions, thereby being equal to four separate cutters. A spring is provided in the sleeve which carries the cutter to allow the latter to ride or lift over the hard places which are frequently found in cast-iron gutters. To operate the machine the gutter is laid in the half-round pads or rests, and fixed in position by means of two cams on the one side and by a strap with wing nut on the other side. The cutter is then fed down to its work by the star wheel in the handle until sufficient cut is put on, and then by working the handle backwards and forwards the gutter is cut through, the tool operating both on the forward and the backward movement. With this machine (the cost of which is 70s.) gutters can be cut square and clean without breakage, and not only is time saved by its use, but odd or broken pieces of gutter can thus be cut and sold instead of being scrapped.

Current Market Prices

FORAGE.

		£	s.	d.	£	s.	d.
Beans	... per qr.	1	13	0	1	15	0
Clover, best	... per load	3	12	0	4	0	0
Hay, good	... do.	3	5	0	3	17	0
Sainfoin mixture	... do.	3	5	0	3	15	0
Straw	... do.	1	8	0	1	14	0

OILS AND PAINTS.

Castor Oil, French	... per cwt.	1	10	0	1	2	0
Colza Oil, English	... do.	1	5	6	—	—	—
Copperas	... per ton	2	0	0	—	—	—
Lard Oil	... per cwt.	2	15	0	2	17	0
Lead, white, ground, carbonate	... per ton	16	0	0	—	—	—
Do. red	... do.	15	0	0	0	19	0
Linseed Oil, barrels	... per cwt.	1	1	9	—	—	—
Petroleum, American	... per gal.	0	0	5½	0	0	6½
Do. Russian	... do.	0	0	5½	0	0	5½
Pitch	... per barrel	0	8	0	—	—	—
Shellac, orange	... per cwt.	9	18	0	—	—	—
Soda, crystals	... per ton	3	2	6	3	5	0
Tallow, Town	... per cwt.	1	7	0	1	7	6
Tar, Stockholm	... per barrel	1	5	0	—	—	—
Turpentine	... per cwt.	2	7	3	—	—	—

METALS.

Copper, sheet, strong	... per ton	93	0	0	—	—	—
Iron, Staffs., bar	... do.	7	5	0	9	0	0
Do. Galvanized Corrugated sheet	... do.	12	7	6	12	10	0
Lead, pig, Soft Foreign	... do.	16	7	6	16	10	6
Do. do. English common brands	... do.	16	17	6	—	—	—
Do. sheet English, 3lb. per sq. ft. and upwards	... do.	18	0	0	—	—	—
Do. pipe	... do.	18	10	0	—	—	—
Nails, cut clasp, 3in. to 6in.	... do.	9	5	0	—	—	—
Do. floor brads	... do.	9	0	0	—	—	—
Steel, Staffs., Girders and Angles	... do.	7	0	0	7	5	0
Do. do. Mild bars	... do.	7	5	0	7	10	0
Tin, Foreign	... do.	167	2	6	167	12	6
Do. English ingots	... do.	16	10	0	170	0	0
Zinc, sheets, Silesian	... do.	31	5	0	—	—	—
Do. do. Vieille Montagne	... do.	31	15	0	—	—	—
Do. Spelter	... do.	26	17	6	27	5	0

TIMBER.

SOFT WOODS.

Fir, Dantzic and Memel	... per load	2	15	0	5	0	0
Pine, Quebec, Yellow	... do.	4	2	6	7	10	0
Do. Pitch, American	... do.	2	19	0	5	0	0
Laths, log, Dantzic	... per cu. ft.	4	0	0	6	0	0
Deals, Kovda, Yellow, 3rd, 3×9	... per std.	11	5	0	—	—	—
Do. Skelleftea, Yellow, 4th, 3×9	... do.	11	0	0	—	—	—
Do. Archangel, White, 2nd, 3×9	... do.	10	10	0	—	—	—
Do. St. Petersburg, Yellow, 1st, 3×9	... do.	11	5	0	—	—	—
Do. do. do. 2nd, 3×9	... do.	9	15	0	10	0	0
Do. do. White, Unsorted, 2½×7	... do.	8	5	0	—	—	—
Do. Quebec, Yellow Pine, 1st, 3×9	... do.	23	0	0	—	—	—
Do. Nederkalix and Lulea, Yellow, 1st, 3×7	... do.	10	10	0	—	—	—
Do. Gefle, Yellow, 3×4	... do.	6	12	6	—	—	—
Battens, all kinds	... do.	6	10	0	9	10	0
Flooring Boards rin. prepared, 1st...	... per square	0	11	0	0	12	0
Do. 2nd	... do.	0	9	3	0	10	3
Do. 3rd, &c.	... do.	0	7	6	0	9	9

HARD WOODS.

Ash, Quebec	... per load	4	0	0	7	15	0
Birch, New Brunswick	... do.	2	7	6	4	10	0
Do. Quebec do.	... do.	2	12	6	5	0	0
Box, Turkey	... per ton	7	0	0	10	0	0
Cedar, Cuba	... per ft. sup.	0	0	3	0	0	4
Do. Honduras	... do.	0	0	7½	—	—	—
Do. Tobasco	... do.	0	0	58	—	—	—
Do. Brazilian	... do.	0	0	4½	—	—	—
Elm, Quebec	... per load	4	5	0	8	10	0
Jarrah, plank	... per ft. cu.	0	2	6	0	3	0
Mahogany, Average Price for Cargo, Honduras	... per ft. sup.	0	0	4½	0	0	5½
Do. Tobasco	... do.	0	0	5½	—	—	—
Do. Cuba	... do.	0	0	11½	—	—	—
Do. African	... do.	0	0	38	—	—	—
Do. Lagos	... do.	0	0	3½	—	—	—
Oak, Wainscot	... per log.	3	15	0	7	5	0
Teak, Indian, logs	... per load	10	0	0	19	0	0
Do. do. planks	... do.	13	0	0	20	0	0
Whitewood, American, logs	... per ft. cu.	0	1	3	0	1	6
Do. do. planks and boards	... do.	0	1	3	0	3	0

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Engineer & Sanitary Specialist,



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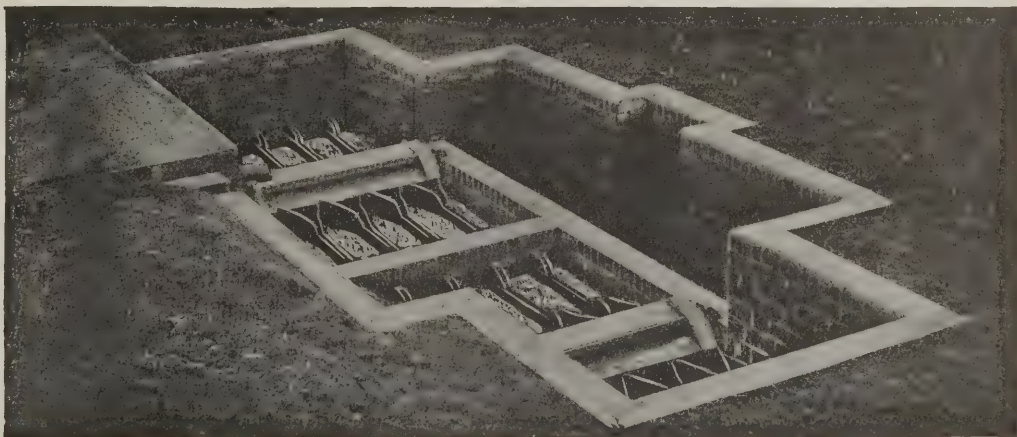
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Tenders.

Addressed postcards on which lists of tenders may be stated will be sent post free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Fetter Lane, E.C. Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Gayton.—For additions to infirmary and for works of drainage and water-supply at the workhouse, Gayton, for the Guardians of Freebridge Lynn Union. Mr. L. F. Engleton, architect, King Street, King's Lynn. Quantities by architect:—

P. Bone, Sutton Bridge	... ..	£1,746	8	0
R. H. Spragg, Grimston	... ..	1,638	2	0
J. J. Bone, King's Lynn	... ..	1,531	9	0
Dye & Allen, King's Lynn	... ..	1,495	0	0
H. Hands & Son, Wisbech	... ..	1,492	11	0
Read & Wildbur, King's Lynn	... ..	1,450	0	0
Renant Brothers, King's Lynn	... ..	1,449	5	0
J. Medwell, King's Lynn	... ..	1,430	0	0
Tash & Langley, King's Lynn	... ..	1,429	5	0
A. F. Foreman, King's Lynn	... ..	1,424	17	6
H. W. Barnes & Co., King's Lynn	... ..	1,335	10	0

* Accepted.

London, S.E.—For the erection of the new Wesleyan East End Mission Centre, Commercial Road, Stepney, E. Messrs. West, Burrows & Weir, architects and surveyors, 17, Victoria Street, Westminster:—

	A.	B.
T. Rider & Son	... £35,956	... £512 ... £557
George Trollope & Sons, and Colls & Sons, Ltd.	... 33,100	... 580 ... 500
F. G. Minter	... 32,987	... 675 ... 437
J. Carmichael	... 32,648	... 566 ... 490
W. Johnson & Co.	... 32,398	... 390 ... 485
George Parker	... 31,387	... 462 ... 465

A. For Portland stone. B. For shop fronts.

London, S.E.—For the erection of twelve maisonnettes at West Norwood. Mr. Philip Stock, surveyor, Coldharbour Lane, Brixton, S.W.:—

E. P. Bulled & Co., Croydon	... ..	£4,953
F. Kinnaird, North Brixton	... ..	4,800
J. Smart, Brixton Hill	... ..	4,678
S. R. Spinner, New Malden	... ..	3,920
R. Dean & Co., Croydon	... ..	3,900
J. Barker & Co., Kensington	... ..	3,737
L. Harris, London, E.C.	... ..	3,690
T. B. Campion, Walthamstow	... ..	3,450
Leader Building Co., London, W.	... ..	3,240
B. & A. Gale, Old Kent Road	... ..	3,119
W. Roberts, West Croydon	... ..	3,000
G. Everitt, Croydon	... ..	2,995
Marriott & Salter, Caterham Valley	... ..	2,937
J. P. Keen, Streatham	... ..	2,880
E. Saunders, Lambeth	... ..	2,850
Hall & Jacobs, Sydenham	... ..	2,723

* Accepted.

London, S.E.—For the erection of a new sorting office at Forest Hill, for H.M. Office of Works, &c.:—

Wright & Hurst	... ..	£3,462	0	0
A. W. Coombs	... ..	3,339	18	0
F. W. Green	... ..	3,300	0	0
T. R. Roberts & Co.	... ..	3,228	0	0
A. Black & Son	... ..	3,119	0	0
W. Mills	... ..	2,995	0	0
J. Garrett & Son	... ..	2,942	0	0
H. Leney & Son	... ..	2,940	0	0
J. D. Leng	... ..	2,930	0	0
J. E. Saunders	... ..	2,900	0	0
H. Groves	... ..	2,774	0	0
J. Shelbourne & Co.	... ..	2,766	0	0
J. C. Bowyer	... ..	2,758	0	0
Grace & Marsh	... ..	2,739	0	0
Martin, Wells & Co.	... ..	2,750	0	0
C. Ansell	... ..	2,737	0	0
J. W. Drake	... ..	2,726	0	0
B. E. Nightingale	... ..	2,703	0	0
B. Colby & Sons	... ..	2,695	0	0
E. Streather	... ..	2,691	0	0
Galbraith Brothers	... ..	2,650	0	0
Edwards & Medway	... ..	2,649	0	0
W. H. Hyde	... ..	2,618	10	0
G. E. Everitt	... ..	2,568	0	0
W. Taylor & Co.	... ..	2,547	0	0
F. & G. Foster	... ..	2,498	0	0
J. Barker & Co.*	... ..	2,474	0	0

* Accepted.

Newcastle-on-Tyne.—Recommended for acceptance for a new pavilion for women at the workhouse, for the Guardians:—

E. T. George £1,180
In lieu of tender from J. Arundel's executors, withdrawn.

Preston.—Accepted for the erection of a public elementary school in Roebuck Street, for the Corporation:—

T. Cottam, Preston	£6,350
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River.—For the erection of an infants' school at Common Lane, River, near Dover, for the Town Council. Mr. Henry E. Stilgoe, M.I.C.E., surveyor, Maison Dieu House, Biggin Street, Dover:—

J. S. Ovenden	... ..	£1,904	7	11
R. & G. Brisley	... ..	1,900	0	0
W. S. Long	... ..	1,880	13	4
Hayward & Paramor	... ..	1,839	0	0
J. Morgan	... ..	1,747	9	6
G. Lewis & Sons	... ..	1,688	0	0
W. H. Grigg	... ..	1,644	0	0
G. Munro*	... ..	1,614	0	0

* Accepted. [All of Dover.]

Sutton.—For the erection of a new infants' school, for the Education Committee. Messrs. A. Wickham & Frank A. Richards, M.A., architects, 36, Victoria Street, London, S.W.:—

Mitchell Brothers	... ..	£5,000
J. J. Pink	... ..	4,987
Crosby & Co.	... ..	4,916

R. J. Humphris	... ..	£4,852
R. Wood & Son	... ..	4,817
Martin, Wells & Co.	... ..	4,565
Drowley & Co.	... ..	4,511
J. B. Potter	... ..	4,488
J. & M. Patrick	... ..	4,458
G. Kemp	... ..	4,432
F. J. Shopland	... ..	4,423
Hawkins & Co.	... ..	4,121
R. Jones & Son	... ..	3,990

Swindon.—For the erection of a new county court, for H.M. Office of Works, &c.:—

J. Long & Sons	... ..	£6,800	0	0
Stephens, Bastow & Co.	... ..	6,642	0	0
Hayward & Wooster	... ..	6,487	0	0
D. Davies & Sons	... ..	6,440	0	0
R. Wilkins & Sons	... ..	6,165	0	0
G. Moore	... ..	6,028	0	0
H. Flint	... ..	5,967	0	0
H. & C. Spackman	... ..	5,885	0	0
W. Jones	... ..	5,880	0	0
G. H. Gibson	... ..	5,238	0	0
A. J. Colborne	... ..	5,199	10	0
J. G. Norman, 62, Victoria Road, Swindon	... ..	5,084	0	0

Wigan.—For the construction of an underground convenience, for the Corporation:—

J. Fletcher, Dobbes Fold, Wallgate	... ..	£2,251	0	0
Webster & Winstanley, Wallgate	... ..	2,250	0	0
R. M. Nally & Son, Wigan Lane	... ..	2,220	10	0
T. & H. Houghton, Warrington Road, Pemberton, Wigan	... ..	2,155	7	0
J. Wilson & Co., Caroline Street	... ..	2,040	0	0
D. A. Ablett, Sovereign Road	... ..	2,040	0	0

* Accepted.

New Companies.

NEWHOLM BRICKWORKS, LTD. Capital: £1,000.

BLAKEY, MORRIS & CO., LTD., painters, paperhangers, &c. Capital: £2,000.

FRYERS, LTD., to adopt agreements with W. J. Fryer and A. de Lissa, and to carry on the business of decorators, painters, &c. Capital: £30,000.

JAMES WALKER SYKES & SON, LTD., to acquire the business of joiners, builders, contractors and timber merchants carried on at Huddersfield by T. Sykes. Capital: £5,000.

Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

DURING THE WEEK ending February 2nd twenty-six failures in the building and timber trades in England and Wales were gazetted.

F. W. GILL, builder, Thornton Heath. R.O. Jan. 23rd.

J. HARRIS, carpenter, Horsley. R.O. Jan. 27th.

R. BALDWIN, builder, Birmingham. Adj. Jan. 24th.

H. NUTTER, painter and decorator, Bradford, P.E., Bradford C.C., Feb. 14th, at 10.

G. SNOWDEN, painter and decorator, Rotherham. Adj. Jan. 23rd.

H. WOOD, builder, Winchmore Hill. Liabilities £87,826; estimated surplus in assets £13,530.

H. B. SOUTHERN, builder, Bolton. Liabilities £1,783; assets £446.

F. J. FRENCH, builder, Bexley. Liabilities £81; deficiency £52.

HAINES & UPSDALE, builders, London, E. Liabilities £5,062.

E. HARRISON, builder and contractor, Whittington Moor. Adj. Jan. 25th.

E. ELLIS, plasterer, Gloucester. P.E., Shirehall, Gloucester, Feb. 27th, at 12.

E. BARROW, painter and decorator, Earlestown. P.E., Warrington C.C., March 2nd, at 11.

H. E. TILLEY, painter and decorator, Market Harborough. R.O. Jan. 26th.

W. BUTT, builder and contractor, London, E.C. Adj. Jan. 22nd.

MARSHALL & Co., builders, London, W.C. Adj. Jan. 22nd.

J. R. DILKS, painter and paperhanger, Tutbury. First meeting, O.R.'s, Derby, Feb. 7th, at 11.30. P.E., Burton-on-Trent C.C., Feb. 14th, at 12.

J. PARR, builder, West Norwood. First meeting, London Bankruptcy Court, Feb. 8th, at 12. P.E., same, March 16th, at 11.30.

J. SIMPSON, builder, Camberwell. First meeting, London Bankruptcy Court, Feb. 12th, at 12. P.E., same, March 6th, at 11.30.

R. W. BRAYLEY, builder, Mumbles. First meeting, O.R.'s, Swansea, Feb. 9th, at 11.30. P.E., Swansea Town Hall, Feb. 16th, at 11.30.

T. NIXON, builder, London, E.C. Liabilities £953. The assets, estimated to produce £1,316, had only realized £51.

G. H. SMITEN, carpenter and builder, Bristol. First meeting, O.R.'s, Bristol, Feb. 7th, at 11.30. P.E., Bristol Guildhall, March 9th, at 12.

F. W. CHATBURN, builder and contractor, Forest Hill. First meeting, 115, High Street, Rochester, Feb. 5th, at 12. P.E., Rochester C.C., Feb. 5th, at 2.30.

W. WINNARD, contractor, Wigan and Southport. First meeting, O.R.'s, Liverpool, Feb. 15th, at 3. P.E., Wigan C.C., Feb. 20th, at 2.15.

Coming Events.

Wednesday, February 7.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Mr. A. R. Myers on "Theory of Construction," at 8 p.m. (Associates' Paper).

NORTHERN ARCHITECTURAL ASSOCIATION.—Council Meeting at 5 p.m.

Thursday, February 8.

ROYAL ACADEMY.—Mr. T. G. Jackson, R.A., on "Reason in Architecture."

MANCHESTER SOCIETY OF ARCHITECTS.—Mr. Alfred E. Corbett, A.R.I.B.A., on "Fire-resisting Construction," at 6.45 p.m.

Friday, February 9.

ARCHITECTURAL ASSOCIATION.—Rev. G. H. Wes on "Differences between English and French Gothic Art," at 7.30 p.m.

INSTITUTION OF CIVIL ENGINEERS (Students' Meeting).—Mr. R. H. Mackie on "Electric Driving at the Locomotive Works of the North London Railway," at 8 p.m.

GLASGOW TECHNICAL COLLEGE ARCHITECTURAL CRAFTSMEN'S SOCIETY.—Mr. James Flett on "Practical Points in Works Inspection," at 8 p.m.

Saturday, February 10.

NORTH OF ENGLAND INSTITUTE OF MINING AND MECHANICAL ENGINEERS.—General Meeting at 2 p.m.

GLASGOW TECHNICAL COLLEGE ARCHITECTURAL CRAFTSMEN'S SOCIETY.—Visit to University Extensions, at 3 p.m.

ARCHITECTURAL ASSOCIATION.—Second Spring Visit to Waring & Gillow's new premises in Oxford Street, at 2 p.m.

Monday, February 12.

SURVEYORS' INSTITUTION.—Ordinary Meeting at 8 p.m.

ROYAL ACADEMY.—Mr. T. G. Jackson, R.A., on "Reason in Architecture."

Tuesday, February 13.

MANCHESTER SOCIETY OF ARCHITECTS.—Mr. Potter to open a debate on "The Advantages of Competitions," at 6.30 p.m.

Wednesday, February 14.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Baillie W. Fraser Dobie on "The Aesthetic Duty of a Corporation to a City," at 8 p.m.

NORTHERN ARCHITECTURAL ASSOCIATION.—Mr. J. B. Mitchell-Withers on "Early Eighteenth-century Architecture," at 7.30 p.m.

Thursday, February 15.

ROYAL ACADEMY.—Mr. T. G. Jackson, R.A., on "Reason in Architecture."

BIRMINGHAM BUILDERS' EXCHANGE.—Mr. F. C. Whittall on "The Housing Problem," at 6 p.m.

WORSHPFUL COMPANY OF CARPENTERS.—Rev. W. Marshall on "Some Points of Architectural Interest in our Parish Churches," at 8 p.m.

Friday, February 16.

INSTITUTION OF MECHANICAL ENGINEERS.—Ordinary Meeting at 8 p.m.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—Mr. Percy S. Worthington on "Homes of the Monks during the Middle Ages."

Monday, February 19.

SURVEYORS' INSTITUTION (Junior Meeting).—Papers on "The Management of Urban Property," at 7 p.m.

ROYAL ACADEMY.—Mr. W. R. Colton, A.R.A., on "Enthusiasm in the Pursuit of Sculpture."

ROYAL INSTITUTE OF BRITISH ARCHITECTS.—Mr. E. Guy Dawber on "Furniture," at 8 p.m.

LIVERPOOL ARCHITECTURAL SOCIETY.—Display of Lantern Slides, and Discussion.

Tuesday, February 20.

ARCHITECTURAL ASSOCIATION OF IRELAND.—Mr. P. J. Lynch on "Holiday Rambles with a Camera," at 8 p.m.

Wednesday, February 21.

SURVEYORS' INSTITUTION.—Annual Dinner at 7 p.m.

Thursday, February 22.

ROYAL ACADEMY.—Mr. W. R. Colton, A.R.A., on "The Rough-hewed and the Imitation of Life."

Friday, February 23.

ARCHITECTURAL ASSOCIATION.—Mr. F. T. Baggallay on "Porches and Approaches," at 7.30 p.m.

ARCHITECTURAL ASSOCIATION CAMERA AND CYCLING CLUB.—Mr. J. A. Gotch on "A Chat on Renaissance Architecture," at 7.30 p.m.

Monday, February 26.

ROYAL ACADEMY.—Mr. W. Goscombe John, A.R.A., on "Modern Sculpture."

SURVEYORS' INSTITUTION.—Ordinary General Meeting at 8 p.m.

Tuesday, February 27.

MANCHESTER SOCIETY OF ARCHITECTS.—Debate. Mr. Blumh to move "That Recent Restorations are destroying the Architectural Beauty of our Old Buildings," at 6.30 p.m.

Wednesday, February 28.

NORTHERN ARCHITECTURAL ASSOCIATION.—Mr. G. A. T. Middleton on "Continental, Romanesque and Gothic Detail," at 7.30 p.m.

Thursday, March 1.

ROYAL ACADEMY.—Sir William Richmond, R.A., on "The Evolution of Sculpture—Egypt and Greece."

Monday, March 5.

ROYAL ACADEMY.—Sir William Richmond, R.A., on "The Evolution of Sculpture—Egypt and Greece."

Thursday, March 8.

ROYAL ACADEMY.—Sir William Richmond, R.A., on "The Evolution of Sculpture—Egypt and Greece."

Complete List of Contracts Open.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:			
Feb. 8	Haughley—Classroom, &c.	Managers	H. G. Bishop, Architect, Bury Street, Stowmarket.
8	Ton Pentre—Chapel	Trustees	T. A. Thomas, Ton Foundry, Ton Pentre, Wales.
8	Chelmsford—Cottages		F. Whitmore, Architect, 73 Duke Street, Chelmsford.
9	Warrington—School	Education Committee	Wright, Garnett & Wright, Architects, 45 Sankey Street, Warrington.
9	Nelson—Church	Methodists	Ford & Slater, Architects, Overhouse Chambers, Burslem.
9	Larne—Cottage		S. P. Close, Architect, Donegal Square Buildings, Belfast.
9	Barnoldswick—Shops	Co-operative Society	Co-operative Society, Barnoldswick, via Colne.
9	Middleton—Conveniences	Corporation	W. Welburn, Town Hall, Middleton.
9	Glyndyfrdwy—Chapel, &c.	Baptists	R. Price, Holly Cottage, Glyndyfrdwy, Llangollen.
10	Glynne—School	Education Committee	Graham Balfour, Education Offices, Stafford.
10	Blackburn—Lime, Bricks and Cement	Corporation	W. Stubbs, Borough Engineer, Municipal Offices, Blackburn.
12	Brettenham—School		A. Ainsworth Hunt, Architect, Sudbury, Suffolk.
12	Cheshunt—Hospital	Urban District Council	A. C. Lee, Clerk to Council, Manor House, Cheshunt.
12	Dykebar—Asylum	Lunacy Board	T. Graham Abercrombie, Architect, County Place, Paisley.
12	Northwich—Building Materials	Trustees	J. A. Saner, Engineer, Weaver Navigation, Northwich.
12	London, N.W.—Lime, Cement, Bricks, &c.	Borough Council	W. Nisbet Blair, Borough Engineer, Town Hall, Pancras Road, N.W.
12	Brighton—School	Education Committee	T. Simpson & Son, Surveyors, 15 and 17 Ship Street, Brighton.
12	Nottingham—Stone Wall	Corporation	Frank B. Lewis, City Architect, Guildhall, Nottingham.
12	Chelmsford—High School		F. Wykeham Chancellor, Architect, Chelmsford.
13	Yarmouth—Additions		C. C. Doig, Architect, Elgin.
13	Reedyford and Peppermint—Widening Bridges, &c.	Bridges Committee	County Bridgmaster's Office, Preston.
13	Golborne—Enlargement of Organ Chamber	Parish Church	The Rectory, Golborne.
13	Fleetwood—School	Education Committee	H. Littler, Architect, 16 Ribblesdale Place, Preston.
13	Boreland—Rebuilding Bridge	District Committee	Paterson, Road Surveyor, Beattock.
14	Dublin—Mortuary, &c.	Guardians	J. O'Neill, Clerk, North Brunswick Street, Dublin.
14	London, N.W.—Workhouse Buildings	Guardians	North, Croft, Neighbour & Nicholson, 9 Regent Street, S.W.
14	Enfield—Additional Storey	Guardians	Stuart Hill, Architect, 106 Cannon Street, E.C.
14	Blaenavon—Alterations to School	Education Committee	H. J. Griggs, Architect, Newport, Mon.
14	Broomhall—Alterations, &c.	Education Committee	H. Beswick, County Architect, Newgate Street, Chester.
14	Froxfield—School	Education Committee	C. S. Adye, County Surveyor, Trowbridge, Wilts.
14	London, S.E.—Portland Cement, Bricks, &c.	Borough Council	Town Clerk, Town Hall, Spa Road, S.E.
15	Wolverhampton—Lime	Sewerage Committee	W. Clifford, Sewage Outfall Works, Wolverhampton.
15	Woolwich—Cement	Borough Council	J. Rush Dixon, Borough Engineer, Town Hall, Woolwich.
15	Droylsden—Two Schools	Education Committee	H. Littler, Architect, 16 Ribblesdale Place, Preston.
15	Ystrad Mynach—Additions to Church	Rev. H. Thomas	E. M. Bruce Vaughan, Architect, Cardiff.
17	London, E.—Bricks, Lime, &c.	Borough Council	Borough Engineer, Municipal Offices, Whitechapel, E.
17	Bedford—Extension	County Council	W. H. Leete, County Architect, Shire Hall, Bedford.
17	Portsmouth—Extension	Guardians	C. W. Bevis, Architect, Elm Grove Chambers, Southsea.
17	Beckenham—Bricks, Cement, &c.	Urban District Council	F. Stevens, Clerk, Council Offices, Beckenham.
19	St. Albans—School Additions, &c.	County Council	Urban A. Smith, County Surveyor, Hatfield.
20	Worcester—Post-office Enlargement	H.M. Office of Works	Secretary, H.M. Office of Works, Storey's Gate, S.W.
20	London, N.E.—Bricks, Lime, Portland Cement, &c.	Borough Council	Borough Engineer and Surveyor, Town Hall, Bethnal Green.
22	Cardiff—Superstructure	University College	J. Austin Jenkins, Registrar, University College, Cardiff.
22	Cheltenham—School	Education Committee	Chatters & Smithson, Architects, 17 Regent Street, Cheltenham.
26	Bradford—Pump-room, &c.	Guardians	F. Holland, Architect, 11 Parkinson's Chambers, Hustlergate, Bradford.
27	Whitworth—Bakery	Co-operative Society	T. F. Wood, Secretary, Co-operative Society, Whitworth.
No date	Dublin—Lime, &c.	Irish Constabulary	Commandant's Office, R.I.C. Depot, Phoenix Park, Dublin.
"	Eaton—Church and Offices	Trustees	A. E. Lambert, Architect, 22 Park Row, Nottingham.
"	Long Eaton—Stores	Co-operative Society	E. R. Ridgway, Architect, Long Eaton.
ENGINEERING:			
Feb. 8	London, E.C.—Girder Bridges	Assam-Bengal Railway	F. A. Lyall, Secretary, Bishopsgate House, 56 Bishopsgate Street Within, E.C.
8	Wigan—Drying Apparatus	Guardians	Master, Workhouse, Frog Lane, Wigan.
8	Newtownbarry—Water-supply Works	Rural District Council	Rural District Council Offices, Newtownbarry, Ireland.
9	Dublin—Sewage Liming Station	Improvements Committee	G. Chatterton, Engineer, 6 The Sanctuary, Westminster, S.W.
9	Rome—Harbour	Ministry of Public Works	Ministry of Public Works, Rome, Italy.
9	Bordeaux—Harbour		Préfecture de la Gironde, Bordeaux, France.
10	Leicester—Boilers	Lighting Committee	A. Colson, Engineer, Millstone Lane, Leicester.
12	Cleethorpes—Fountain	Urban District Council	E. Rushton, Engineer, Cleethorpes.
12	Hull—Telephone Equipment	Town Council	A. R. Bennett, Queen Anne's Chambers, Westminster, London, S.W.
12	Glasgow—Electrical Cable, &c.	Trustees	G. H. Baxton, Engineer, 16 Robertson Street, Glasgow.
12	Epsom—Gas-engines, &c.	Urban District Council	W. Vaux Graham, Engineer, 5 Queen Anne's Gate, Westminster, S.W.
12	Porthacwl—Reservoir, &c.	Urban District Council	J. Taylor, Sons & Santo Crimp, Engineers, 27 Great George Street, Westminster, S.W.
12	Barnes—Steam Dynamo and Switchboard	Urban District Council	C. S. Davidson, Engineer, Electricity Works, High St., Mortlake, S.W.
13	Pontypridd—Steam Dynamo	Urban District Council	J. Colenso Jones, Clerk, Council Offices, Pontypridd.
14	Stockport—Retort Benches	Gas Committee	S. Meunier, Engineer, Portwood Gasworks, Stockport.
15	Newport—Lift	Guardians	Master, Workhouse, Newport, Mon.
16	Antwerp—Heating Apparatus	Theatre	Hotel de Villa, Antwerp.
16	Cardiff—Cooling Towers	Corporation	A. Ellis, Engineer, Central Offices, The Hayes, Cardiff.
16	Ingatstone—Waterworks	Rural District Council	J. Dewhurst, Engineer, Avenue Chambers, Market Road, Chelmsford.
16	Dundee—Filter Beds, &c.	Water Commissioners	G. Baxter, Engineer and Manager, 93 Commercial Street, Dundee.
17	Arlon—Drainage		M. Hermans, Chief Engineer, Arlon.
20	London, S.W.—Gas-engines	County Council	Maurice Fitzmaurice, Chief Engineer, County Hall, Spring Gardens, S.W.
20	Rotherham—Retorts, &c.	Gasworks Committee	J. S. Naylor, Engineer, Gasworks, Rotherham.
21	Cwm Dimbath—Reservoir	Water Co.	Togarmah Rees, Engineer, Corn Exchange Chambers, Newport.

[Continued on p. xvi.]

PERFECTION

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Appointments Wanted.

The charge for Advertisements under this heading is 1s. 6d. per insertion not exceeding four lines, and 6d. per line afterward, prepaid. Three insertions may be had for the price of two. Advertisements must reach the Office not later than 5 o'clock on Monday.

A JUNIOR ASSISTANT (21) requires ENGAGEMENT; just completed articles; neat draughtsman and tracer; good constructionist.—R., 73, Wool Exchange, Coleman Street, City. 1634

ADVERTISER (27) desires ENGAGEMENT in Architect's office or superintendence on gentleman's estate. Building experience. Ten years as draughtsman, leveller. Good references.—TEMPLE, Graham Road, Wimbledon. 1600

ARCHITECT & SURVEYOR'S ASSISTANT DISENGAGED. Sixteen years' varied experience in town and country. Eight years last appointment.—H., The Cottage, Northstoke, near Bath. 1621

ARCHITECT'S JUNIOR ASSISTANT (20), good draughtsman and colourist, five years' London experience. Salary 30s.—S. A. T., 43, Chestnut Avenue, Forest Gate, E. 1623

ARCHITECTURAL ASSISTANT seeks immediate ENGAGEMENT.—Three years' London with previous Colonial experience. Two guineas. Good references.—Box 1625, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

ARCHITECT'S ASSISTANT (25) DISENGAGED. Nine years' experience. Good draughtsman, designs, working drawings, details, &c. London or country.—W. A. N., 46, St. Augustine's Road, Camden Square, N.W. 1578

ARCHITECT'S ASSISTANT, five years' experience; first-class draughtsman, thorough knowledge of construction.—Box 1618, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

ARCHITECT'S ASSISTANT.—Working drawings, details, specification, perspectives, measuring, &c.; five years' experience.—Box 1586, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

ARCHITECT'S ASSISTANT desires ENGAGEMENT for year or two with view to future partnership; country town preferred.—Box 1587, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

ARCHITECT'S ASSISTANT (23) wishes to enter London office as IMPROVER. Good references, unsalaried probation.—Box 1606, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

ARCHITECT and SURVEYOR'S ASSISTANT desires ENGAGEMENT; 12 years' experience, town and country; good draughtsman, working and detail drawings, surveys, specifications, and general routine; moderate salary.—A. R., 25, Rusham Road, Egham. 1605

ARCHITECT and SURVEYOR'S ASSISTANT (good) desires engagement. Design, working and detail drawings. Surveying and levelling.—A. B., 3, Huntsmoor Road, East Hill, Wandsworth, S.W. 1616

ARCHITECT and SURVEYOR'S ASSISTANT seeks re-engagement; four years' sound experience in general office work; excellent testimonials; willing to commence for moderate salary.—C. E. L., Station Road, Ashburton, S. Devon. 1576

ARCHITECT and SURVEYOR'S COMPETENT ASSISTANT (25) requires engagement. Working drawings, details, specifications, land surveying, &c.; practical experience; excellent references.—Apply Box 1575, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

ARCHITECT and SURVEYOR'S JUNIOR ASSISTANT (24) disengaged. Five years' experience working drawings, details, surveying. First-class advanced construction. Good references. Moderate salary.—E. E. M., 6, Womersley Road, Crouch End, N. 1607

BUILDER'S and DECORATOR'S MANAGING GENERAL FOREMAN; good refs.; used to City and West End work; age 40.—L., c/o Hawbridge, 14, Water Lane, Stratford, E. 1631

BUILDER'S ASSISTANT DISENGAGED. Quantities, abstracting, billing, good office routine, business inside and out; practical experience; excellent references as to character and ability; abstainer; moderate salary.—P. TOWNSEND, Great Missenden. 1593

BUILDER'S ASSISTANT desires re-engagement. Nineteen years' experience. Drawing, quantities, measuring up, levelling; land surveying, supervision of operations, &c.—L. J. G., 88, Adelaide Road, Shepherd's Bush, W. 1572

BUILDER'S CLERK (22) seeks ENGAGEMENT; seven years' experience; book-keeping and office routine, neat tracing, quantities, and estimates; good refs.—B. G., 19, London Road, Neath, South Wales. 1585

BUILDER'S SON (30) desires RE-ENGAGEMENT as General Foreman or Management of Estate. Life experience in London, Midlands, and the South. Splendid references; eight building construction certificates. Abstainer, competent, energetic, of good address, and capable of improving a business.—Box 1581, BUILDERS' JOURNAL Office, 6 Great New Street, Fetter Lane, E.C.

BUILDER'S SMITH and FITTER (26) seeks JOB; eight years in last yard; abstainer; plain and ornamental; gas and hot-water.—L. W., 139, Cornwall Road, Bayswater. 1594

CABINETMAKER (General) seeks situation. Fifteen years' experience, best class work. Excellent references.—R. S., 5, Clarence Street, Islington.

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GENERAL FOREMAN seeks RE-ENGAGEMENT. Town or country. New or alterations. Thoroughly practical in all branches. First-class references. Age 39. Carpenter and joiner.—HOUGHTON, 36, Bywater Street, King's Road, S.W. 1598

GENERAL FOREMAN (disengaged), capable, good manager of Labour, thoroughly practical in all branches, age 45. Carpenter and joiner by trade; good references.—B., 4, Eythorn Rd., Brixton, S.W. 1617

GENERAL or WORKING FOREMAN (41) seeks RE-ENGAGEMENT; trade, bricklayer; well up in all branches; good manager of men.—Address, 16, Chelmsford Road, Walthamstow, Essex. 1613

JUNIOR DRAUGHTSMAN (18) desires RE-ENGAGEMENT with an Architect. Four years' experience. Moderate salary.—W. M., 107, High Street, Stratford, E. 1626

JUNIOR ASSISTANT (21) requires ENGAGEMENT; just completed articles; neat draughtsman and tracer; good constructionist.—R., 73, Wool Exchange, Coleman Street, City. 1595

MACHINIST seeks RE-ENGAGEMENT to take charge and work any class of wood-working machinery. Steam or gas engines. Ten years last situation, excellent reference.—HERBERT, 42, Selhurst Road, South Norwood, S.E. 1591

PAPERHANGER, PAINTER, &c. Thoroughly experienced. If piecework, can estimate for new or old work, with or without materials; if daywork, good colourist and manager.—Address, PAPERHANGER, 162, Walm er Road, Notting Hill. 1614

PLUMBER, reliable, wants JOB; well up in sanitary work and lead-laying, or jobbing; any distance; wages moderate for constancy.—A. S., 7, Ludwick Road, New Cross, S.E. 1602

QUANTITIES.—Surveyor, with London office, prepares Quantities, Estimates, Variations, &c. Terms by arrangement.—Box 1468, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

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JUNIOR ASSISTANT WANTED, with good knowledge of Shorthand and use of Smith Premier Typewriter and Drawing.—Apply to H. T. JENKINS & SON, The Marble Works, Torquay.

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THE SOCIETY OF ARCHITECTS.

An EXAMINATION to qualify for MEMBERSHIP will be held on APRIL 10th, 11th, and 12th, 1906.

SYLLABUS on application to the SECRETARY, at Staple Inn Buildings, Holborn, W.C.

Telegrams: "Crypt, London." Telephone: 1852, Holborn.

THE ARCHITECTURAL ASSOCIATION

FEBRUARY 9th.—Ordinary General Meeting, at No. 18, Tufton Street, Westminster, S.W. Paper by Rev. G. H. WEST, D.D., A.R.I.B.A. on "The Differences between English and French Gothic Art, illustrated with lantern views, 7.30 p.m.

FEBRUARY 10th.—Second Spring Visit, to Messrs. Waring & Gillow's new premises, Oxford Street. Mr. R. Frank Atkinson, Architect. Members to meet at the building at 2 p.m.

H. TANNER, JUNR., } Hon. Secs.
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Particulars of the Solicitors, Messrs. MILLS, CURRY & GASKELL, 11, Queen Victoria Street, E.C., and of the Auctioneers, 8, Moorgate Street, E.C., and 2, New Kent Road, S.E.

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THE TITLE PAGE

AND

INDEX FOR VOL. XXII.

(July to December, 1905)

OF

THE BUILDERS' JOURNAL

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Competitions Open.

UNIVERSITY COLLEGE OF NORTH WALES, BANGOR.

The Council will shortly invite a limited number of Architects to submit COMPETITIVE DESIGNS for the Permanent Buildings of the College. Architects who desire their names to be considered by the Council in selecting their list may send particulars of work already designed or executed by them to the undersigned (from whom further particulars may be obtained) before MARCH 1st next.

JOHN EDWARD LLOYD, M.A.,
Bangor, Secretary and Registrar.
January 24th, 1906.

Contracts Open.

HERTFORDSHIRE COUNTY COUNCIL.

GARDEN FIELDS COUNTY COUNCIL SCHOOL, ST. ALBANS.

The Education Committee are prepared to receive TENDERS for the carrying out of ADDITIONS and ALTERATIONS to the Garden Fields County Council School, St. Albans.

Persons desirous of tendering for the work may see the Drawings, Specification, Agreement, &c., at the County Surveyor's Office, Hatfield, on and after Monday, February 5th, 1906, between the hours of 10 a.m. and 4 p.m., except on Saturday, when they will be on view from 10 a.m. to 12 noon.

A copy of the Schedule of Works and Prices (Quantities), and a Form of Tender, can be obtained at the County Surveyor's Office upon payment of Two Guineas, which sum will be returned to the tenderer upon receipt of a bonâ fide tender and the documents which have been supplied to him.

Sealed tenders, endorsed "Tender for alterations and additions to Garden Fields C.C. School, St. Albans," must be delivered to the undersigned at his Offices not later than 5 p.m. on MONDAY, February 19th, 1906.

Such security for the due execution of the works as the Council may require must be given by the Contractor. The lowest or any tender will not necessarily be accepted.

URBAN A. SMITH,
County Surveyor.

County Surveyor's Office, Hatfield,
26th January, 1906.

CHELTENHAM EDUCATION COMMITTEE.

TO BUILDERS.

Tenders are invited for the ERECTION of new SCHOOL BUILDINGS, to accommodate 1,100 children, for the Naunton Park District of Cheltenham, in accordance with Plans, Specifications, and Conditions of Contract, to be seen at the Offices of Messrs. CHATTERS and SMITHSON, Architects, 17, Regent St., Cheltenham.

Early application is requested for bills of quantities, which will be supplied by the Architects upon receipt of a deposit of £2 2s., to be returned upon receiving a bonâ fide Tender.

Tenders, sealed and endorsed, must be delivered to the undersigned by TWELVE o'clock, on THURSDAY, the 22nd FEBRUARY next.

No pledge is given by the Committee to accept the lowest or any tender.

WILLIAM PRESTON,
Education Offices, Secretary.
Rodney Road, Cheltenham.

EMPLOYMENT REGISTER.

Too late for Classification.

- 1621.—ARCHITECT and SURVEYOR'S ASSISTANT; 16 yrs. exp.; town and country; 8 yrs. last berth.
- 1622.—SHOP FOREMAN OF JOINERS; practical and energetic.
- 1623.—ARCHITECT'S JUNIOR ASSISTANT (20); good draughtsman and colourist; 5 yrs. London exp.; sal. 30s.
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- 1631.—BUILDER'S AND DECORATOR'S MANAGING GENERAL FOREMAN; good refs.; City and West-end work; age 40.
- 1634.—JUNIOR ASSISTANT (21); good draughtsman, tracer, and constructionist; just completed articles.

See p. xx for the Employment Register.

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"	2	Sunderland—Feed-pump, Cooling-tower, &c.	Corporation... ..	J. F. C. Snell, Borough Electrical Engineer, Town Hall, Sunderland.
"	15	Antwerp—Sluice	—	M. Pierrot, Directeur des Ponts et Chaussées, Marché au Blé de Zélande, Antwerp.
"	15	Pretoria—Refuse-destroyer	Municipality	Mosenthal, Sons & Co., 72 Basinghall Street, London, E.C.
April	2	Valparaiso—Port Improvements... ..	—	Minister of Finance, Santiago.
May	1	Talcahuano, Chili—Dock	—	Direccion de Material, Valparaiso.
IRON AND STEEL:				
Feb.	8	Dublin—Ironmongery	Board of Public Works	H. Williams, Office of Public Works, Dublin.
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"	8	London, E.C.—Wrought-iron, Steel Tires, &c.	G.I.P. Railway Co.	J. I. Berry, Secretary, 48 Copthall Avenue, E.C.
"	9	Stettin—Steel Wire Rope, &c.	Harbour Authorities	Die Kgl. Hafenbauinspektion, Swinemünde.
"	10	Blackburn—Iron Castings, Tools, &c.	Corporation... ..	W. Stubbs, Borough Engineer, Municipal Offices, Blackburn.
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"	12	Manchester—Ventilating Grids, &c.	Corporation... ..	H. Prescott, Manager, House Drainage Dept., Town Hall, Manchester.
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"	12	London, N.W.—Ironmongery, Tools, &c.	Borough Council	W. Nisbet Blair, Borough Engineer, Town Hall, Pancras Road, N.W.
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"	15	Woolwich—Sewer Ironwork, &c.	Borough Council	J. Rush Dixon, Engineer, Town Hall, Woolwich.
"	15	London, E.C.—Steel Material, Tools, &c.	Bombay, Baroda and Central India Railway Co.	T. W. Wood, Secretary, Gloucester House, Bishopsgate Street Without, E.C.
"	16	Christiania—Water-Pipes	—	Commercial Intelligence Branch, Board of Trade, Basinghall St., E.C.
"	19	Beckenham—Ironwork	Urban District Council	F. Stevens, Clerk, Council Offices, Beckenham.
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No date		Kalk Bay, Cape Colony—Mains	—	Staley, Rodford & Co., 2 Fenchurch Avenue, E.C.
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Feb.	8	Keighley—Painting	Working Men's Club	Curator, Working Men's Club, Hanover Street, Keighley.
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[Continued on p. xviii.

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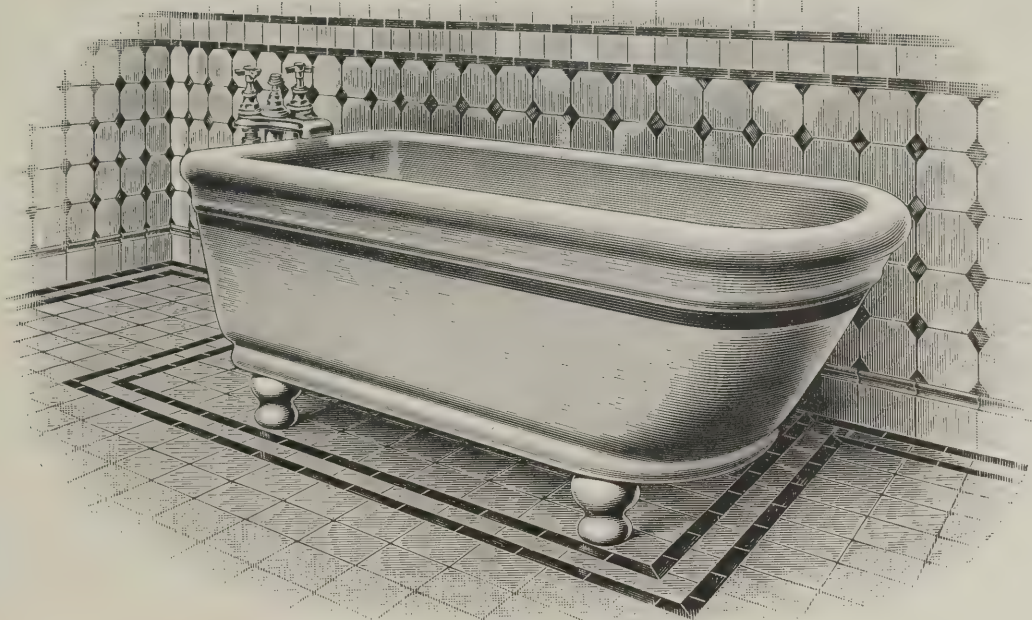
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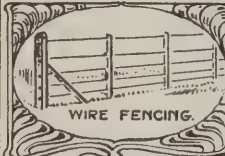
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Feb. 8	Islington—New Street	Trustees	H. Porter, Surveyor, 16 Russell Square, W.C.
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" 12	Bulcamp—Granite Blocks	Guardians	H. A. Mullens, Clerk, Bulcamp, Halesworth.
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" 19	Bredford—Paving, Flagging, &c.	Corporation	City Surveyor's Office, Town Hall, Bradford.
" 21	Aylesbury—Granite	County Council	R. J. Thomas, County Surveyor, County Hall, Aylesbury.
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" 21	South Shields—In Situ Concrete	Corporation	E. E. Burgess, Borough Surveyor, Chapter Row, South Shields.
" 27	Southall—Making-up	Urban District Council	R. Brown, Engineer, Council Offices, Southall.
No date	Winchester—Stone	County Council	County Surveyor, The Castle, Winchester.
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" 10	Guildford—Sewerage Works	Town Council	C. G. Mason, Borough Engineer, Guildford.
" 10	Northfleet—L. trines	Education Committee	F. Mitchell, 49 Windmill Street, Gravesend.
" 10	Blackburn—Earthenware Pipes, &c.	Corporation	W. Stubbs, Borough Engineer, Municipal Offices, Blackburn.
" 10	Blackburn—Sewerage and Private Drainage Works	Corporation	W. Stubbs, Borough Engineer, Municipal Offices, Blackburn.
" 10	Aubervilliers—Sewers	Corporation	Secretary to Mayoralty, Bureau 6, Town Hall, Aubervilliers, France.
" 12	London, N.W.—Drainage Works, &c.	Urban District Council	S. Slater Grimley, Engineer, Council Offices, Hendon.
" 12	London, N.W.—Stoneware Pipes, &c.	Borough Council	W. Nisbet Blair, Engineer, Town Hall, Pancras Road, N.W.
" 12	Leek—Scavenging	Rural District Council	J. Morris Shaw, Clerk, Union Offices, Leek.
" 14	London, S.W.—Removal of Refuse	Commissioners	Lodge, Park Square West, Regent's Park.
" 14	London, W.—Pipes, Gulleys, &c.	Urban District Council	J. Barclay, Surveyor, Town Hall, Chiswick.
" 15	Duffield—Sewerage Works	Rural District Council	R. Lowcock & Phelps, 50 Queen Ann's Gate, Westminster, S.W.
" 15	Woolwich—Drain Pipes, &c.	Borough Council	J. Rush Dixon, Borough Engineer, Town Hall, Woolwich.
" 19	Beckenham—Disinfectants and Stoneware Goods	Urban District Council	F. Stevens, Clerk, Council Offices, Beckenham.
" 20	Forsmouth—Urinals	Corporation	Borough Engineer, Town Hall, Portsmouth.
" 20	London, N.E.—Drain Pipes, &c.	Borough Council	Borough Engineer, Town Hall, Bethnal Green, N.E.
No date	Woolton—Sewers	Corporation	Peter Davies, 8 Cook Street, Liverpool.
TIMBER:			
Feb. 10	Blackburn—Timber	Corporation	W. Stubbs, Borough Engineer, Municipal Offices, Blackburn.
" 12	Salford—Timber	Tramways Committee	General Manager, Tramway Offices, 32 Blackfriars Street, Salford.
" 12	London, N.W.—Timber	Borough Council	W. Nisbet Blair, Town Hall, Pancras Road, N.W.
" 14	London, S.E.—Hardwood Blocks and Timber	Borough Council	F. Ryall, Town Clerk, Town Hall, Spa Road, S.E.
" 15	Woolwich—Timber	Borough Council	J. Rush Dixon, Engineer, Town Hall, Woolwich.

List of Competitions Open.


DATE OF DELIVERY.	DESIGNS REQUIRED.	AMOUNT OF PREMIUM.	DEPOSIT REQUIRED FOR CONDITIONS, &c.	FROM WHOM PARTICULARS MAY BE OBTAINED.
Feb. 15	Wrexham—Schools (W. E. Willink, Assessor) ..	£50, £30	—	Clerk to Education Committee, Wrexham.
Mar. 12	Greenock—School	—	—	A. F. Niven, Municipal Buildings, Greenock.
" 20	Bangor—Free Library	£25 and £15	—	W. H. Worrall, Municipal Offices, Bangor, North Wales.
" 24	Swadincote—Free Library	£25, £15, £10	—	W. A. Musson, Clerk, Council Offices, Swadincote.
" 31	Birmingham—Council House Extension (Sketch Plans).	—	£1 is.	Town Clerk, Council House, Birmingham.




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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

February 14, 1906. Vol. 23, No. 575.

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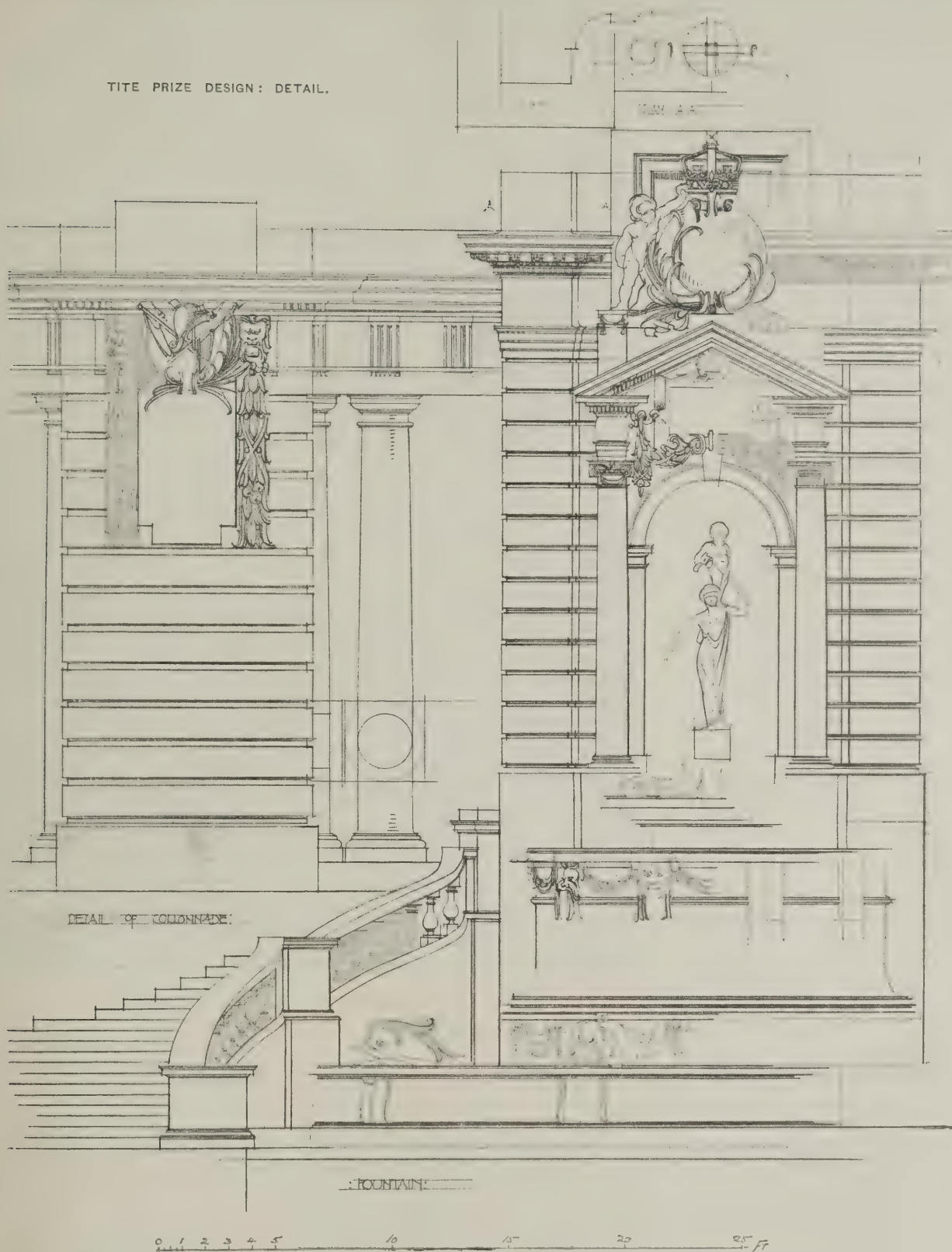
The Ghost. A FRENCH sculptor, M. Paul Nocquet, who won the Prix de Rome in 1900, has been agitating recently against the employment of "ghosts" by sculptors. It must seem rather strange to us that sculptors should employ ghosts, but of course in France sculpture is much more largely used than it is here. M. Nocquet states that many sculptors are not the authors of the works they are commissioned to do, although they sign their own names to them, and he desires "to determine clearly who among those that claim the appellation of sculptors are real and sincere artists, and who are merely business men." This reminds us of the fact that the architectural profession also possesses its ghosts to a much greater

extent than the sculptor's profession. There are undoubtedly many draughtsmen in architects' offices who carry out the entire work for which the business man receives the credit. A few of these business architects could not make a creditable drawing to save their lives, nor understand the construction of the buildings ascribed to them. The only saving clause is that architects do not sign their buildings here, and the majority of such office-manufactured works are not of merit enough to leave any posthumous credit to the head of the office that designs them. For those few draughtsmen who are of great ability and undertake the work with the utmost sincerity we have sympathy, and we condemn the system which does not allow their names even to appear as part-creators of the work. But there is another side to the question, which we think ought to be considered by draughtsmen who are only too ready to relieve their chief of any share in the work, and that because he does not put pencil to paper for every detail for which they are responsible. The fact is architectural design has become much more complicated, and architects of large buildings are now required to possess business ability and power of organization not generally characteristic of men of artistic temperament. On a large job it is impossible for any man to carry out in the short time at his disposal all the detail drawings, or even thoroughly to supervise them. He must leave a good deal to the draughtsmen, who, after all, do little more than the masons of the Gothic age. If the architect can go so far as to prepare the $\frac{1}{8}$ -scale drawings he is in a fortunate position, but we would not deprive anyone of the title of architect who did not even put his pencil to paper throughout the designing of a building. The case of Mr. Richardson, the great American architect, is one in point. He suffered from continual ill-health, and on that account often only made rough sketches of the mass and general lay-out of a plan. This he talked over and gave to his chief draughtsman, who came to his bedroom and then went away to carry out the idea as best he could, bringing it back to his chief for criticism. Richardson often kept him busy for hours rubbing out before he was satisfied. He also had other draughtsmen and an outside superintendent or superior clerk of works, but the fact that Richardson was the architect and not his assistants was clearly shown after his death, because not a single member of his office (which split up) ever executed a building that had any suggestion of being strong or of the same character as that done in Richardson's lifetime, although they copied his style as nearly as possible because it happened to be the fashion. Of course we may go so far as to say that the work of Richardson was really the product of a school, but we think he was rather more than the nominal head: that it was his

critical ability and power of impressing upon his assistants his ideas and methods that were responsible for the remarkably fine work he turned out. There are architects to-day whose methods are very similar. They may employ draughtsmen whose hand can be seen in their work, but it is tempered and refined by their presiding genius. Architects now require a large staff of draughtsmen and many assistants, and the architect himself needs to have considerable business tact and the power of organization and supervision of the details. He need not be such a master of every special branch of construction as the particular assistants to whom he relegates these branches, nor need he be as fine a draughtsman as many of those he employs, but his all-round abilities in planning and organization must be recognized as superior to any one of his assistants, many of whom could not secure and undertake such large jobs even if they had the opportunity. The practice followed in the States in the case of firms of architects who have large works in hand is, however, worthy of adoption in this country, namely, to associate the names of the chief men responsible. Some of these offices of associated architects have three names—the first being that of the dominant business partner, who deals with the clients, secures the work and generally receives all instructions and organizes the office; the second name that of the more artistic partner, who is responsible for the design in consultation with the business architect; while the third is the one who attends to the carrying-out of the work and the engineering side.

Competition Design by Proxy. ATTENTION was called to another variety of the employment of ghosts at the last annual convention of the American Institute of Architects, when the committee on competitions presented a report in which they reprehended a practice "which becomes more and more popular in some cities." This practice appears to be that of "employing skilled men only for and during competitions for the special purpose of designing and preparing plans to win." The committee assert that they have heard—they do not say "known"—of instances "where competition experts were employed to take charge of the office, evolve the plan, make the design and superintend the preparation of all drawings, while the architect knew little of what was going on"! This sort of thing is not altogether unknown in this country, but there does not seem to be any means of putting a stop to it other than the remedy in the hands of the draughtsmen themselves; for if they have the ability to win competitions for their employers, they have it also for themselves. If they fail when standing alone, then it must be recognized that the assistance they receive from their employers is more than monetary.

TITE PRIZE DESIGN: DETAIL.



their baths as ordinary buildings with the roof removed. Viewed from outside they might be casinos, town halls or any other public buildings.

"Fiat Lux" sends end elevations which are absolutely ecclesiastic in character, though his treatment of the bath with an open colonnade to the garden is quite excellent. It is a pity he did not develop this suggestion further. "Pleiades" has an ambitious but hardly completed design with many good points, not the least of which is that he has aimed high: "Bo'sun" has a good idea in the terrace roofing to his colonnade, but his detail is poor, and the

intercolumniations unpleasant, the voids being too square in form. "Hodden-Gray" sends a design well drawn but hardly student-like enough in detail. The masonry of the parapets is too heavy, and the central entrance very unsatisfactory as regards the panel over the arch.

"Cui Bono" has a vigorously-drawn set showing a really fine sense of massing. The interior is, however, rather "thin" in design and hardly carries on the solidity of the exterior. The author has destroyed the scale of his perspective by filling in the circular openings with black, which forces them into undue prominence and is fatal to all

suggestion of aerial perspective. I mention this design for its merits, but it is clearly disqualified as not complying with the conditions of the competition. "Seed," "1905," and "Aqua," with a Palladian design of merit, all deserve mention. "Aristobulus" fails in the treatment of his internal angles and rounded seats. "Ajax" shows some good composition in his section, but the whole design is slovenly in execution. "E pluribus unum," "Michelange" and "Ultra" show some promise; but the first fails, in scale, the second is lacking in imaginative quality, and the flat domes, of the third require more apparent solid support.

Views and Reviews.

Model Villages.

We consider Bournville to be the most successful of the garden villages which have been promoted. Port Sunlight had several firms of architects engaged on it, and although variety is all very well in its way there seems to be no general coherence in the scheme there carried out. At Bournville, however, the general direction of affairs has been in the hands of Mr. W. Alexander Harvey, who while achieving considerable variety in design has retained the same general feeling in his work, which is most able. Almost all his designs deserve praise. This book illustrates the different varieties of plan and elevation which he has designed, both by means of scale plans and elevations, perspectives, sketches and photographs. It forms a most useful collection of data derived from practice and not from theory, while Mr. Harvey has imparted much interest to the volume by chapters of a general character in which he puts forward his own ideals. A very good feature is the statement of cost in each particular case. This, however, shows us that Bournville has no more than any other garden village really solved the problem of the cheap cottage. Its cottages are for the superior artisan rather than the agricultural labourer. There is no cottage at Bournville which has cost less than £150. The cheapest seems to be about £200 and upwards. There is, it is true, a block of cottages illustrated in this book estimated to cost £135 each when built in blocks of eight, but of course everyone has had experience of estimates, and we could wish for the actual figures. The fact that the Village Trust cannot build more than blocks of four cottages prevented this from being carried out, and we learn that blocks of four on this plan are estimated to cost £160. We think, however, this ought to be lessened because the plan is a very economical one, consisting of living-room, scullery, w.c., and larder on the ground floor, with three bedrooms on the first floor, all in a square block. The planning of all the cottages at Bournville is on the whole economical, but we think there has in some cases been a waste in the direction of the provision of needless buttresses, complication of roofs, and other features by which the architect has endeavoured to give interest. The effect is not always happy because we instinctively feel the futility of so increasing the cost where simplicity is pleasing enough. We have already published some of the photographs which appear in this volume. We now illustrate a cottage built in 1903 at a cost of £540, which comes out at 6½d. per ft. cube. The cottage is built of white-washed common bricks with a tarred plinth, the roof being tiled.

"The Model Village and its Cottages: Bournville," by W. Alexander Harvey. London: B. T. Batsford, price 8s. 6d. nett.

Laxton's Price Book.

We welcome the 1906 edition of this recognized aid-book. The prices in the book for this year have been thoroughly revised, and it needs no recommendation on our part. We would only impress upon the building trade that such reference books as this are too often neglected and one edition kept in the office for several years, whereas it should be up-to-date, and it ought to be made a rule to possess the latest editions of all text-books in every office. The cost is so very small considering the assistance they give, the saving in time alone being a great consideration, that it is foolish to neglect such an obvious business matter. In this edition the amendment to the London Building Act for 1905 has been included in full.

"Laxton's Price Book." London: Simpkin, Marshall, Hamilton, Kent & Co., Ltd., price 4s.



HOUSE AT BOURNVILLE, BIRMINGHAM.

W. ALEXANDER HARVEY, ARCHITECT.

Law Cases.

Extension of Time: The Architect's Position.—The case of *Ellis v. Gundry* came before the Devon Assizes, Second Court, recently. Counsel for the defendant, Col. Gundry, of The Grange, near Honiton, said the claim arose upon a building contract and upon the architects' certificate. Col. Gundry employed the plaintiffs, Messrs. Ellis & Sons, of North-tawton, to build certain stables for him. The contract was dated March 4th, 1904. The question of law to be determined was whether or not the parties were, in the circumstances, bound by the certificate of the architects fixing the time in which the contract, plus extras, had to be finished, so as to give right of deduction after that date. The time fixed for the contract works to be completed was September 8th, 1904, and the works at the time were not finished. Col. Gundry wrote to Messrs. Ellis, Bowden & Ellis, architects, of Exeter, asking what was a reasonable time for the completion of the contract. They replied giving the date as December 24th, 1904. The defendant claimed penalty of £10 a week for fifteen weeks, the work not having been completed until the spring of the following year.

Counsel for the plaintiffs submitted that the architects' certificate as to time of completion not having been given before the contract was completed, did not come within the meaning of clause 25 of the contract. The judge said the only question was as to the construction of clauses 23, 24 and 25. He construed these to mean that if in the opinion of the architects the works in question were delayed by reason of authorized extras or additions the architects must make a fair and reasonable extension of time for the completion of such works. That was all set out in the plainest possible way in clause 25. The question was when it had to be done. For the plaintiffs it had been contended that it must be done before the completion of the work, and that unless it was done before that time it did not come within the meaning of clause 25. His lordship disagreed. If that were the case an architect must extend the time whenever extras and additions were ordered at the time they were ordered, which was absurd. The architect was not bound to give the certificate before the completion of the work. His lordship held that in this case the argument of the defendant must prevail, and judgment would be given in his favour.

Corporation's Refusal of Plans: Important Case.—In the King's Bench Division of the High Court of Justice last week Mr. Dean, builder of Middlesbrough, moved for a rule nisi for a mandamus calling on the Middlesbrough Corporation to show cause why they refused to approve certain plans deposited with them in connection with the proposed erection of fifteen houses on the west side of Lothian Road, Middlesbrough. The Corporation had refused the plans on two occasions, but would give no reason for their action, although it was pointed out to them that the by-laws had all been complied with.—The Lord Chief Justice gave it as his opinion that the rule ought not to be granted. The affidavit stated that the plans had been twice refused, and that they were in accordance with the by-laws. But, in order to grant a rule for a mandamus, there must be something to show that the local authority were not acting properly in the matter, and had refused the plans on some ground which was not within their discretion. That had not been shown, and therefore the rule could not be granted. If the applicant could amend his application and bring forward anything to show that the Corporation had not exercised a proper discretion, or any discretion at all, the court would consider whether a rule ought to be granted. But at present the materials submitted in this case were wholly insufficient.—Mr. Justice Ridley concurred, and the rule was accordingly refused.

Competitions.

Acton Municipal Buildings.

We regret that in our remarks last week under the heading of "The Acton Municipal Buildings Farce," the figures were inadvertently given as £10,000 and £60,000. The sentence should have read: "The lowest tender for works which were expected to cost some £60,000 has come out at close upon £100,000."

Carnegie Library Competition, Crompton, Shaw, near Oldham.

The assessor in this competition has made his award as follows:—1st premium (£30), Mr. Jesse Horsfall, F.R.I.B.A., 4, Chapel Walks, Manchester; 2nd premium (£20), Mr. A. E. Dixon, A.R.I.B.A., and Mr. Charles H. Potter, 65, King Street, Manchester; 3rd premium (£15), Mr. Thomas J. Hill, 55, Cross Street, Manchester; 4th premium (£10), Messrs. John Eaton, Sons & Cantrell, Stamford Street, Ashton-under-Lyne. There were forty-six designs submitted. The award was unanimously approved by the Free Library Committee, and on the assessor's recommendation it was decided to give an additional fourth premium (£30, £20, £15 and £10 instead of £30, £20 and £10 as originally intended) as above. The designs are on public exhibition this week at the Crompton Town Hall from 2 p.m. to 8 p.m., except on Saturday, when they can be seen from 10 a.m. to 12 a.m. and from 2 p.m. to 6 p.m.

GREENWICH LIBRARY COMPETITION.

THE 172 designs submitted in the competition for a branch library to be erected in London Street, Greenwich, are on exhibition this week in the Greenwich Public Library. We publish on the next page the first-premiated design, by Messrs. Wills & Anderson, of London, and by giving a detailed description of this design the character and conditions of the whole competition will be set out for all. Messrs. Wills & Anderson state:—

It is evident that the exceptional nature of the site, hemmed in as it is between adjoining properties, precludes the usual arrangement adopted in similar buildings, *i.e.*, a centrally-placed lending department immediately opposite a central entrance with a news-room to one side and a reference library to the other. Nevertheless, in so small a building it is desirable to avoid corridors, which are expensive and difficult to supervise. In the arrangement adopted the three departments are placed in the usual order, but in consequence of the narrowness of the site they are arranged one behind the other, the news-room and lending library occupying the whole width of the site, and the reference-room made sufficiently narrow to allow the book-binding room and workroom to be arranged at the side of it. Corridors are thus avoided, sufficient space being allowed for passage-way in the newsroom, while giving the full superficial area demanded for news-stands and magazine-tables. In the lending department the borrowers' space also forms a passage-way to the reference library, which would not be found an inconvenience bearing in mind the small number of readers who would at any time be using the reference library. It has been considered that although a central entrance lends itself to a more architectural treatment than a side entrance, such an arrangement unnecessarily complicates the plan, and such a sacrifice of simplicity is not worth the advantages gained. On the opposite side, balancing the entrance, is the entrance leading up to committee-room and down to heating chamber and caretaker's store. This stairway is accessible either externally by a separate entrance or internally from the newsroom.

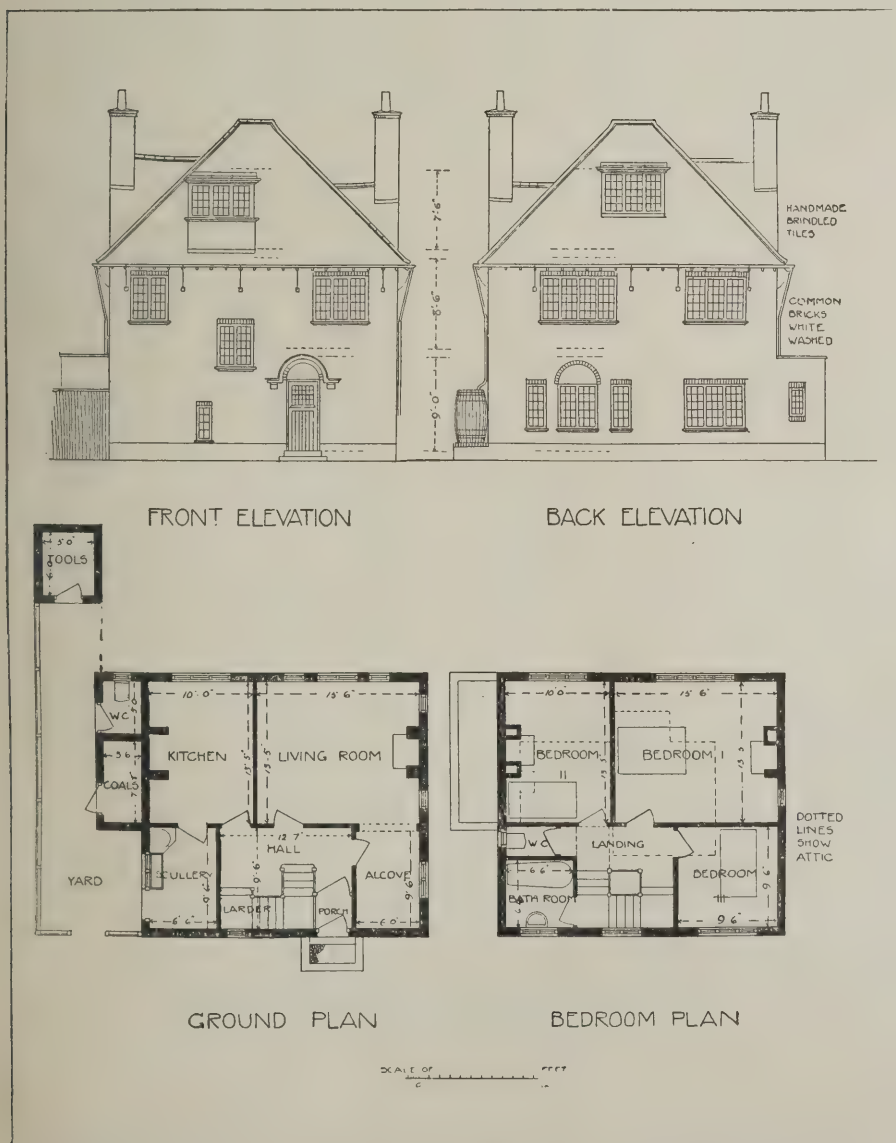
The internal treatment is exceedingly simple, each of the two main rooms forming a square hall lighted from shallow central domes supported on four columns. The reference library is treated in a similar manner.

The front is proposed to be faced with red bricks and Portland stone dressings; floors of pine blocks laid in asphalt on cement; pitched roof slated, and flats of steel and coke-breeze concrete asphalted; domes of steel covered with 6 lbs. lead; joinery of deal painted, with oak doors on the front elevation; windows glazed with lead lights in iron frames; heating by low-pressure hot-water ventilating radiators.

The building contains 110,449 cub. ft., which at 9d. a foot cube amounts to £4,142, or with architects' and quantity surveyors' fees to the stipulated amount of £4,500, this sum including gas and heating arrangements: fittings would probably cost another £250.

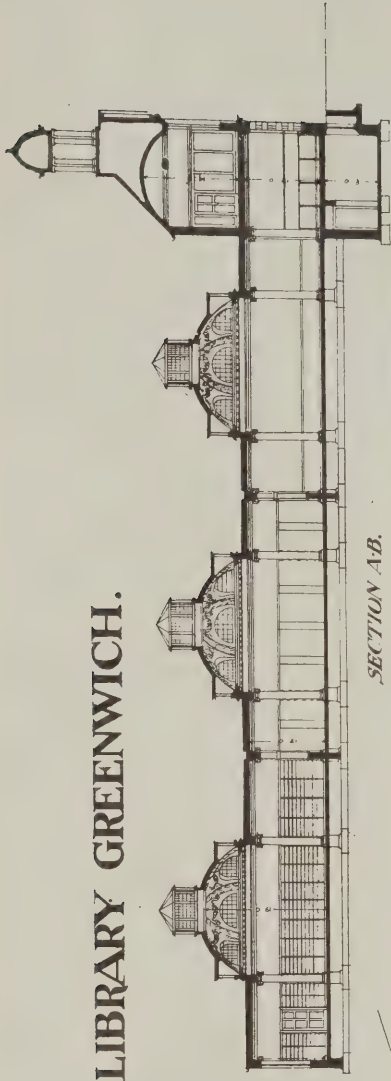
The design placed second, by Mr. Henry Goldsmith and Mr. G. Hartley Goldsmith, of Manchester, has the newsroom in the front, with the lending library behind, and the reference library and staff room at the back of the site, a passage-way being arranged from the main entrance to the lending library, running along beside the newsroom into a large hall facing the lending library and abutting on the reference library. The design placed third, by Mr. H. A. Crouch, of London, W.C., follows very much the same arrangement, though the hall in this design is not so large.

The premiums in the competition were £25, £15 and £10 respectively. Mr. A. W. S. Cross, F.R.I.B.A., was the assessor.

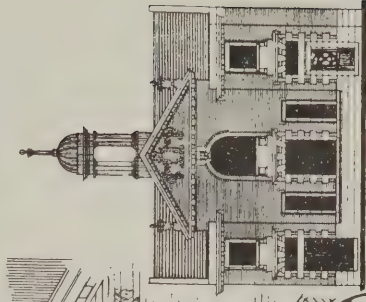


ELEVATIONS AND PLANS OF HOUSE AT BOURNVILLE.

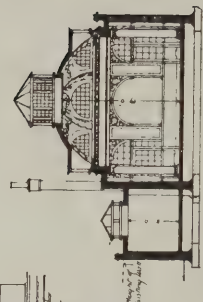
PUBLIC LIBRARY GREENWICH.



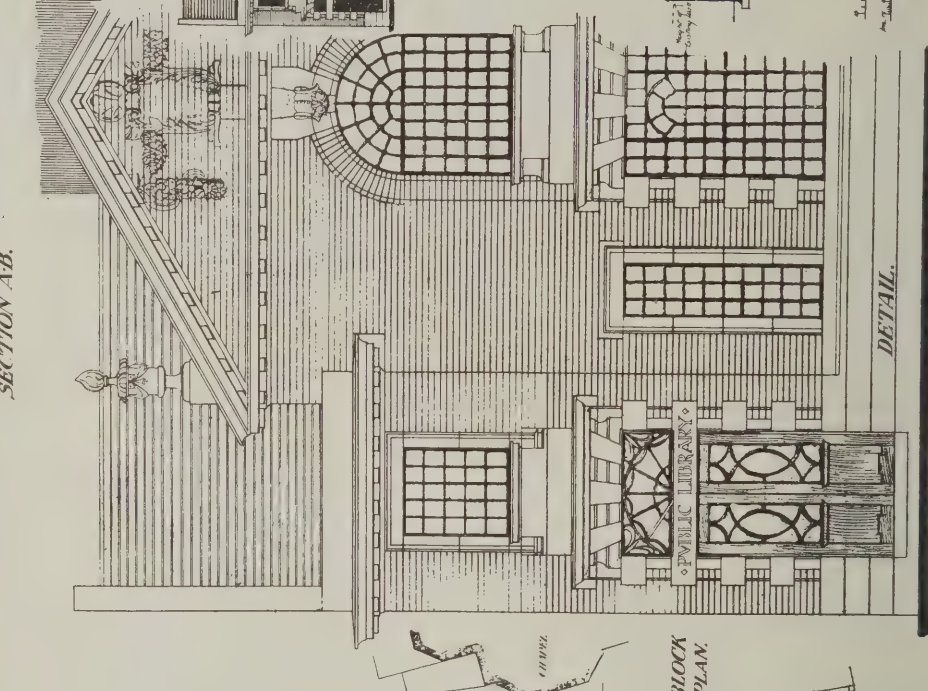
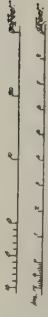
SECTION A.B.



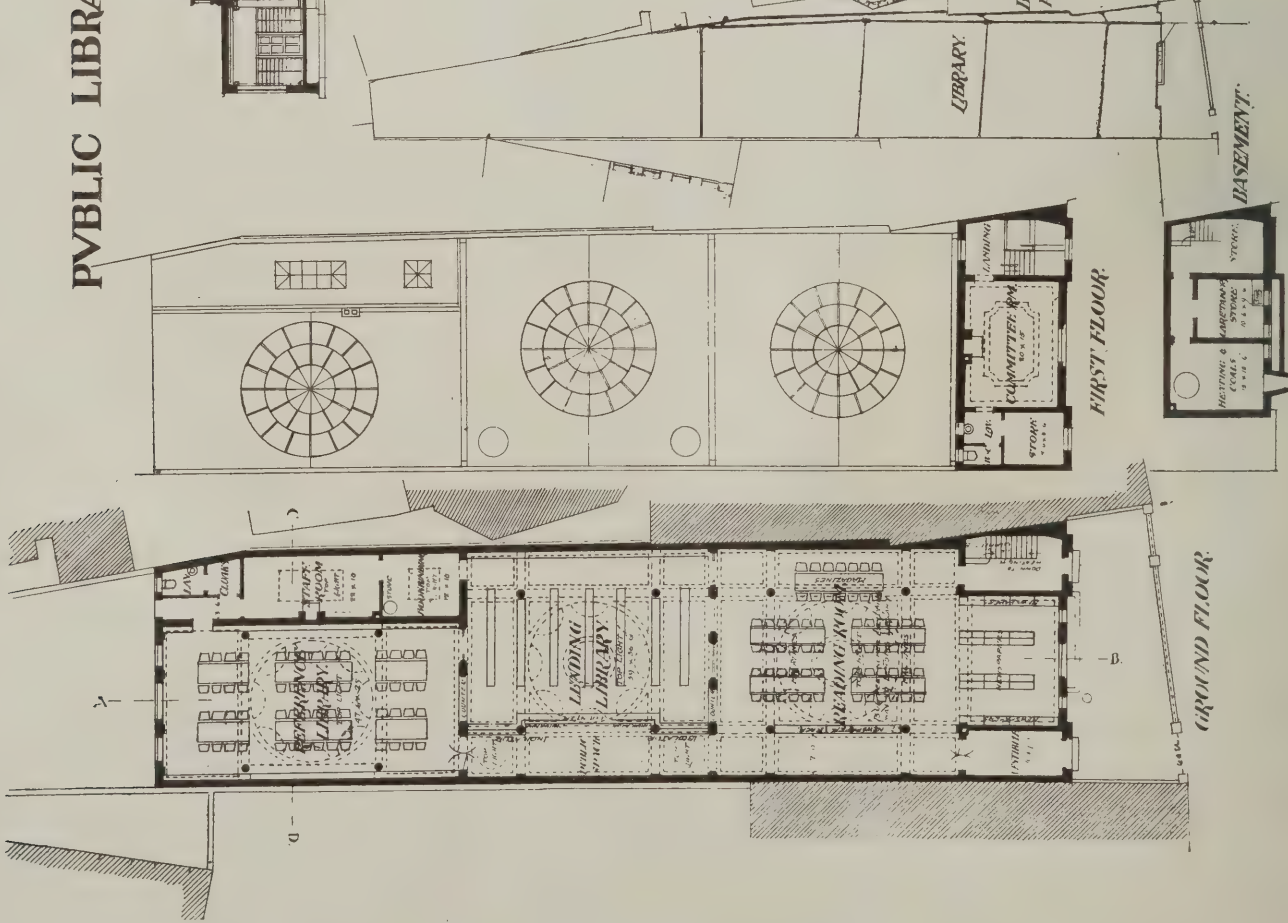
FRONT ELEVATION.



SECTION C.D.



BLOCK PLAN.

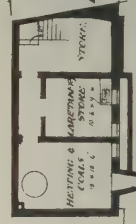


GROUND FLOOR.

LIBRARY.

BASEMENT.

FIRST FLOOR.



LYTHAM GRAMMAR SCHOOL COMPETITION.

AMONG competitions recently decided undoubtedly the most important has been that for the proposed secondary grammar school to be erected near Lytham, a town on the Lancashire coast built on the long line of sand dunes which extend in an almost unbroken series from the estuary of the Dee to Fleetwood.

The town is one of those possessing a large endowment vested in governors, who recently decided to devote a very large amount for the erection of a grammar school and to obtain designs by a competition limited to thirteen architects resident in Liverpool, Hull, Manchester, Lancaster, Lytham and other towns.

The importance of the competition may be gauged from the initial outlay—£22,000 for land and £30,000 for the first instalment of buildings. Additions are intended to be made later, and they had to be provided for in the designs.

Competitors had an excellent site giving them an entirely free hand in the grouping of their buildings—a large square plot bounded by roads on all sides, facing the sea, just outside the town, with an area of more than thirty acres, a frontage of 1,293 ft. and a depth of 1,267 ft. The conditions stated that it was the intention of the governors to accept the award of the assessor and to entrust the carrying-out of the work to the author of the design placed first—a most important paragraph, which ought to be included in all competition instructions.

The successful competitors were Messrs. Briggs & Wolstenholme, of Blackburn, to whom the first premium of £250 was awarded by the assessor, Prof. Beresford Pite, of London.

The Requirements.

Before describing the designs submitted, a brief reference to the requirements will be necessary to enable readers to grasp the main features of the scheme. A group of buildings was required for day scholars, boarders' and headmaster's residence; staff, including masters, matron, servants; science and lecture rooms; a large hall to seat 700 to 800 persons; workrooms for wood, metal, &c.; a large dining hall with kitchen, and a number of other rooms—all grouped to comply with complicated conditions and arranged round a quadrangle after the style of our old colleges.

The instructions stated "that the site is subject to storms of wind and sand of great violence, and that designs must be studied to withstand them." The residential portion of the buildings was, therefore, placed on the east side of the quadrangle by all the competitors, as this is the most sheltered. On the west side many of them placed the science room, and on the north or south sides the classrooms and the large hall.

In many designs one side of the quadrangle was left open, shut in with a low screen wall and large entrance gates and piers, the entrances being placed inside the quadrangle.

No fewer than ten pages of instructions and schedules were sent to competitors, who had an extremely tough task in attempting to comply with them. They had to work out six essential points before the details of the plans could be elaborated, namely, the position of the great hall, the grouping of the classrooms, and the positions of the dining hall, of the headmaster's house, of the boarding school, and of the science rooms and workrooms.

It may be stated generally that the conditions laid down by the Board of Education were complied with, except that in one case the classrooms had right-hand instead of left-hand lighting, without any apparent reason for what is obviously an error.

The Design Placed First

has fairly won the place of honour. A lofty tower, which will become a noted landmark, forms the centre of the elevation facing the main road, and a bold archway on the ground-level is the main entrance to a large quadrangle, on four sides of which the college buildings are grouped. Facing the tower on the opposite side of the court is the main school entrance, with cloak-rooms right and left, leading to a large hall (with top light) and the main stairs, all planned on the centre line of the building. Branching right and left is the corridor extending completely round the quadrangle, giving easy access to all the rooms. Continuing along the centre line is the hall, extending outwards from the south front of the building, with a corridor on each side leading to the doors and the platform. Along the south front, opening out of the corridor, are the classrooms, mainly with south light, and all on the ground floor, as suggested by the conditions. At the west end of the quadrangle is the archway to the playing fields, also an isolated w.c. block, whilst along the west corridor are the changing room, drying room, spray baths, lavatories and gymnasium. The east side is set apart for the residential rooms; at one corner is the headmaster's house, with a separate entrance and access to the corridors. Adjoining is the school kitchen and its offices, placed round a square court to serve both the master's house and the dining hall, and at the extreme south end are the rooms for the boarders. The buildings on each side of the tower are intended for future erection; it is unfortunate that they cannot be erected at once so as to complete the scheme. It would probably be more economical to do so whilst the contractor has his plant and staff on the ground. The elevations are designed in Renaissance, cleverly treated; and as the plan shows prominent projections and wings formed by the larger rooms, a very attractive group of buildings is shown on the elevations, cleverly elaborated on the sheet of details.

Second-premiated Design.

The second premium of £100 was awarded to Hull architects, Messrs. Broderick, Lowther & Walker. They arranged their buildings in three blocks placed at right angles so as to enclose three sides of a large courtyard open to the sea. The classrooms were grouped around the great hall, without corridors, most of them facing south and forming the north side of the court. The headmaster's house, dining hall, the boarders' dayrooms and dormitories formed the east side, so as to obtain as great a protection as possible from the prevailing westerly winds and storms. The science rooms, gymnasium and subsidiary rooms were on the west side, totally different from the plan placed first. These three blocks were connected to each other by short covered ways with arched openings. The principal entrance to the school from the main road was provided with a well-designed porter's lodge. The classrooms for future addition were placed on the first floor over those below. Several competitors adopted the same idea, though it may be urged that it leaves the main portion of the building in an incomplete state for a term of years. The problem of future additions to both classrooms and science rooms has given competitors a good deal of trouble; its solution has been tried from almost every point of view. The proper way would be to design the future additions as separate wings. One competitor has done so to a limited extent, but not to the whole design.

Third-premiated Design.

The third premium went to Messrs. Potts, Son & Hennings for a cleverly-thought-out design, the only flaw in it being that the classroom corridor had rooms on both sides with borrowed light. The working-out of

the extensions problem is the essential feature of this set. The classrooms face south and form the sea-frontage of the quadrangle, those for future requirement being placed over them on the first floor; the whole of this block it was suggested should be erected at once and completed. These upper rooms were to be used as temporary science rooms, until the science block was erected completing the quadrangle; that would prevent the erection of an incomplete classroom block and an incomplete science block, both of which would be eyesores for many years. This proposal evidently attracted the attention of the assessor, and the third premium is probably due to it. This was one of the designs with a complete quadrangle, the buildings being grouped as follows:—Classrooms and large hall on the south side, the hall forming the main architectural feature of the quadrangle; the master's residence, dining hall, kitchen offices and boarders' rooms on the east side; the science and art rooms and museum on the north side; and the cloak and changing rooms, gymnasium on the west. Towards the main road two large arched entrances were shown into the courtyard, with a central entrance into the science block. Towards the sea-front there was a central entrance into the classroom block and large hall. The conditions stated that the headmaster's house should be isolated and that his study should be in direct touch with the classrooms was worked out by placing it at the corner of the quadrangle with a door into the classroom corridor. The elevations were effectively designed in the late Tudor period, which has been so frequently used for buildings of this class. They would probably have looked well if they could have been carried out.

Fourth-premiated Design.

Several competitors must have stood a good chance of securing the fourth premium. Messrs. T. Muirhead, Mangnall & Littlewoods, Haywood & Harrison, and G. H. Willoughby sent carefully-thought-out designs. The fourth premium was awarded to Mr. Willoughby. All these designs were worked out from different points of view and all had their good points. Some preferred to enclose the quadrangle with buildings and others to leave one side open, to enable views of the interior to be obtained. Mr. Willoughby treated the position of the headmaster's house in relation to the school buildings with great skill. Messrs. Mangnall & Littlewoods placed the whole of the classrooms on the ground floor with a central corridor, with top light; both those to be erected at once and those for future extension. There can be no doubt that this is a good idea, but it involves the use of north light for many of them. The conditions stated: "The classrooms should as far as possible face south; it is preferable that they should be on the ground floor." Messrs. Mangnall & Littlewoods' scheme was a successful compromise.

Mr. Muirhead placed his classrooms in two parallel rows, both facing south; those to be erected later were to be placed over them on the first floor.

Messrs. Haywood & Harrison's large hall and dining-hall were well placed in relation to other parts of the buildings. The elevations of all were of the collegiate type, and evidently the work of experienced draughtsmen.

Designs were also submitted by Messrs. H. & W. Wade, Austin & Paley, Barry & Son, Medland Taylor, J. D. Harker, and J. Gorst & Son; all have good points, but space will not permit special reference to them.

The Strand Station of the Piccadilly and Brompton Railway will have its entrance on the Strand and its exits in Surrey Street, where there will be a forecourt.

THE TIMBER TRADE.

London Market in January.

PRICES for wood in the London market rose during January, dragged up by increasing quotations elsewhere. The dock deliveries, Messrs. Churchill & Sim state, were less even than in January, 1905, but the open weather both here and in the north of Europe enabled an increased business of more than 2,000 standards to be effected overseas. This is the only sign of any improvement in the local demand, and prospects ahead for importers are therefore most difficult. With their trade practically as bad as ever, they are faced with a greatly increased cost for everything they want, which has been established by conditions which do not apply to their own market; and after a series of years of unsatisfactory trade the long looked-for improvement has come in a shape which, although increasing the value of the small stocks stored here, holds out little hope of profits on further purchases. The financial breakdown which occurred during the month rather points the situation. Both from Sweden and Russia the business of the month for fresh shipments in the coming season was on a large scale and at gradually augmenting prices. Buyers have been found chiefly in the various Continental centres, and to some extent also in Scotland and the north of England. Stock notes have been generally denuded of all saleable dimensions and qualities, and large quantities of the less appreciated sizes have been carried off with them. There is a residuum of deals, especially from the White Sea, where the starting quotations erred a little on the side of dearth; but even for these there has been no sign of any relaxation from the full prices asked.

Messrs. Denny, Mott & Dickson, Ltd., observe that January started so hopefully that some disappointment has been caused by an absence of any very appreciable briskness in the demand. "Business has, however, been steady and well sustained, although merchants and dealers have not seen eye to eye with shippers in respect to forward business. The improvement in the demand has been real, but as usual overrated by the shippers, who want to make up for bad times. When the views of shippers and merchants have reached 'the happy mean' a good all-round trade should be done, as it is reasonable to expect that even the disorganized building-trade industry cannot lag so far behind the general improvement in trade, as it still appears to be doing. Housebuilding, both as a necessity for an increasing population as well as a favourite means of investment for savings with the well-to-do working class and small trader, must have a place in the general improvement in business."

The abstract of dock stock, consumption, &c., for January, published by Messrs. Foy, Morgan & Co., is given in the table at the foot of this page.

Dock Stock.

The stock of wood in the public docks on January 31st was:—

Foreign deals and ends -	-	-	Pieces.
Do. battens -	-	-	1,418,000
Do. battens -	-	-	2,445,000

Pine deals and battens -	-	-	Pieces.
Spruce do. do. -	-	-	873,000
Boards, rough -	-	-	764,000
Do. prepared -	-	-	3,845,000
Do. prepared -	-	-	6,941,000
Totalling 16,286,000 pieces, as against			
19,666,000 in 1905, 23,125,000 in 1904, and			
20,321,000 in 1903.			
In other kinds the stock was as follows:—			
Foreign wainscot logs -	-	-	159 pieces.
Do. oak timber -	-	-	342 loads.
Do. fir timber -	-	-	2,150 do.
Do. Oregon pine, &c., spars	-	-	and masts
Colonial oak timber -	-	-	5,377 do.
Do. birch timber and planks -	-	-	1,429 do.
Do. elm and ash timber -	-	-	4,204 do.
Do. yellow pine -	-	-	878 do.
Do. red pine -	-	-	350 do.
United States pitch-pine timber	-	-	64 do.
Do. do. deals -	-	-	14,083 do.
East India teak -	-	-	28,000 pieces.
	-	-	6,470 loads.

The deliveries for January

have been of—

Foreign deals and ends -	-	-	Pieces.
Do. battens -	-	-	283,000
Pine deals and battens -	-	-	428,000
Spruce do. do. -	-	-	71,000
Boards, rough -	-	-	83,000
Do. prepared -	-	-	444,000
	-	-	1,103,000

Totalling 2,412,000 pieces, as compared with 2,576,000 in 1905, 2,774,000 in 1904, and 3,316,000 in 1903.

Deliveries from Ship to Craft.

The deliveries direct from ship to craft for January were:—

	P.s.h.	1905.	1904.	1903.
Deals and battens	3,232	1,634	2,632	1,930
Boards -	874	394	402	679
Total	4,106	2,028	3,034	2,609

Soft Woods.

Swedish Deals and Battens.—There was not much change in the London market for Swedish stocks during January. The increased rates established in December were fully maintained, but the demand was poor, and the small stocks of deals and battens were bought up because they were cheaper than anything that could be imported rather than for consumption. Flooring boards have improved freely in price, the demand being more active, the stock small, and forward prices prohibitive. Shippers are expecting to add the full cost of preparing on to the high rates at which their battens can be easily sold, which is not unreasonable, but there are no equivalent prices in the London market yet, and there has probably seldom been a January in which so little business for arrival has been negotiated to London.

Norwegian Boards.—Prepared boards rose freely in price during January, and the local demand was fairly satisfactory. A large business was done by Norwegian shippers with this country in boards for shipment in the coming season at good prices, which, however, have been under those which could be accepted by the Swedish millowners. Norwegian stocks seem now to be fairly cleared for the present.

Russian Deals and Battens.—In London prices for Russian deals and battens have remained nearly stationary at the best of the rates established before Christmas. For arrival, White Sea shippers have made large progress with their open-water stocks at high rates, depending mainly on the specification sold. Considerable quantities of deals have been carried off at full prices with the more saleable dimensions, and the prospects of the

available stock being absorbed during the season without any break in quotations are brighter now than they were a month ago.

Finnish Battens.—The London market for Finnish battens was quietly firm in January. Shippers made further very considerable sales forward to this country and the Continent during the month.

Prussian Timber.—The demand for fir timber was comparatively lively during January, and prices improved. Oak also improved again in price. There was not much demand, but supplies this year promise to be scanty and costly.

Canadian Timber.—The pine deal market in London has shown more life than for some time past, and, stimulated by the position in Canada, prices here have advanced. For spruce deals also the market is better, scepticism as to the solidity of present quotations from the other side being rather on the wane. More business has therefore been possible, buyers yielding to a very slight easing in quotations for shipment. Prices for all the Canadian hardwoods and for yellow-pine timber are also rather on the increase in the London market.

Hardwoods.

Teak.—Messrs. Denny, Mott & Dickson, Ltd., state that the landings in the docks in London during January consisted of 1,186 loads of logs and 569 loads of planks and scantlings, or a total of 1,755 loads as against 356 loads for the corresponding month of last year. The deliveries into consumption were 1,456 loads of logs and 313 loads of planks and scantlings—together 1,769 loads, as against 1,255 loads for January, 1905. Figures show that, notwithstanding the restriction in consumption attendant upon unprecedentedly high prices, the demand has been fully up to the total imports of all descriptions of teak. It is also to be noted that one-third of the abnormally small total stock of logs and planks consists of Java wood, which description—although forcing its way into consumption—is, quite apart from the question of weight and quality, very much handicapped by want of length in the logs, so that the better-liked Rangoon, Moulmein and Bangkok stocks of 4,321 loads all told are dangerously inadequate to the demand; and the stocks on the shipbuilding rivers are also very bare. The position, therefore, promises neither relief from high prices nor from nervousness as to an inevitable shrinkage in the volume of the turnover unless shippers can increase the rate of supplies, which they insist cannot be done except by shipping second-class wood, which is an expedient tending to discredit the merchant here with the buyer and also to lower the high character of teak.

Messrs. C. Leary & Co. report that business in teak during the month was characterized by a quiet tone, sufficient to arrest the upward course of prices without, however, entailing any decline in values.

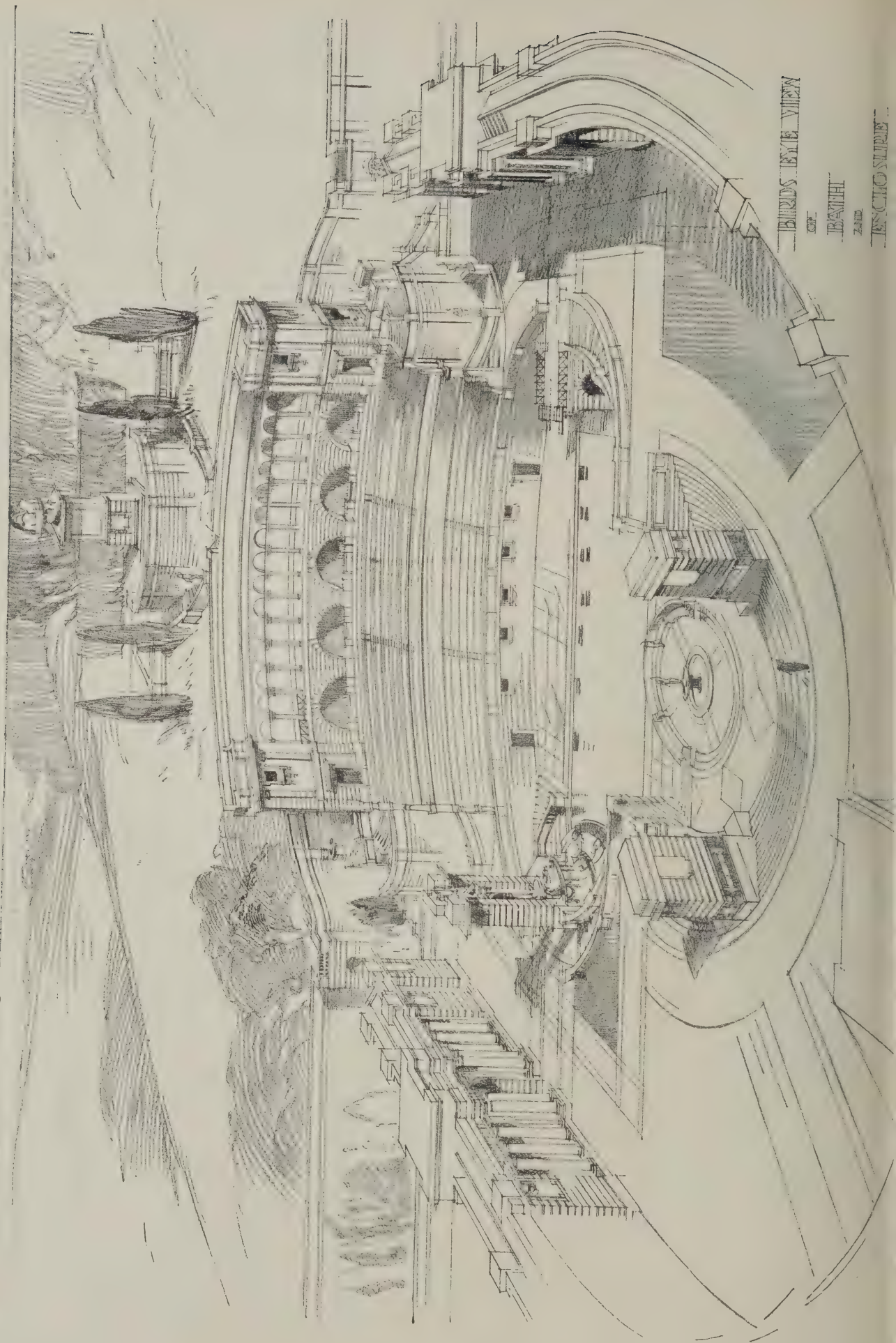
Mahogany.

In mahogany three public auctions took place during the last half of the month, competition being good and prices firm. Stocks of most descriptions are small, and with a prospect of light imports the outlook is distinctly favourable.

ABSTRACT OF STOCK, CONSUMPTION, &c., IN LONDON DOCKS, FOR JANUARY.

S.C. Dks. and M. Dks.	Deals (Fir).	Battens (Fir).	Pine.	Spruce.	Pitch-pine Deals.	Deals and Battens in Aggregate.	Rough Boards (All Countries).	Flooring.	Floated Timber.
	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Loads.
Public dock stock -	1,224,678	2,610,311	871,903	763,690	26,771	5,497,353	3,844,984	6,941,648	22,500
Monthly public dock consumption -	236,825	464,003	71,062	82,258	5,949	860,097	463,579	1,064,016	3,309
Overside stock -	646,532	1,266,728	193,999	224,564	—	2,331,823	1,265,571	798,012	—
Overside consumption (estimated of dock):—									
92 per cent. Sawn } 62 " Planed }	217,879	426,883	65,377	75,677	—	785,816	426,493	659,690	—
Duration of supply at same rate of consumption -	4'12 months.	4'35 months.	7'81 months.	6'26 months.	4'50 months.	4'76 months.	5'74 months.	4'49 months.	6'80 months.

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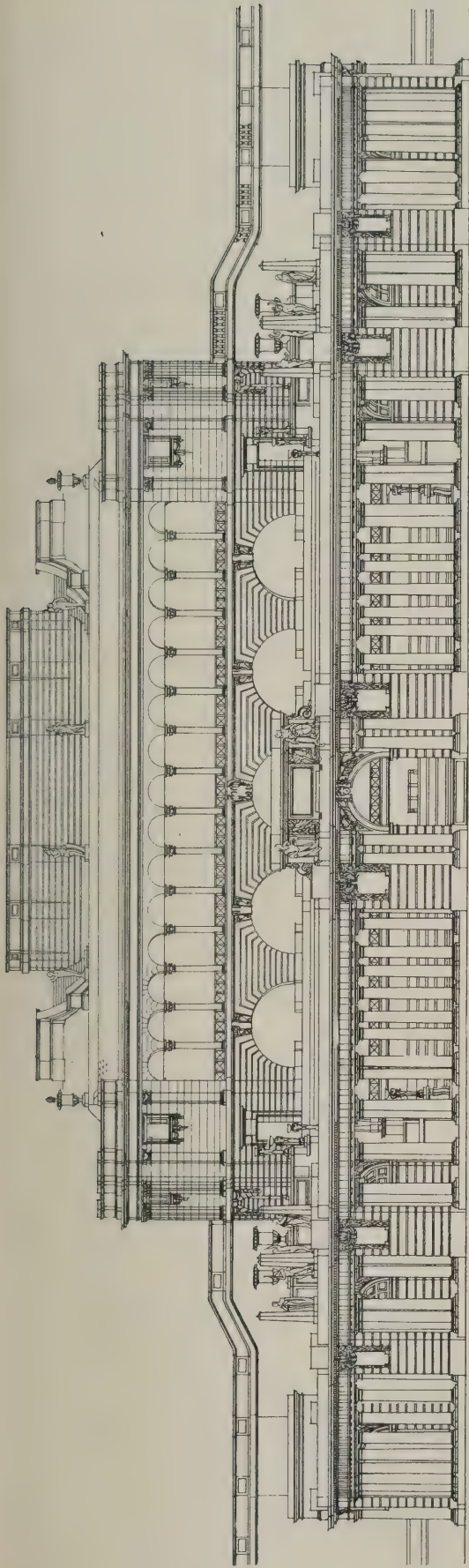
BIRDS EYE VIEW

OF

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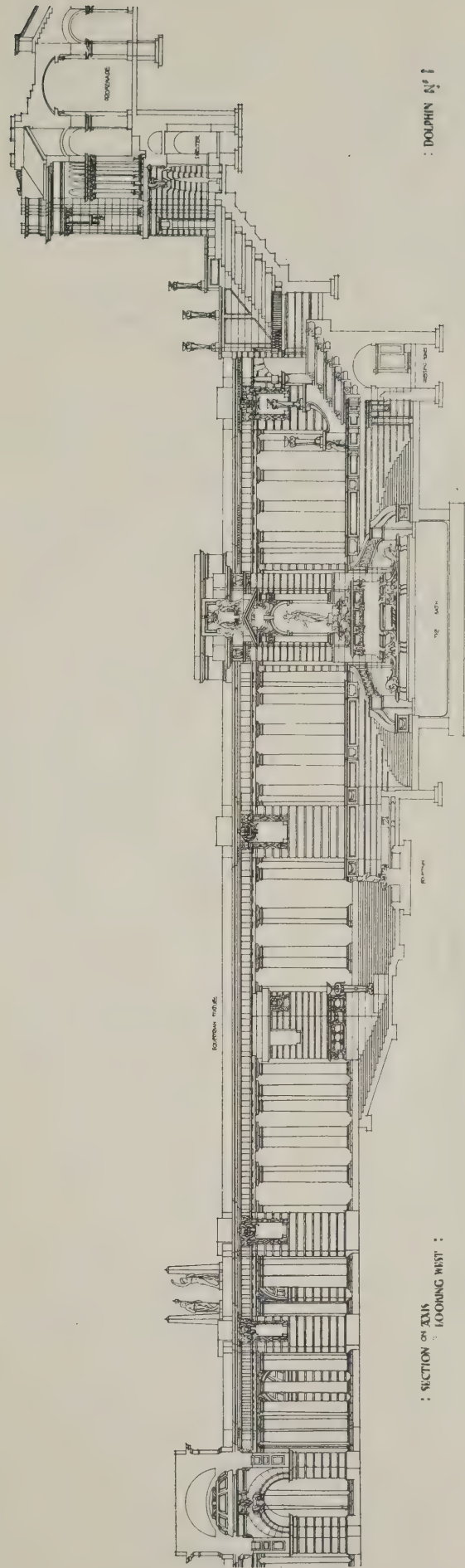
LAND

THE COLOSSEUM



§ ELEVATION

THE SOUTH GATE



§ SECTION ON AXIS
LOOKING WEST

§ DOUPHIN

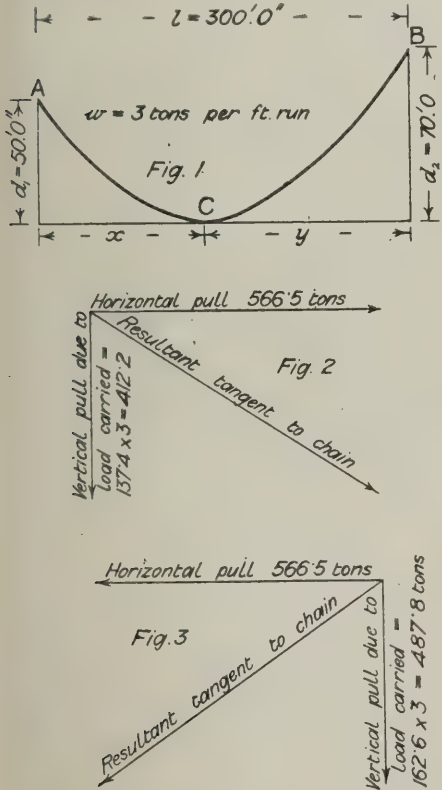
R.I.B.A. TITE PRIZE DESIGN FOR AN OPEN-AIR SWIMMING BATH, WITH SEATING FOR SPECTATORS AND COLONNADE ENCLOSURE. BY ALICK GEORGE HORSNELL.

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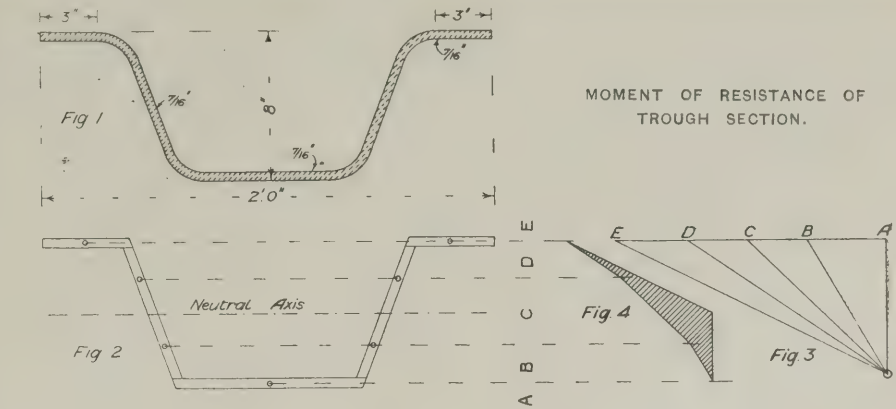
Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters. Correspondents are particularly requested to be as brief as possible. The querist's name and address must always be given, not necessarily for publication. Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

Stresses in Suspended Chain.
HARROGATE.—QUEX writes: "The points of support of a uniformly loaded hanging chain are 50ft. and 70ft. above the lowest point in the chain, and the horizontal distance between the points of support is 300ft. The load is 3 tons per foot-run horizontal. Please state the pull in the chain at the points of support and at the lowest point. I desire to know the method of calculating only the focal length on a bridge due to moving load and dead load. Do not trouble in regard to the graphic method."
The load being taken at 3 tons per foot-run horizontally, the chain will hang in two semi-parabolas instead of being catenary as would be produced by the weight of a



uniform chain only. Fig. 1 shows a sketch of the arrangement. Tension at lowest point c of chain = $wl^2 = \frac{w(2x)^2}{8d_1} = \frac{w(2y)^2}{8d_2}$
 $= \frac{wx^2}{2d_1} = \frac{wy^2}{2d_2}$. Therefore $\frac{x^2}{d_1} = \frac{y^2}{d_2}$ and $\frac{x^2}{y^2} = \frac{d_1}{d_2}$
 $= \frac{50}{70} = \frac{5}{7}$, whence $\frac{x}{y} = \frac{2'236}{2'646}$. Therefore
 $x = \frac{2'236}{2'236 + 2'646} \times 300 = 137'4$ ft., and
 $y = \frac{2'646}{2'236 + 2'646} \times 300 = 162'6$ ft., making
the total of 300ft. Take tension = $\frac{wx^2}{2d_1}$
 $= \frac{3 \times 137'4^2}{2 \times 50} = 566'37$ tons, or
 $\frac{wy^2}{2d_2} = \frac{3 \times 162'6^2}{2 \times 70} = 566'54$ tons,



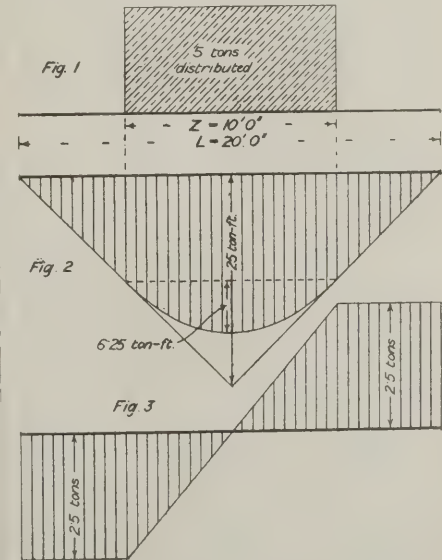
mean, say 566'5 tons. The tension at support A (Fig. 2) is composed of two forces, viz., 566'5 horizontal and 412'2 vertical. Resultant = $\sqrt{(566'5)^2 + (412'2)^2} = \sqrt{490831'09} = 700'6$ tons. The tension at support B (Fig. 3) will in the same manner be Resultant = $\sqrt{(566'5)^2 + (487'8)^2} = 747'5$ tons. The "focal length on a bridge" is a new term in bridge design which the writer has not heard before, and he is therefore unable to say how it can be calculated. HENRY ADAMS.

Moment of Resistance of Trough Section.
LONDON.—W. L. J. writes: "How is the moment of resistance determined for deck flooring shown by accompanying sketch? Also, what safe distributed load would it bear, the span being 7ft. 6ins.?"
The moment of resistance (R) of the section shown in Fig. 1 is equal to the moment of inertia (I) divided by the distance (y) from the neutral axis to the furthest edge of the section in inches, and multiplied by the intensity of stress (c) allowed in tons per square inch. The inertia area may be found as shown in Figs. 2, 3 and 4, and described in Molesworth's Pocket Book, p. 129, from which the moment of inertia (I) = inertia (a) \times area of section (A), or $9'2 \times 15 = 138$. Then $R = \frac{I}{y} c = \frac{138}{4} \times 6'5 = 224$ ton-inches. Now the moment of resistance (R) is equal to the maximum bending moment (M), and the maximum bending moment for a distributed load is $\frac{WL}{8}$, where w = total load in tons and L = span in inches. Then $M = R$, $\frac{WL}{8} = R$, $WL = 8R$, whence $w = \frac{8R}{L}$. Substituting the figures obtained, $w = \frac{8 \times 224}{7'5 \times 12} =$ say, 20 tons total distributed load over a span of 7ft. 6ins. HENRY ADAMS.

Overhanging Wall.
LONDON.—E. S. writes: "Kindly advise me about a wall which divides the garden of my house from next door. I wish to know who it belongs to. It overhangs my garden about 6ins., and looks as if it might fall down any moment."
The information you give is insufficient, in itself, to enable a true opinion to be formed as to the ownership of the wall in question. Are there not some T marks in the boundary lines upon the plan on your lease? If so, the wall belongs to the side upon which those marks are shown. How is the wall constructed? If it has strengthening piers or "counterforts" in various places the wall probably belongs to the side upon which those thickening piers occur, as it is presumed that the owner originally built it with a straight face towards his neighbour's land and upon the extreme boundary of his

own property; and any projections therefore would be built upon his own land. F.S.I.]

Distribution of Load on Girder.
HARROW.—STUDENT writes: "A rolled steel girder over a 20ft. span carries a brick pier which is distributed over the central roft. of girder. Should this be calculated as a load concentrated in the centre or as one distributed over the entire length of girder?"
The brick pier—or brick wall as it should be called—must be taken as a distributed load over the portion occupied. Assuming the wall to weigh 5 tons, as Fig. 1 (below), the bending moment diagram will be as Fig. 2 and the shear stress diagram as Fig. 3. A suitable section would be Dorman, Long & Co.'s* Groa roin. by 5in. by 29 lb. rolled steel joist, or their G 7a 12in. by 5in. by 32 lb. rolled steel joist. In Fig. 2 the height of the triangle is $\frac{WL}{4} = \frac{5 \times 20}{4} = 25$ tons-feet. Joining the two points of the sides of the triangle immediately below the ends of the load, a parabola should be constructed upon the line with the height of $\frac{WZ}{8} = \frac{5 \times 10}{8} = 6'25$ tons-feet. The base of the parabola being 12'5 tons-feet below the base of the triangle, the total maximum bending moment will be $12'5 + 6'25 = 18'75$ tons-feet. Then $18'75 \times 8 = 150$, the tabular number to seek for in the catalogue. For the shear stress diagram (Fig. 3) the stress at each end equals the reaction = $\frac{5}{2} = 2'5$ tons, and continues uniform until the edge of the load is reached, when a line joining the two extremities as shown will give ordinates for the stress throughout the beam. HENRY ADAMS.



DISTRIBUTION OF LOAD ON GIRDER.

Locality of Roof Truss.

NORTHWICH.—M. K. E. writes: "If existent, where can I see the roof described and illustrated on p. 37 of your issue for January 17th?"

The writer is unable to say where the roof truss referred to is erected, or even whether it exists, and in the face of the dispute disclosed in the question the locality could not be stated, even if known.

HENRY ADAMS.

A Party-wall Question.

WESTERLY GALES writes: "A is the owner of certain houses, one of which adjoins vacant building sites owned by B. One of the conditions of the land company from whom the sites were purchased by both parties provides as follows—that 'all division walls and division railings are to be party-walls and railings, and if already made, the taker of the adjoining lot must pay to the person by whom they were erected one-half the cost incurred in such erection.' Now A has erected dwelling-houses upon his sites in accordance with the plans of the estate architect, and B has paid A the half value of the division walls, &c., built by A for their joint benefit: but it is not the intention of B to commence building on his sites for some years. In the meantime A's house is rendered very damp and practically untenable through the rain which penetrates this party-wall (of brick and of the thickness, &c., as approved by by-laws and estate architect). What is B's liability and A's remedy? Can B be legally compelled to make his own half of the party-wall impervious to the rain, or, in other words, can A require B to take such measures as are necessary to prevent A's property being damaged by wet entering through B's half of the party-wall?"

Both parties appear to have fulfilled their legal responsibilities in this matter, and there would appear to be no liability upon B compelling him to build within a certain period) the land company's rules would show whether this is the case or not). At common law there is certainly no such liability upon B, and I can only advise that A should come to an arrangement with him by which A may at his own expense render the face of the party-wall waterproof. F. S. I.

Obituary.

Mr. James Brown, builder, of Newport, Dundee, died last week, aged about 80.

Mr. W. A. F. Powell, head of the well-known glass firm, died at Clifton last week in his ninety-third year. He attended to his business until within a week of his death.

The late **Mr. F. W. Wentworth-Shields, M.I.C.E.**, of Southampton, resident engineer of the Crystal Palace during its construction and largely associated with the design of the Victoria Embankment and with the foundation of the Albert Memorial, left estate of the gross value of £2,382.

Mr. Coates Murgatroyd, a well-known builder and contractor, of Bradford, died last Wednesday after a brief illness. His firm, Messrs. Coates Murgatroyd & Son—the latter being Mr. Arthur J. Murgatroyd, who is a member of the Bradford City Council—carried out many important railway and Government contracts.

The late **Mr. Ingleby Wood**, architect, of Edinburgh, whose death at the early age of thirty-three was chronicled in our issue for last week, acted as honorary secretary for the exhibition of architectural refinements held last autumn under the auspices of the Edinburgh Architectural Association, and to his administrative ability and untiring energy the success of the exhibition was due.

NEW LONDON BUILDINGS.

AT yesterday's meeting of the London County Council the Building Act Committee reported the following applications under the London Building Act, 1894, their recommendations as to consent or refusal being appended in *italics*:—

Retention for a further period of the temporary iron chimneyshaft at the electricity generating-station, Millbank Street, Westminster, on the application of C. S. Peach. (*Consent.*)

Deviation from the plans approved on 30th August, 1905, for the erection of a building for the United Universities Club, Suffolk Street and Pall Mall East, so far as relates to the substitution of two smaller balconies for one large balcony at the first-floor level on the Pall Mall East frontage (the projecting portion of the front being also kept back to the main front of the building), and an alteration in the projection and length of the two balconies at the first-floor level on the Suffolk Street frontage, on application of R. Blomfield, A.R.A. (*Consent.*)

Retention of a projecting clock in front of No. 118, West End Lane, Hampstead, on the application of R. Cornish. (*Consent.*)

Bay windows above the one-storey shops in front of Nos. 23, 24, 25, 26 and 27, Crofton Park Terrace, Brockley Road, on the application of Tomkins & Connew. (*Consent.*)

Iron and glass conservatory at the first-floor level at the rear of "Keith House," Bayswater Road, Paddington, on the application of L. H. Isaacs, on behalf of Sir Clifton Robinson. (*Consent.*)

Retention of a wooden signboard in front of No. 47, King Street, Hammersmith, on the application of F. T. Harris, on behalf of H. Samuel. (*Refusal.*)

Iron and glass shelter in front of No. 26, Vaughan Road, Camberwell, on the application of G. G. Rogers, on behalf of F. J. Wescott. (*Refusal.*)

Buildings on the site of No. 247, Lower Road, Deptford, on the further application of J. H. Bethell, on behalf of H. Bellsham. (*Refusal.*)

Building on the site of Nos. 75 and 76, Lombard Street, City, with external walls at less than the prescribed distance from the centre of the roadway of such street, on the application of M. E. Collins, on behalf of Slazenger & Son. (*Consent.*)

Retention of wooden enclosures at the rear of No. 34, Newington Green, Hackney, abutting upon Church Path, on the application of R. Manley. (*Refusal.*)

Buildings on the west side of Vestry Road, Camberwell, on the application of E. Crosse & Co., on behalf of G. Pedley. (*Consent.*)

Modification of the provisions of that section with regard to open spaces about buildings, so far as relates to the proposed erection of a two-storey stable building on a site at the rear of warehouses on the south-east side of Barron's Place, Southwark, on the application of A. E. Chasemore, on behalf of W. Sumption. (*Consent.*)

New street for carriage traffic to lead from Lower Kennington Lane to Denny Street, Lambeth, on the application of C. Barker, on behalf of the Duchy of Cornwall. (*Consent.*)

Two oriel windows in front of Nos. 59 and 60, Pall Mall, on the application of E. Guy Dawber, on behalf of the London and Lancashire Fire Insurance Co. (*Consent.*)

Retention of a wood and iron motor-house at the rear of No. 219, New King's Road, Fulham, abutting on Coniger Road, on the application of Dr. F. J. Ayre. (*Consent.*)

Deviation from the plan approved on 18th July, 1905, for the erection of a building with a one-storey portion in front upon the site of No. 73, Highgate Road, St. Pancras, so far as relates to the construction of two skylight windows over the one-storey portion next the wall of the main building, and to the erection of an iron and glass covered way over the front portion of the cartway entrance to the premises, on the application of S. P. Rees. (*Consent.*)

Building on a site abutting upon Prah Road and St. Thomas Road, Finsbury Park, on the further application of F. Matcham & Co. (*Refusal.*)

Dwelling-house and a one-storey shop on the west side of Harvey Road, Camberwell, southward of No. 6, on the application of W. Smith. (*Refusal.*)

Building at the rear of No. 243, Uxbridge Road, Hammersmith, to abut upon Askew Crescent, on the application of Prickett & Ellis, on behalf of Miss Axton. (*Refusal.*)

Modification of the provisions of that section with regard to open spaces about buildings, so far as relates to the proposed erection of buildings on the southern side of Camberwell New Road, next Denmark Hill, with irregular spaces at the rear, on the application of R. L. Pearce, on behalf of A. A. Carter. (*Consent.*)

One-storey shop adjoining No. 118, Manor Road, Brockley, abutting upon Brockley Road and Manor Road, on the application of J. Webster, on behalf of P. Verschooten. (*Consent.*)

Iron and glass porch in front of No. 13, Maresfield Gardens, Finchley Road, Hampstead, on the application of H. Carpenter, on behalf of S. Baer. (*Consent.*)

Retention of a building to be used as a watch-box on the eastern side of Wood Lane, Hammersmith, on the application of W. Weaver, on behalf of the Council of the Royal Borough of Kensington. (*Consent.*)

Oriel window and balconies in front of a proposed extension of the Berkeley Hotel, Berkeley Street, Piccadilly, on the application of R. Griggs, on behalf of the Berkeley Hotel Co., Ltd. (*Consent.*)

One-storey shop in front and at the flank of No. 14, Brownhill Road, Catford, on the application of A. W. Osborn, on behalf of B. Walker. (*Consent.*)

Addition to a building at the rear of No. 1, Mitre Terrace, Mitcham Road, Tooting, to abut upon Vant Road, on the application of E. Bates, on behalf of Welfords' Surrey Dairies, Ltd. (*Consent.*)

Alteration to a porch in front of No. 87, Victoria Street, Westminster, on the application of Griffin & Woollard, on behalf of J. B. Martin and others. (*Consent.*)

Deviation from the plan approved on 21st October, 1902, for the formation or laying-out of a new street to lead from Morning Lane to Chatham Place, Hackney, so far as relates to an alteration in the position of the boundaries of such street, on the application of Hodson & Whitehead. (*Consent.*)

Erection at Messrs. Peek, Frean & Co.'s biscuit works, Drummond Road, Keeton's Road, and Storks Road, Bermondsey, of additions to Blocks B, C, L, M, N and N¹, whereby such blocks will exceed in extent 250,000 cub. ft., on the application of Stock, Page & Stock, on behalf of Peek, Frean & Co., Ltd. (*Refusal.*)

Deviations from the plans certified by the district surveyor so far as relates to the proposed erection of a building on the site of Nos. 240 and 241, High Holborn, on the application of H. T. C. Newton-Mason. (*Consent.*)

Five dwelling-houses to be inhabited by persons of the working class, to be erected on a site at the rear of dwellings in Picton Street, Camberwell, on the application of J. A. J. Woodward & Sons, on behalf of J. Dennis. (*Consent.*)

New street for carriage traffic to lead from Perry Hill to Castland Road, Lewisham, on the application of E. E. Leach. (*Consent.*)

Deviation from the plans sanctioned on 25th July, 1905, for the formation or laying-out of new streets for carriage traffic out of the western side of Thrale Road and northern side of Nimrod Road, so far as it relates to the omission of the footpath on the northern side of the road adjoining Tooting Graveney Common, on the application of D. Young & Co., on behalf of A. W. Gosden and H. F. Crunden. (*Consent.*)

New streets for carriage traffic out of the south side of Hazlewell Road and in continuation westward of Chartfield Avenue, Putney, on the application of J. C. Radford, on behalf of Lord Westbury. (*Consent.*)

Retention of wooden fences or barriers across Biddulph Road and Ashworth Road, on the Paddington Estate, Sutherland Avenue, Paddington, on the application of A. T. Stewart. (*Consent.*)

Retention of barriers across the Delaware Road on the Paddington Estate, Sutherland Avenue, Paddington. (*Refusal.*)

Retention of barriers across Ellerton Road, Wandsworth, on the application of Holloway Brothers. (*Consent.*)

Deviation from the plans approved on 19th December, 1904, for the formation or laying-out of streets for foot traffic only on a site on the west side of Backchurch Lane and east side of Gower's Walk, Whitechapel so far as relates to an alteration in the position of buildings on the western side of Backchurch Lane, on the application of Crickmay & Heath. (*Consent.*)

The Theatres and Music Halls Committee also reported the following:—

Plans submitted by F. Matcham & Co. showing the alterations proposed to be carried out at the Holborn Empire (late Royal Music Hall), Holborn, in order to give effect to the suggestions made by the Council for the structural improvement of the premises. In the execution of the work certain deviations have been made from these plans, and amended plans have now been submitted by Matcham & Co. showing the alterations which have been carried out. Matcham & Co. have also submitted plans showing the office accommodation in connection with the premises. (*Consent.*)

Plan submitted by F. Matcham & Co. showing a proposed rearrangement of the coal-bunker in connection with the boiler-house at the London Coliseum. (*Consent.*)

Plans submitted by Bull & Bull showing the proposed arrangement of the seating for the Naval and Military Tournament which it is intended to hold at Olympia, and also the seating arrangements in the Olympia annexe in connection with its use as a variety theatre. (*Consent.*)

THE PURPLE PATCH.

THE "third spasm" of "The Tufton Street Tatler or The Purple Patch," wherein the wits of the Architectural Association disport themselves—and they do so with much gusto—is now upon us. We recommend it as an excellent sixpenny tonic to all dejected assistants and comfortable practitioners. Here are a few of the latest quips and fancies:—

The forthcoming Architectural Congress is beginning to loom large on the horizon, and already preparations are being made for what, as far as we can make out, will be an enlarged and glorified Spring Visit. But if we may judge the state of the profession abroad by its present condition in England, we would advise intending hosts not to make too elaborate arrangements, as it seems only too likely that many of our visitors will have the greatest difficulty in satisfying the Immigration Officers under the new Act that they possess means of subsistence.

A possible addition to the specification: "Attend upon the engineer, and finish him in the best manner, and do everything to render the work perfect and complete."

From a village churchyard: "Here lies an architect who designed his own tombstone, for which the contract sum was less than his estimate."

That in view of the condition of some of the cottages in the Wilderness City, it is now to be re-named "Shoreham."

That one of the most recent building combines is to be re-named the "Britannia Metal Building Co.," on account of its wearing white all through.

Patcho for the hair. N.B.—Insist on seeing the libel.

THE ARCHITECTURAL ASSOCIATION.

THE VAULT-BUILDERS.

A MEETING of the Architectural Association was held on Friday evening at 18, Tufton Street, Westminster, the chair being occupied by the president, Mr. E. Guy Dawber, F.R.I.B.A.

The following new members were elected:—Messrs. E. Dickens, D. W. Rowntree, H. R. Levy, P. M. Stratton, W. F. Edge, G. Robb, G. Dovaston, R. S. B. Wyld, G. S. H. Bradford, R. S. Petch, J. G. Alder, B. J. Boothroyd, C. P. Wade, G. E. Fitzgerald, F. E. Harris and E. Petre.

The following further donations to the Building Fund were announced:—

	£	s.	d.
Charles Morrison	-	50	0 0
Ernest George & Yeates (2nd donation)	10	10	0
Leslie W. Green do.	-	3	3 0
H. L. Anderson do.	-	2	2 0
A. Durst (double subscription)	-	1	1 0
Maurice E. Webb do.	-	1	1 0
A. Crow do.	-	0	10 6
C. W. Ferrier do.	-	0	10 6
W. Curtis Green do.	-	0	10 6
F. T. W. Millar do.	-	0	10 6
John Murray do.	-	0	10 6

It was decided to send a vote of condolence to the widow and family of the late Mr. John P. Seddon, one of the oldest members of the Association, who joined in 1847. He was honorary secretary to the Association in 1850-51, and also honorary secretary of the Royal Architectural Museum for a time with Mr. Maurice B. Adams.

The president announced that it was proposed to call a special general meeting for February 23rd, with reference to rules 21 and 31, the proposal being to reduce the ordinary members of council by one and to make the editor of the Association "Journal" a member of council.

The Rev. G. H. West, D.D., A.R.I.B.A., then read a paper on "A Comparison between the Mediæval Architecture of England and France." At the outset he explained

The Outstanding Difference between English and French Cathedrals.

The French cathedral, he said, was the material expression of a newborn national life, rising from the very midst of the crowded dwellings, a great assembly hall open to all from end to end, with generally a comparatively small choir and no solid screen between clergy and people; whereas the English cathedral, the expression of monastic life, generally stood apart from the city to which it belonged, nestled amidst the elms of its quiet close, side by side with the chapter-house where the monks transacted their business during life and the peaceful cloister where they slept at last—two buildings hardly ever found now in connection with a French cathedral; for though so-called cloisters did exist in some cases in France, yet they were the dwellings of the secular clergy of the church, and very early became a tangled mass of tortuous streets surrounded by a wall, not a cloister in the usual sense.

Such contrasted views as those of Chartres and Lichfield, Wells and Rouen, summed up completely the stories of the two national churches, and anyone who could remember Rouen as it used to be, with the old houses built against its walls, would be able to realize how completely the French cathedral was the centre of the life of the city.

There could be no more telling contrast than the view of Rouen, with the fortified palace of the archbishop adjoining the cathedral, in the very centre of the town, and that of Exeter from the quiet bishop's garden, with the large-windowed Elizabethan house. It would also be found that, whereas the great lay guilds built the French cathedrals and handed down as craft secrets their learning and traditions, so that the constructional development of French Gothic was the result of the severest logical reason-

ing from first to last, the English cathedrals were frequently built under the direction of the monks, if not actually with their own hands, as at Gloucester, and there was consequently a comparative absence of scientific tradition, much less coherence in purpose and expression, but more individuality and local originality.

Let us now turn to the constructional development.

The Problem.

From the time when Christian art began to revive after the fall of the Roman empire the efforts of all builders in the ancient imperial provinces of Western Europe had been centred in the attempt to do with small materials and a limited supply of unskilled labour what the Romans themselves had never even attempted with building resources such as the world had never seen before or since—to cover the three-aisled basilica, which by long use had become the recognized form for the Christian church, with the stone or concrete vault of the great halls of the Roman baths. The intersecting vault could be managed over the small square compartments of the aisles, but was quite beyond the power of these early builders for the high vault of the nave, while the continuous thrust of a barrel-vault, unless the three aisles were kept of equal height, as at Champdeniers, brought all to ruin before long.

Its Solution.

By the beginning of the twelfth century it had become obvious that if the problem was to be solved some means must be found for concentrating the thrust upon certain points, preferably upon the corners of a square, either, as at Perigueux, by a series of domes on pendentives, or, as at Vezelay, by the regular Roman intersecting vault. This was the form which ultimately prevailed, for it was a fairly obvious step to work from centerings placed under the angles of the intersecting cylinders, and to get over the difficulty, insurmountable to these early builders, of getting the proper ellipse given by the intersection of two semicircular vaults in one of three ways—either by making the intersecting centerings semicircular and then building a dome around them, as in Aquitaine; or by piling earth on the top till the vaults themselves also became nearly semicircular, though still domical, as at Vezelay; or, as at Durham, by making the centerings segmental.

Stone Centerings.

It was at Durham, in England, and a little later at St. Denis, in France, that the great step was made which gave birth to Gothic of making these centerings of stone and leaving them as a permanent support to the vaulting panels, and letting each panel be separately supported by the centerings or ribs.

In this lay the key to the history of all later mediæval architecture. After St. Denis all French churches existed by and for the vault, the plan of which was in the mind of the builder from the moment when the first stone was laid. It took some time for it to be found out how great the thrust was even of this form of vault, but that abutments were needed only at the springers. This abutment was given at first in the simplest way, as at Durham, by a complete arch over the triforium carrying its roof, and later by a quarter arch butting against the springing, as at Gloucester and the Abbaye aux Hommes at Caen. But it was soon found that these arches should abut higher, and when the triforium became a mere passage they were left outside the roofs and became continually more complex, passing from the simple forms of Chartres to the extremely elaborate and beautiful ones of Amiens and St. Ouen.

Exposed Construction.

The principle once admitted of allowing all the constructional parts of a building to

be exposed to the weather, nothing could be more perfectly thought out than the French cathedral, where the walls had formed "four deep" and the thrust of the great vault was carried down to the main buttress by an arch. All the intermediate spaces were mere screens of storeyed glass, and nothing could be more perfect in its beauty. But, as always in human work, only for a moment did these stern reasoners and perfect artists rest on the summit, and Beauvais was a literal example of that "vaulting ambition which o'erleaps itself."

Effect on the Interior.

Such was the extreme expression of French thirteenth-century Gothic; but while the vault thus dictated the exterior forms of the building, it affected the interior hardly less. The monocylindrical columns, with great voluted capitals derived from Classic times, were soon felt to be unsuitable, as so much of their upper surface was left unused and the arrangement was illogical. So in the later columns of Notre-Dame the pier arches had their own column, with a capital of one course, and the main vaulting shaft was the continuation of another column rising from the ground, and having its capital at the vault, and the original main column, with a capital of two courses, appeared behind these.

We thus had

The Principle of Continuity

distinctly formulated—that every arch must have its own column, that every column must have its base on the ground and its capital at the springing of its arch. Soon it was felt that every colonette should have members corresponding to the mouldings of its arch, and so by a gradual transition, which might be well traced at N. D. de l'Épine and St. Ouen, it came to be felt that the capitals had lost their meaning, and that all mouldings of all arches should run down to a common base without a break, sometimes dying into one another on the way, as at St. Maclou, but reappearing below, even if their reappearance was marked only by the corners of their imaginary bases supposed to exist inside that of the main pier, but to have been turned round so that their corners projected from the facer. Though ugly and wearisome in its latest examples, the better specimens of this last French style were many of them singularly beautiful, as St. Wulfram, at Abbeville, and the smaller details of these churches were often exquisite, like the organ staircase of St. Maclou and its wonderful porch.

The English Development.

Turning now to English architecture. First to be noticed was the tendency to bold square projections and the square east end, both of which might safely be attributed to the persistence of Saxon traditions. For a time this Saxon tradition was obscured by the Lombardic or Basilican plan, with three parallel apses or a single one, used by the Normans in Italy. English tradition, however, soon reasserted itself, and was finally fixed by the great influx of Cistercians in the twelfth century, whose churches invariably had square east ends. One other peculiarity of the English plan, the great length of the nave, was probably due to the narthex of Cluny, the influence of whose plan was to be noted at Lincoln, being taken into the church. We had only one instance—Ely—of its persisting in its original form; the Galilee of Durham being hardly a case in point.

How the Hammer-Beam Roof arose.

There was also this to remember. When the Normans came to England they had already learned to build in stone probably from their Italian masters, but their predecessors, the Scandinavian invaders of the eastern counties, were, like the ancient Greeks, essentially a shipbuilding race, accustomed to the use of large timbers and of planking on

curved surfaces. In the eastern counties, therefore, we find in several cases, as at York and Ely, stone vaulting imitated in wood, and an original development (to which there is nothing corresponding in France) in very elaborate open timber roofs made of large timbers. While in the French roof the tie-beam was a mere light tie often suspended from the main trusses by braces, as at St. Ouen, these shipbuilders used a heavy tie-beam carrying the king-post, and, when it sagged, took to bringing forward the sole-piece into the church and connecting it by long curved struts like ship ribs with the rest of the roof, and so developed the hammer-beam roof.

A new System.

But the real glory of English art was to be found in its latest form, due to the way in which the English mason, when left to himself and deprived during the Hundred Years' War of all French influence and help, reasserted his own originality and worked out a completely new system of vaulting, which gave to our Perpendicular a stately life and vigour almost lacking in late French Flamboyant.

The English Mason.

The early French builders could hardly get rid of the idea that each vaulting bay ought to be a separate entity, by preference a square, and at least domical.

To the Englishman, accustomed to curved planking on his ships, it seemed much simpler to treat the courses of his vaults like planks of the same width all along, and by dividing the half rib and half arch into an unequal number of equal parts, instead of, like the Frenchman, into an equal number of unequal ones, he got not a straight joint, but a dovetail along the ridge, and his vaulting panel ceased to be curved and self-supporting and became flat and weak. So an intermediate rib, or lierne, was inserted to strengthen this, and then others, till after passing through the stage of Lincoln we reached such a beautiful form as Exeter. But a difficulty arose with these liernes. They varied greatly in length, according to their position, and were all much shorter than the diagonals. Either, therefore, the ridge could not be kept level, or the curves of the shorter ribs must be "judged," as at Minster. Where the curve changed a short cross rib, or tierceron, was put, and a star of lozenge pattern obtained with the ribs, as in Worcester cloister and at Christchurch.

Then bosses were put where the ribs intersected, as at Lincoln and Canterbury, and all sorts of fanciful arrangements of the ribs indulged in, till the practical result was a ribbed wagon vault with intersections, as in Winchester nave and Gloucester choir, while from the number of ribs of similar curve springing from one capital and meeting a flat ceiling arose the fan vaulting of the cloister, where the curves were simple. Then from changing the curves to make them meet a level ridge where there was no flat ceiling arose

The Four-centred Arch.

the form usually adopted in fan-vaulting, and which naturally, as the pointed arch had done previously, descended through the wall arch and window head into all the rest of the building.

Having thus got the idea of this cone of spreading ribs, it was ingenious to bring it out from the wall and spring it from a pendant as centre, as at Christchurch and Oxford Cathedral, or even to bring it out so far as to quite complete the cone and let it meet another half cone springing from the wall, as in the Divinity School, Oxford, and that final masterpiece of Henry VII.'s Chapel, so easy to criticize, so impossible not to admire.

The important point to notice was that in these latest vaults the true function of the multiplied ribs had entirely disappeared, and

they and the intermediate parts were all cut out of large blocks of stone. We had thus returned to the Roman wagon vault, with its continuous thrust—a strange result to follow from a slight alteration of the arrangement of the stones in the vaulting panels, and yet inevitable from rigidly following artistic reasoning. It was rendered all the more striking by the fact that the French, who strictly adhered to their original system, never arrived at these rich vaults. Here and there, as at Caudebec, we found a pendant taking the place of a central column, but it was a *tour de force*, and in late French vaults, as at Abbeville, pendant bosses were quite common and lierne vaults, as at St. Riquier, not uncommon; but when we met with anything like elaboration, as at Rue, it was a piece of fanciful decoration, not a natural artistic development.

Mr. W. H. Seth-Smith, proposing a vote of thanks, recalled the fact that Dr. West had been trained as an architect both in England and France. He felt it was impossible to criticize the paper, which was of the greatest importance because there was a strong tendency to-day to set aside Gothic work in favour of Classic.

Mr. Hugh Stannus, in seconding, said he had never heard the differences between the two great styles of French and English Gothic so admirably put as by Dr. West.

The president also spoke.

The lecture was illustrated by a large number of lantern slides of absorbing interest.

Correspondence.

Over-pupilled Architects' Offices and Assistants taking Private Work.

To the Editor of THE BUILDERS' JOURNAL.

SIR,—In the excellent paper on "Difficulties of Practice" published in your issue for January 24th, Mr. J. Archibald Lucas, F.S.I., A.R.I.B.A., touches the question of over-pupilled offices and suggests that no architect should be allowed to take more than two pupils at one time. Would that such a practice were carried out. What assistant has not been nearly heartbroken to see his drawings, upon which he has lavished so much care, hopelessly disfigured in tracing by pupils doing the work of paid assistants, to say nothing of the wearisome task of correcting and making good the multitudinous commissions before the tracing can be sent out.

As to assistants taking private work, surely nothing could be more unjust than Mr. Lucas's contention. Take the case of an assistant who has to depend entirely upon himself for a livelihood (not one who can state in his advertisement "salary a minor consideration") and who has not the opportunities or connection necessary to start a practice. Think of the hard-earned money spent on an expensive education, and with what result? A prospect of a miserable suburban villa existence on £3 10s. a week—and none too certain at that. Surely he will not be grudging the paltry guinea or so earned in his spare time by an occasional tracing or a design for a "villa residence" for the builder round the corner, who would never go to the expense of employing an architect. If so, then may I give warning to any would-be aspirant to the hallowed ranks of the architectural profession, whose sole capital is his brain: rather let him be content with a Board school education and a berth as a commission traveller in somebody's patent "Allalite" wall-covering. His prospects will be a thousand times better, and he will be entirely free from the hundred-and-one cares of

AN ARCHITECT'S ASSISTANT.

LEYTONSTONE.

Notes and News.

The President of the American Institute of Architects this year is Mr. Frank Miles Day, and the first vice-president Mr. Cass Gilbert.

District Surveyors' Association.—Mr. Edward Dru Drury has been elected president of this Association for 1906 and Mr. Frederick Wallen vice-president.

Llandaff Diocesan Architect.—The post of diocesan architect for Llandaff has become vacant by the death of Mr. John P. Seddon, and a successor is now being advertised for.

A new School at Bargoed was opened recently. It is built of Pennant stone, with Forest of Dean and brick dressings. It accommodates 350 children. The cost of the work was £6,200. Mr. John Lewis, Caerphilly, was the builder, and the architects were Messrs. Morgan & James, F.R.I.B.A., of Cardiff.

A Rowton House at Newcastle-on-Tyne has been built at the top of Dog Bank and Lower Pilgrim Street. The building is of three storeys, containing 254 cubicles. Mr. J. C. Maxwell, A.R.I.B.A., of Newcastle, was the architect and Mr. S. F. Davidson the contractor, who carried out his work in fourteen months.

A new Church at Harrogate is being erected at a cost of £24,000 (exclusive of tower and spire) from designs by Mr. Temple Moore. The length will be 187ft., nave 104ft., width of nave and aisles 54ft., length of transepts 112ft., length of choir 80ft., and width 56ft. Tadcaster stone is to be used for the building. Mr. T. Rawling, of York, is the contractor.

The extension of the Plymouth Borough Asylum at Blackadon, which has been carried out at a cost of about £30,000, is now completed. By the addition of new male and female wings and another storey built over a portion of the old premises the accommodation for patients has been doubled to 400. There only remains the re-decoration of the old building below the new storey, tenders for which are to be invited forthwith.

An Exhibition of Municipal Cottages.—The directors of First Garden City are considering the question of holding an exhibition of municipal cottages on the Garden City estate (Letchworth, Herts) during the summer of 1907. It is hoped to have the cottages erected during the coming year, so that the buildings will be complete and the gardens laid out before the exhibition is opened.

At the Church of St. John Bowling, Bradford, thirteen coats-of-arms have been inserted in the east widow by Messrs. Burlison & Grylls, of London (who supplied twelve), and by Messrs. Kayle & Co., of Leeds (who supplied one). New clergy and choir vestries have also been erected, and the reredos completed as a memorial. The various works have been carried out from the designs and under the supervision of Mr. J. Drake, M.I.C.W.A.

Cardiff Town Hall and Law Courts nearing Completion.—The huge new town hall and law courts in Cathays Park, Cardiff, are expected to be finished by next autumn. So far as the building work is concerned, Messrs. Turner & Sons have practically completed their contract. The heating and ventilating apparatus has been in operation for some time, and the electric-light wiring has been done, though the fittings have not yet been fixed, neither has the telephone system been installed. In the law block the assize court has been panelled to a height of about 20ft. by Mr. John P. White, of Bedford, who is also executing other fine woodwork. The architects of the buildings are Messrs. Lanchester & Rickards, of London.

New Municipal Buildings for Marylebone are proposed to be erected, the old court house in Marylebone Lane being wholly insufficient for the administrative work of the borough council and its staff.

Municipal Architecture.—At their last meeting the Edinburgh Town Council decided to leave on the table a memorial from the Edinburgh Architectural Association in reference to the disposal of the architectural work for the city.

One of the Loveliest Things in the World is a drain, said Sir Wyke Bayliss at last week's annual dinner of the Sanitary Inspectors' Association, but he hastened to add—"when it is consecrated by art in the form of a gargoyle on the roof of a cathedral."

Forgery by a Manchester Architect.—Mr. W. T. Singleton, described as an architect, 38 years of age, was charged before Mr. Justice Grantham at Manchester Assizes recently with forging a cheque for £5 and with uttering the same well knowing it to have been forged. The jury returned a verdict of guilty. Sentence was deferred.

Messrs. Mellowes & Co., Ltd., of Corporation Street, Sheffield, have secured the orders for glazing on their "Eclipse" patent imperishable system the roofs of extensions to works of Messrs. Stephenson & Co., Ltd., at Newcastle-on-Tyne; Head, Wrightson & Co., Ltd., at Thornaby-on-Tees; Cammell, Laird & Co., Ltd., at Sheffield; an electric car shed at Dumbarton; and West Kilbride Station, G. & S.W. Railway.

Bristol Master-Builders' Association.—The annual general meeting of this Association was held last week, when Mr. R. F. Ridd was elected president for the current year and Mr. R. F. Wilkins vice-president, Messrs. E. I. Neale, Frank N. Cowlin, W. Foster, E. Walters, A. Dowling, J. Lovell, F. Chown and E. A. Love being elected members of committee. The annual report stated that not for many years past had the building trade of the city been under such a cloud of depression as during 1905, but the downward tendency had now reached its lowest ebb and there was every indication of an improvement of the trade in the near future.

A Chronological Exhibition of English Architecture from the Norman conquest to the death of Sir Charles Barry in 1860 is to be held in connection with the seventh international congress of architects in the Grafton Galleries, London, in July next. In addition there will be shown a collection of oil paintings and water-colour drawings of architectural subjects by known painters. Many of these are scattered throughout the country in private collections. It is hoped therefore that all those who know the whereabouts of any such paintings or drawings will communicate with the secretary of the executive committee at the offices of the Institute, 9, Conduit Street, W. Such an exhibition of purely British work should be made as representative as possible in view of the forthcoming visit of our foreign confrères.

Gift of Stalls to Liverpool Cathedral by Mr. S. J. Waring.—A series of stalls of remarkable beauty and simplicity has been designed by Mr. G. F. Bodley, R.A., for Liverpool Cathedral, and the committee has just been informed that it is the intention of Mr. S. J. Waring (head of the well-known firm of Waring & Gillow, Ltd.) and his sons to present the entire series in commemoration of their long connection with the city of Liverpool, in which their business originated. The generous gift is, of course, a personal one, but although Messrs. Waring & Gillow, Ltd., do not contribute to it, it is anticipated that the work will be carried out by special workmen in their workshops. No exact estimate of the cost of the work can be given. Owing, however, to the great size of the stalls and the detail of the carved work involved, the cost will be probably not less than £8,000.

The L.C.C. School of Building at Brixton is to be lighted by electricity. Tenders will be invited.

A new Women's Residential Club has been opened at Hopkinson House, Vauxhall Bridge Road. It accommodates 120 residents.

For the Glasgow Royal Infirmary Reconstruction white freestone is to be used in place of terra-cotta blocks as at first proposed.

Mr. Lawrence I. Gomme, assistant librarian to the R.I.B.A., has gone to Montreal to take up a new position.

A Statue of Charles Kingsley was unveiled at Bideford last Thursday. It is of white Sicilian marble, 8½ ft. high, standing on a pedestal 9½ ft. high. The statue is by Mr. Joseph Whitehead, of London. New municipal buildings for Bideford (architect, Mr. A. J. Dunn, A.R.I.B.A., of Birmingham) and the Carnegie Free Library, built at a cost of about £60,000, were also opened on Thursday last.

Mr. Edmund Woodthorpe, F.R.I.B.A., surveyor for the northern division of the City of London, has been appointed to the eastern division also, and Mr. M. L. Saunders, A.R.I.B.A. (the present surveyor for the western division), to the southern district also—this in consequence of the death of Mr. H. H. Collins, who acted as dangerous structures inspector for the eastern and southern divisions.

A Lecture on "An English Monastery in the Middle Ages" was delivered by Mr. G. C. Snaith before the Sheffield Society of Architects and Surveyors last Thursday. The lecturer dealt principally with the Benedictine Order and its reformed branch the Cistercian Order. The causes leading to the foundation of Fountains Abbey, a house of the latter Order, were instanced as typical of those which led to the erection of so many of the beautiful abbeys of Yorkshire.

Concrete Steel.—At a meeting of the Engineering and Scientific Association of Ireland held at Dublin last week Mr. W. Noble Twelvetees, M.I.M.E., read a paper on "Concrete Steel in Engineering Practice," in the course of which he said it was by no means clear why engineers who did not hesitate to design in concrete or in steel should doubt the wisdom of dividing the work over the two materials. An important saving could be made by such combination.

The Underground Slate Quarries of North Wales formed the subject of a lecture delivered by Mr. H. Browning Button before the Birmingham Builders' Exchange on February 1st. The shipment of Welsh slates from Portmadoc, he said, averaged from 115,000 to 120,000 tons per annum. There had latterly been an increasing import of foreign slates, but these were unfit for districts where the air was charged with chemical fumes, and buildings on which they had been used had needed to be re-roofed with Welsh slates.

The Buildings of Mr. Kiralfy's Exhibition at Shepherd's Bush, which is to be opened next year, have been designed by M. Toudoire, the French architect who designed the Architectural Court of the Esplanade des Invalides at the Paris Exhibition of 1900. The principal entrance will be in Uxbridge Road, communicating with the entrance hall, from which will extend eight industrial buildings. From these the visitor will wander through Electricity Hall, the Indian Court, Congress Hall, the Transportation Building, the Court of Honour and a Salles des Fetes. At one end of the Court of Honour will be the "Imperial Tower," marking the centre of the grounds. From here the "Elite Gardens" will open out. In addition there will be a huge sports ground, with accommodation for 140,000 spectators, and a Court of Recreation.

Current Market Prices

FORAGE.

		£	s.	d.	£	s.	d.
Beans	... ..	per qr.	1	13	0	1	15
Clover, best	... ..	per load	3	12	0	4	2
Hay, good	... ..	do.	3	5	0	3	12
Sainfoin mixture	... ..	do.	3	5	0	3	15
Straw	... ..	do.	1	8	0	1	14

OILS AND PAINTS.

Castor Oil, French	... ..	per cwt.	1	1	10	1	2
Colza Oil, English	... ..	do.	1	5	0	—	—
Copperas	... ..	per ton	2	0	0	—	—
Lard Oil	... ..	per cwt.	2	15	0	2	17
Lead, white, ground, carbonate	... ..	per ton	16	0	0	—	—
Do. red	... ..	do.	15	0	0	0	19
Linseed Oil, barrels	... ..	per cwt.	1	1	3	—	—
Petroleum, American	... ..	per gal.	0	0	6	0	6½
Do. Russian	... ..	do.	0	0	5	0	5½
Pitch	... ..	per barrel	0	8	0	—	—
Shellac, orange	... ..	per cwt.	9	18	0	—	—
Soda, crystals	... ..	per ton	3	2	6	3	5
Tallow, Town	... ..	per cwt.	1	7	0	1	7
Tar, Stockholm	... ..	per barrel	1	5	0	—	—
Turpentine	... ..	per cwt.	2	7	4½	—	—

METALS.

Copper, sheet, strong	... ..	per ton	93	0	0	—	—
Iron, Staffs., bar	... ..	do.	7	5	0	9	0
Do. Galvanized Corrugated sheet	... ..	do.	12	7	6	12	0
Lead, pig, Soft Foreign	... ..	do.	16	7	6	—	—
Do. do. English common brands	... ..	do.	16	15	0	—	—
Do. sheet English, 3lb. per sq. ft. and upwards	... ..	do.	18	0	0	—	—
Do. pipe	... ..	do.	18	10	0	—	—
Nails, cut clasp, 3in. to 6in.	... ..	do.	9	5	0	—	—
Do. floor brads	... ..	do.	9	0	0	—	—
Steel, Staffs., Girders and Angles	... ..	do.	7	0	0	7	5
Do. do. Mild bars	... ..	do.	7	10	0	7	15
Tin, Foreign	... ..	do.	165	5	0	165	15
Do. English ingots	... ..	do.	166	5	0	168	0
Zinc, sheets, Silesian	... ..	do.	31	5	0	—	—
Do. do. Vieille Montagne	... ..	do.	31	15	0	—	—
Do. Spelter	... ..	do.	27	0	0	27	10

TIMBER.

Soft Woods.

Fir, Dantzic and Memel	... ..	per load	2	15	0	5	0
Pine, Quebec, Yellow	... ..	do.	4	2	6	7	10
Do. Pitch, American	... ..	do.	2	19	0	5	0
Laths, log, Dantzic	... ..	per cu. fath.	4	0	0	6	0
Deals, Archangel, White, 1st, 3×9	... ..	per std.	12	15	0	—	—
Do. do. do. 1st, 3×9	... ..	do.	12	10	0	12	15
Do. do. do. 2nd, 3×11	... ..	do.	11	10	0	—	—
Do. do. do. 2nd, 3×9	... ..	do.	10	10	0	—	—
Do. do. Yellow, 3rd, 3×9	... ..	do.	11	5	0	—	—
Do. Räfsö, Yellow, 2nd, 3×9	... ..	do.	12	5	0	—	—
Do. Galatz, White, 1st, 3×9	... ..	do.	8	15	0	—	—
Do. Hudikswall, Yellow, 3rd, 3×9	... ..	do.	13	15	0	—	—
Do. Quebec, Spruce, Unsorted, 3×9	... ..	do.	9	10	0	—	—
Do. do. do. 2½×8	... ..	do.	7	15	0	—	—
Do. Ingrampont, White, Unsorted, 3×4	... ..	do.	7	0	0	—	—
Do. Gefle, Yellow, Unsorted, 3×3	... ..	do.	9	0	0	—	—
Battens, all kinds	... ..	do.	6	10	0	9	10
Flooring Boards rin. prepared, 1st...	... ..	per square	0	11	0	0	12
Do. 2nd	... ..	do.	0	9	3	0	10
Do. 3rd, &c.	... ..	do.	0	7	6	0	9

HARD WOODS.

Ash, Quebec	... ..	per load	4	0	0	7	15
Birch, New Brunswick	... ..	do.	2	7	6	4	10
Do. Quebec do.	... ..	do.	2	12	6	5	0
Box, Turkey	... ..	per ton	7	0	0	20	0
Cedar, Cuba	... ..	per ft. sup.	0	0	3	0	4
Do. Honduras	... ..	do.	0	0	7½	—	—
Do. Tobasco	... ..	do.	0	0	5½	—	—
Do. Brazilian	... ..	do.	0	0	4½	—	—
Elm, Quebec	... ..	per load	4	5	0	8	10
Jarrah, plank	... ..	per ft. cu.	0	2	6	0	3
Mahogany, Average Price for Cargo, Honduras	... ..	per ft. sup.	0	0	4½	0	5½
Do. Tobasco	... ..	do.	0	0	5½	—	—
Do. Cuba	... ..	do.	0	0	11½	—	—
Do. African	... ..	do.	0	0	3½	—	—
Do. Lagos	... ..	do.	0	0	3½	—	—
Oak, Wainscot	... ..	per log.	3	15	0	7	5
Teak, Indian, logs	... ..	per load	10	0	0	19	0
Do. do. planks	... ..	do.	13	0	0	20	0
Whitewood, American, logs	... ..	per ft. cu.	0	1	3	0	1
Do. do. planks and boards	... ..	do.	0	1	3	0	3

Complete List of Contracts Open.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:			
Feb. 15	Wolverhampton—Lime	Sewerage Committee	W. Clifford, Sewage Outfall Works, Wolverhampton.
" 15	Woolwich—Cement	Borough Council	J. Rush Dixon, Borough Engineer, Town Hall, Woolwich.
" 15	Droyliden—Two Schools	Education Committee	H. Littler, Architect, 16 Ribblesdale Place, Preston.
" 15	Ysrad Mynach—Additions to Church	Rev. H. Thomas	E. M. Bruce Vaughan, Architect, Cardiff.
" 15	Carlisle—Hospital, &c.	Corporation	H. C. Marks, City Surveyor, 36 Fisher Street, Carlisle.
" 15	Charmminster—Cottages	Committee	W. J. Fletcher, Architect, Wimborne, Dorset.
" 15	Dewsbury—Church Works	School Board	J. Kirk & Sons, Architects, Dewsbury.
" 15	Kinross—School	Industrial Society	A. Muirhead, Architect, 4 Abbey Park Place, Dunfermline.
" 15	Huddersfield—Mason's Work	County Council	J. Berry Architect, 3 Market Place, Huddersfield.
" 16	London, S.E.—Conveniences	Building Club	Architect's Department, London C.C., 15 Pall Mall East, S.W.
" 16	Gorseinon—Houses	Education Committee	C. T. Ruthen, Architect, Bank Chambers, Heathfield Street, Swansea.
" 16	Coalmore—House	Borough Council	F. G. Townsend, Architect, Ballyshannon.
" 16	Cradley Heath—School	County Council	Council Offices, Old Hill, Staffs.
" 17	London, E.—Bricks, Lime, &c.	Guardians	Borough Engineer, Municipal Offices, Whitechapel, E.
" 17	Bedford—Extension	County Council	W. H. Leete, County Architect, Shire Hall, Bedford.
" 17	Portsmouth—Extension	County Council	C. W. Bevis, Architect, Elm Grove Chambers, Southsea.
" 17	Lasswade—Pavilion	County Council	C. S. S. Johnston, Architect, 66 Hanover Street, Edinburgh.
" 17	Huntingdon—Rebuilding Bridge	County Council	H. Leete, County Surveyor, 36 High Street, Huntingdon.
" 17	London, S.E.—Cement and Lime	Urban District Council	H. W. Longdon, Surveyor, Town Hall, Anerley, S.E.
" 17	Arklow—Alterations and Repairs	Vestry	J. Annesley, 50 Main Street Arklow.
" 18	Cheshunt—Lime	Urban District Council	R. H. Jeffes, Surveyor, Manor House, Cheshunt.
" 19	Grimsby—House	Town Council	E. Goodhand, Architect, Osborne Chambers, Grimsby.
" 19	Richmond—Portland Cement	Urban District Council	S. B. Senior, Town Clerk, Town Hall, Richmond.
" 19	Beckenham—Bricks, Cement, &c.	County Council	F. Stevens, Clerk, Council Offices, Beckenham.
" 19	St. Albans—School Additions, &c.	Gas Committee	Urban A. Smith, County Surveyor, Hatfield.
" 19	Coventry—Shed	Town Council	F. W. Stevenson, Engineer, Gas Works, Coventry.
" 20	Portsmouth—Urinals, &c.	H.M. Office of Works	Borough Engineer, Town Hall, Portsmouth.
" 20	Worcester—Post-office Enlargement	Borough Council	Secretary, H.M. Office of Works, Storey's Gate, S.W.
" 20	London, N.E.—Bricks, Lime, Portland Cement, &c.	Rural District Council	Borough Engineer and Surveyor, Town Hall, Bethnal Green.
" 20	Tilbury—Mortuary	Borough Council	S. A. Hill-Willis, Surveyor, Council Offices, Orsett Road, Grays.
" 21	London, S.E.—Cement and Lime	Corporation	Town Clerk, Town Hall, Walworth Road, S.E.
" 21	Bootle—Wall, &c.	Trustees	B. J. Wolfenden, Borough Engineer, Bootle.
" 21	Pontypridd—Classrooms, &c.	Asylums Board	W. Jones & W. D. Morgan, Architects, Victoria Chambers, Pentre.
" 21	Homerton—Re-laying Floor	Council	Metropolitan Asylums Board Offices, Embankment, E.C.
" 21	Burntisland—Library	Town Council	W. Williamson, Architect, 67 High Street, Dunfermline.
" 22	London, N.—Portland Cement, &c.	Commissioners	E. J. Lovegrove, Borough Engineer, Municipal Offices, Highgate, N.
" 22	Dublin—Cement	Education Committee	Irish Lights Office, Dublin.
" 22	Cheltenham—School	Corporation	Chatters & Smithson, Architects, 17 Regent Street, Cheltenham.
" 22	Liverpool—Public Baths	Education Committee	W. R. Court, Municipal Offices, Liverpool.
" 23	Aberafon—Schools	H.M. Office of Works	J. Llewellyn Smith, Architect, Central Chambers, High Street, Merthyr Tydfil.
" 23	Tottenham—Sorting Office	Education Committee	H.M. Office of Works, Storey's Gate, London, S.W.
" 24	Stony Stratford—Schools	University College of South Wales	Harrington, Ley & Kerkham, Architects, 65 Bishopsgate St. Without, E.C.
" 24	Cardiff—Superstructure	Guardians	J. Austin Jenkins, Registrar, University College, Cardiff.
" 26	Bradford—Pump-room, &c.	Co-operative Society	F. Holland, Architect, 11 Parkinson's Chambers, Hustlergate, Bradford.
" 27	Whitworth—Bakery	H.M. Office of Works	T. F. Wood, Secretary, Co-operative Society, Whitworth.
" 27	London—Extension of British Museum	Town Council	Sir Henry Tanner, H.M. Office of Works, Storey's Gate, S.W.
" 27	London, W.—Chimney-shaft	Irish Constabulary	C. Jones, Borough Engineer, Town Hall, Ealing, W.
" 28	Wick—Hospital	County Council	J. Young, County Clerk, Thurso.
" 28	Dublin—Lime, &c.	Corporation	Commandant's Office, R.I.C. Depot, Phoenix Park, Dublin.
Mar. 1	Shrewsbury—County Buildings	Urban District Council	A. T. Davis, County Surveyor, Shirehall, Shrewsbury.
" 1	Accrington—Library	Managers	W. J. Newton, Borough Engineer, Town Hall, Accrington.
" 3	Londonderry—Portland Cement	Education Committee	Town Clerk, Guildhall, Londonderry.
" 5	Dalkey—Working class Dwellings	Ministry of Public Works	J. P. Gahan, Clerk, Town Hall, Dalkey.
" 6	Bromley-by-Bow—Alterations	Education Committee	J. & W. Clarkson, Architects, 136 High Street, Poplar, E.
" 9	Wenhaston—School Enlargement	Education Committee	W. E. Watkins, Secretary, White House Lower Churchyard, Ipswich.
No date	Haxby—Houses	Education Committee	Felgate & Hepworth, Architects, 3 Stonegate, York.
ENGINEERING:			
Feb. 15	Rome—Canal Extension	Ministry of Public Works	Minister of Public Works, Rome.
" 15	Handsworth—Heating, &c.	Education Committee	Wood & Kendrick, Architects, West Bromwich.
" 15	Newport—Lift	Guardians	Master, Workhouse, Newport, Mon.
" 16	Antwerp—Heating Apparatus	Theatre	Hotel de Villa, Antwerp.
" 16	Cardiff—Cooling Towers	Corporation	A. Ellis, Engineer, Central Offices, The Hayes, Cardiff.
" 16	Ingatstone—Waterworks	Rural District Council	J. Dewhurst, Engineer, Avenue Chambers, Market Road, Chelmsford.
" 16	Dundee—Filter Beds, &c.	Water Commissioners	G. Baxter, Engineer and Manager, 93 Commercial Street, Dundee.
" 16	West Ham—Electrical Plant	Town Council	A. H. Seabrook, Engineer, Tucker Street, Canning Town, West Ham.
" 17	Bilston—Heating Apparatus	Education Committee	Bailey & McConnell, Architects, Bridge Street, Walsall.
" 17	Todmorden—Retorts	Gas Committee	H. Talbot, Gas Engineer and Manager, Todmorden.
" 17	Arlon—Drainage	Corporation	M. Hermans, Chief Engineer, Arlon.
" 17	Elgin—Alterations to Heating Apparatus	County Council	Burgh Surveyor, Elgin.
" 20	London, S.W.—Gas-engines	Gasworks Committee	Maurice Fitzmaurice, Chief Engineer, County Hall, Spring Gardens, S.W.
" 20	Rotherham—Retorts, &c.	Water Co.	J. S. Naylor, Engineer, Gasworks, Rotherham.
" 21	Cwm Dimbath—Reservoir	Municipality	Togarnah Rees, Engineer, Corn Exchange Chambers, Newport.
" 22	Shanghai—Electrical Plant	County Council	Preece & Cardew, 8 Queen Anne's Gate, Westminster, S.W.
" 22	Cavan—Traction Engine	Guardians	County Surveyor, Atbara, Cavan.
" 28	Lancaster—Heating Apparatus	Corporation	Newcombe & Newcombe, Architects, 89 Pilgrim Street, Newcastle.
Mar. 2	Sunderland—Extension Electricity Station	Corporation	J. F. C. Snell, Borough Electrical Engineer, Town Hall, Sunderland.
" 2	Sunderland—Feed-pump, Cooling-tower, &c.	Corporation	J. F. C. Snell, Borough Electrical Engineer, Town Hall, Sunderland.
" 2	Antwerp—Heating Apparatus	Town Council	Secretary, Town Hall, Antwerp.
" 7	Brussels—Turn-bridges	Ministry of Public Works	M. de Rudder, rue de Loriain 11, Brussels.
" 15	Antwerp—Sluice	Municipality	M. Pierrot, Directeur des Ponts et Chaussées, Marché au Blé de Zélande, Antwerp.
April 15	Pretoria—Refuse destructor	Ministry of Public Works	Mosenthal, Sons & Co., 72 Basinghall Street, London, E.C.
May 1	Valparaiso—Port Improvements	Ministry of Public Works	Minister of Finance, Santiago.
" 1	Talcahuano, Chili—Dock	Ministry of Public Works	Direction de Material, Valparaiso.
IRON AND STEEL:			
Feb. 15	Manchester—Pipes	Gas Committee	C. Nickson, Superintendent, Gas Department, Town Hall, Manchester.
" 15	Trondhjem—Steel Rails, &c.	Commercial Intelligence Branch, Board of Trade, 73 Basinghall Street, E.C.	
" 15	Woolwich—Sewer Ironwork, &c.	Borough Council	J. Rush Dixon, Engineer, Town Hall, Woolwich.
" 15	London, E.C.—Steel Material, Tools, &c.	Bombay, Baroda and India Railway Co.	T. W. Wood, Secretary, Gloucester House, Bishopsgate Street, Without, E.C.
" 16	Christiania—Water-Pipes	Gas Committee	Commercial Intelligence Branch, Board of Trade, Basinghall St., E.C.
" 17	Tipton—Wrought-iron Tubes and Fittings	Gas and Water Board	S. O. Stephenson, Engineer and Manager, Gasworks, Tipton.
" 17	Chesterfield—Cast-iron Pipes	Urban District Council	J. Middleton, Law Clerk, Chesterfield.
" 18	Cheshunt—Ironmongery, Tools, &c.	Urban District Council	R. H. Jeffes, Engineer and Surveyor, Manor House, Cheshunt.
" 19	Beckenham—Ironwork	South Indian Railway Co.	F. Stevens, Clerk, Council Offices, Beckenham.
" 20	London, E.C.—Springs, Wheels, Axles, &c.	Borough Council	Sir G. B. Bruce, 3 Victoria Street, S.W.
" 20	London, N.E.—Ironwork, &c.	Corporation	Borough Engineer, Town Hall, Bethnal Green, S.E.
" 20	Barrow-in-Furness—Ironmongery, Pipes, &c.	Borough Council	Manager, Gas and Waterworks, Barrow-in-Furness.
" 21	London, S.E.—Tools, Steel and Iron, &c.	Gas Committee	1 own Clerk, Town Hall, Walworth Road, S.E.
" 21	Nelson—Ironmongery	Commissioners	A. J. Hope, Gasworks, Leeds Road, Nelson.
" 22	Dublin—Iron Castings, Ironmongery, &c.	Waterworks	Irish Lights Office, Dublin.
" 22	Gothenburg—Pipes	Works Committee	Waterworks Offices, Lund.
" 23	London, E.—Iron Castings	Guardians	Harley Heckford, Surveyor, Council Offices, High Street, Poplar.
" 27	Kingston-on-Thames—Ironmongery	Corporation	J. Edgell, Union Offices, Coombe Road, Kingston-on-Thames.
Mar. 3	Londonderry—Ironwork	Corporation	Town Clerk, Guildhall, Londonderry.

Complete List of Contracts Open.—continued.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
PAINTING AND PLUMBING:			
Feb. 15	Ipswich—Re-decorating	Town Council	E. Buckham, Borough Surveyor, Town Hall, Ipswich.
" 19	Macclesfield—Painting, &c.	Asylum Committee	J. W. Lees, Clerk, Parkside Asylum, Macclesfield.
" 21	London, S.E.—Oils and Colours	Borough Council	Town Clerk, Town Hall, Walworth Road, S.E.
" 21	Poole—Painting	Council	J. Elford, Surveyor, Poole.
" 21	Tooting, S.W.—Painting	Asylums Board	Metropolitan Asylums Board Offices, Embankment, E.C.
" 22	Dublin—Paints, White Lead, Plumbing Work	Commissioners	Irish Lights Office, Dublin.
" 22	Dublin—Painting and Glazing	Board of Public Works	H. Williams, Office of Public Works, Dublin.
" 24	Manchester—Paints, &c.	Rivers Committee	Secretary, Rivers Department, Town Hall, Manchester.
Mar. 3	Londonderry—Plumbing	Corporation	Town Clerk, Guildhall, Londonderry.
" 6	Croydon—Lead, Glass and Painter's Materials	Visiting Committee	Clerk of Asylum, Croydon Mental Hospital, Warlingham, Surrey.
ROADS AND CARTAGE:			
Feb. 15	Caerphilly—Roads, &c.	S. Gregory	G. L. Watkins, Architect, Rectory, Caerphilly.
" 15	Stockport—Road Works	Corporation	J. Atkinson, Borough Surveyor, Stockport.
" 15	Stockport—Materials	Corporation	J. Atkinson, Borough Surveyor, Stockport.
" 15	Stokesley—Stone	Rural District Council	W. H. Dixon, District Surveyor, Kirkby-in-Cleveland, near Stokesley.
" 15	Lowestoft—Materials	Rural District Council	S. G. Blay, Surveyor's Office, Oulton Broad, Lowestoft.
" 15	East Retford—Granite	Corporation	J. D. Kennedy, Borough Surveyor, Retford.
" 15	Woolwich—Road Materials	Borough Council	J. Rush Dixon, Borough Engineer, Town Hall, Woolwich.
" 15	Boston—Carting	Rural District Council	H. Snaith, Clerk, 10 New Street, Boston.
" 16	Pottersbury—Granite and Slag	Rural District Council	J. R. Phillips, Clerk, 2 St. Giles's Square, Northampton.
" 16	Horncastle—Granite and Slag	Rural District Council	Council Offices, Horncastle.
" 17	Bridgend—Materials and Haulage	County Council	T. Lloyd Edwards, County Surveyor, Town Hall, Bridgend.
" 17	London, S.E.—Granite, Macadam, &c.	Urban District Council	H. W. Longdon, Surveyor, Town Hall, Anerley.
" 17	Banbury—Stone	Town Council	N. H. Dawson, Borough Surveyor, Town Hall, Banbury.
" 17	Heswall—Road	District Council	T. Davies, 33 Kingsland Road, Birkenhead.
" 18	Cheshunt—Granite, Cartage, &c.	Urban District Council	R. H. Jeffes, Engineer and Surveyor, Manor House, Cheshunt.
" 19	Wisbech—Materials	Rural District Council	A. G. Catling, Highway Surveyor, 4 Post Office Lane, Wisbech.
" 19	Richmond—Materials	Town Council	F. B. Senior, Town Clerk, Town Hall, Richmond.
" 19	Beverley—Stone	District Council	E. Picker, Surveyor, Beverley.
" 19	London, W.—Paving Works	Borough Council	A. R. Finch, Deputy Borough Engineer, Town Hall, Kensington.
" 19	St. Albans—Kerbing and Paving	County Council	County Surveyor's Offices, Hatfield, Herts.
" 19	Rawtenstall—Materials and Labours	Corporation	Borough Surveyor, Municipal Offices, Rawtenstall.
" 19	Surbiton—Materials	Urban District Council	Council Offices, Ewell Road, Surbiton.
" 19	Cerne—Materials and Labour	Rural District Council	Clerk, District Council, Cerne Abbas, Dorset.
" 19	Beckenham—Granite, Flints, Gravel, &c.	Urban District Council	F. Stevens, Clerk, Council Offices, Beckenham.
" 19	London, E.C.—Horse Hire	Metropolitan Asylums Board	Metropolitan Asylums Board Offices, Embankment, E.C.
" 20	Bradford—Paving, Flagging, &c.	Corporation	City Surveyor's Office, Town Hall, Bradford.
" 21	Spalding—Hauling Road Materials	Rural District Council	H. Stanley Maples, Clerk to Council, Spalding.
" 21	Aylesbury—Granite	County Council	R. J. Thomas, County Surveyor, County Hall, Aylesbury.
" 21	Chailey—Materials	Rural District Council	C. Patrick, Clerk, Union Offices, West Street, Lewes.
" 21	South Shields—In Situ Concrete	Corporation	E. E. Burgess, Borough Surveyor, Chapter Row, South Shields.
" 21	Headington—Materials	Rural District Council	J. C. Coates, Surveyor, Hartfield Cottage, New Headington.
" 21	London, S.E.—Horse Hire, Asphalt, Bitumen, &c.	Borough Council	Town Clerk, Town Hall, Walworth Road, S.E.
" 24	Epping—Carting	Rivers Committee	Forrester, Surveyor, Thornwood, near Epping.
" 24	Manchester—Carting, &c.	Rural District Council	Secretary, Rivers Department, Town Hall, Manchester.
" 24	Spalding—Granite, Slag, &c.	Urban District Council	H. Stanley Maples, Clerk to Council, Spalding.
" 26	Old Hill—Materials	Rural District Council	Council Offices, Lawrence Lane, Old Hill.
" 27	Woodbridge—Materials	County Council	G. Cook, District Surveyor, Grandisburgh, near Woodbridge.
" 27	Lewes—Materials	Urban District Council	F. J. Wood, County Surveyor, County Hall, Lewes.
Mar. 5	Southall—Making-up	Town Council	R. Brown, Engineer, Council Offices, Southall.
" 6	Batley—Materials	County Council	O. J. Kirkby, Town Hall, Batley.
" 6	London, S.W.—Stone and Cartage	County Council	W. T. Wakelam, County Surveyor, Middlesex Guildhall, Westminster.
SANITARY:			
Feb. 15	Duffield—Sewerage Works	Rural District Council	R. Lowcock & Phelps, 50 Queen Ann's Gate, Westminster, S.W.
" 15	Woolwich—Drain Pipes, &c.	Borough Council	J. Rush Dixon, Borough Engineer, Town Hall, Woolwich.
" 15	Stockport—Earthenware and Stoneware Pipes	Borough Council	Borough Surveyor, Stockport.
" 15	Kendal—Sewers	Corporation	Borough Engineer, Town Hall, Kendal.
" 16	Boote—Earthenware Pipes and Gulleys, &c.	Corporation	Borough Engineer, Town Hall, Boote.
" 17	West Didsbury—Stoneware Pipes and Junction	Corporation	Surveyor, Town Hall, West Didsbury.
" 17	London, S.E.—Disinfectants	Urban District Council	H. W. Longdon, Town Hall, Anerley, S.E.
" 17	Elgin—Sewers	Town Council	Borough Surveyor's Office, Elgin.
" 17	Darlington—Sanitary Pipes, &c.	Corporation	G. Winter, Borough Surveyor, Town Hall, Darlington.
" 18	Cheshunt—Stoneware Pipes and Gulleys	Urban District Council	R. H. Jeffes, Engineer, Manor House, Cheshunt.
" 19	Frinton-on-Sea—Sewers, &c.	Urban District Council	E. M. Bate, Engineer and Surveyor, Council Offices, Frinton-on-Sea.
" 19	Surbiton—Scavenging	Urban District Council	Council Offices, Ewell Road, Surbiton.
" 19	Beckenham—Disinfectants and Stoneware Goods	Urban District Council	F. Stevens, Clerk, Council Offices, Beckenham.
" 20	Portsmouth—Urinals	Corporation	Borough Engineer, Town Hall, Portsmouth.
" 20	London, N.E.—Drain Pipes, &c.	Borough Council	Borough Engineer, Town Hall, Bethnal Green, N.E.
" 20	Hemsworth—Sewage-disposal Works	Rural District Council	T. H. Richardson, Hemsworth.
" 20	Tilbury—Sewers, &c.	Rural District Council	S. P. Adams, 1 Weston Chambers, Weston Road, Southend-on-Sea.
" 20	Clatterbridge—Sewers, &c.	Guardians	F. E. Priest, Engineer, 13 Harrington Street, Liverpool.
" 20	Brandon and Byshottles—Disinfectants and Scavenging	Urban District Council	Surveyor's Office, Langley Moor, Durham.
" 21	London, S.E.—Disinfectants	Borough Council	Town Clerk, Town Hall, Walworth Road, S.E.
" 21	Leigh—Sewerage Pipes	Corporation	T. Hunter, Borough Surveyor, Leigh, Lancashire.
" 22	Gillingham—Requisites for Precipitation Works, &c.	Town Council	J. L. Redfern, Borough Engineer, Corporation Offices, Gillingham.
" 22	Rishton—Sanitary Pipes, &c.	Urban District Council	Council Offices, 4 Church Street, Rishton.
" 26	Halifax—Stoneware Pipes, &c.	Corporation	J. Lord, Borough Engineer, Town Hall, Halifax.
" 26	Stoke-upon-Trent—Sanitary Pipes, &c.	Corporation	A. Burton, Borough Surveyor, Town Hall, Stoke-upon-Trent.
Mar. 1	Tillington and Castlechurch—Drainage Works	Rural District Council	R. E. W. Berrington & Son, Engineers, Bank Bldgs., Wolverhampton.
" 13	London, E.C.—Drain Pipes, &c.	Borough Council	Town Clerk, Shoreditch Town Hall, Old Street, E.C.
TIMBER:			
Feb. 15	Woolwich—Timber	Borough Council	J. Rush Dixon, Engineer, Town Hall, Woolwich.
" 16	Boote—Timber	Corporation	Borough Engineer's Office, Town Hall, Boote.
" 17	Abertillery—Oak Fencing Posts	Urban District Council	J. M'Bean, Surveyor, 1 King Street, Abertillery.
" 19	Antrim—Timber	Asylum Committee	Clerk, Asylum, Holywell, Antrim.
" 20	Grimsby—Crescoted Wood Fence	Education Committee	H. C. Scapling, Architect, Court Chambers, Grimsby.
" 21	Leigh—Timber	Corporation	T. Hunter, Borough Surveyor, Leigh, Lancashire.
" 21	London, S.E.—English and Foreign Timber	Borough Council	Town Clerk, Town Hall, Walworth Road, S.E.
" 22	Dublin—Timber	Commissioners	Irish Lights Office, Dublin.
" 22	Gillingham—Timber	Town Council	J. L. Redfern, Borough Engineer, Corporation Offices, Gillingham.
" 26	Halifax—Timber	Corporation	J. Lord, Borough Engineer Town Hall, Halifax.
Mar. 13	London, E.C.—Timber	Borough Council	Town Clerk, Shoreditch Town Hall, Old Street, E.C.

List of Competitions Open.

DATE OF DELIVERY.	DESIGNS REQUIRED.	AMOUNT OF PREMIUM.	DEPOSIT REQUIRED FOR CONDITIONS, &c.	FROM WHOM PARTICULARS MAY BE OBTAINED.
Feb. 15	Wrexham—Schools (W. E. Willink, Assessor)	£50, £30	—	Clerk to Education Committee, Wrexham.
Mar. 1	Bangor—New College Buildings (Names only)	—	—	J. E. Lloyd, Secretary, University College of North Wales, Bangor.
" 12	Greenock—School	—	—	A. F. Niven, Municipal Buildings, Greenock.
" 20	Bangor—Free Library	£25 and £15	—	W. H. Worrall, Municipal Offices, Bangor, North Wales.
" 24	Swadlincote—Free Library	£25, £15, £10	—	W. A. Musson, Clerk, Council Offices, Swadlincote.
" 31	Birmingham—Council House Extension (Sketon Plans)	—	£1 1s.	Town Clerk, Council House, Birmingham.
April 2	Southwark—Public Library (£7,000)	£50, £30, £20	£1 1s.	J. A. Johnson, Town Clerk, Town Hall, Walworth Road, S.E.

Tenders.

Addressed postcards on which lists of tenders may be stated will be sent post free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Fetter Lane, E.C.

Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Allendale (Northumberland).—Accepted for stabling and cottage work. Mr. Arthur B. Plummer, F.R.I.B.A., M.R.A.I., architect, Newcastle and Tyne-mouth:—

Middlemiss Brothers, Newcastle.

Beckenham.—For the erection of a school for defective children, together with cookery classroom, at the elementary schools, Arthur Road, for the Urban District Council. Mr. John A. Angell, surveyor:—

Wright & Hurst, East Dulwich	£2,257	2	1
Ennes Brothers, Erith	2,193	0	0
Hall & Jacobs	2,152	8	9
H. Heathfield	2,079	0	0
J. & C. Bowyer, Upper Norwood	2,047	0	0
Wallis & Sons, Maidstone	2,043	0	0
F. W. Green	1,994	16	0
J. Smith & Sons, South Norwood	1,993	0	0
B. E. Nightingale, Albert Embankment	1,990	0	0
W. F. Blay, Dartford	1,985	0	0
F. Jacob	1,959	0	0
Jones & Andrews	1,956	0	0
J. Lonsdale, Swanley	1,920	0	0
Myall & Upson, Clacton	1,853	0	0
F. & G. Foster, Norwood Junction	1,744	0	0

* Accepted. [Rest of Beckenham.]

Boldon (co. Durham).—Accepted for restoring Boldon church after fire. Mr. Arthur B. Plummer, F.R.I.B.A., M.R.A.I. (Newcastle diocesan surveyor), architect, Newcastle and Tynemouth:—

J. W. Tiffin, Sunderland.

Burntwood Chase.—Accepted for the erection of a Council school for 628 children at Burntwood Chase, for the Staffordshire Education Committee:—

T. Mason, Hednesford	£5,458	0	0
Ashwell & Nesbit (installation of heating apparatus)	420	6	0

Caerau.—For the erection and completion of an infectious diseases hospital consisting of three ward pavilions, with out-bathing station, laundry, disinfecting station, administrative block, lodge and other buildings, in the parish of Caerau, near Cardiff, for the Llandaff and Dinas Powis Rural District Council. Mr. John H. James, M.S.A., architect, 18, Quay Street, Cardiff:—

J. Jones, Penarth	£12,475	0	0
Galsworthy & Blight	11,219	15	0
F. Bond	10,782	5	3
A. J. Colborne, Swindon	10,715	4	9
C. Dunn	10,458	2	0
G. Griffiths	10,207	6	0
H. Smith, Kidderminster	10,182	0	0
S. Shepton & Son	10,180	2	7
W. T. Morgan	10,155	16	1
A. White & Son, Liverpool	9,950	0	0
B. Williams, Whitechurch, Cardiff	9,928	16	9
W. Williams	9,847	15	7
J. C. Thomas & Sons, Abergavenny	9,818	8	9
G. Beams	9,688	3	0
E. Turner & Sons	9,613	16	8
W. Symonds & Co.	9,574	11	6
Hughes & Stirling, Bootle, Liverpool	9,454	2	7
E. R. Evans & Brothers, Cathays, Cardiff	9,440	12	6
D. W. Davies	9,340	10	0
Knox & Wells	9,203	11	9

* Accepted. [Rest of Cardiff.]

Clacton-on-Sea.—For the erection of shops and houses, Pier Avenue, for Mr. H. Bromley. Messrs. Baker & Wrightson, architects, Clacton-on-Sea, and 21, Liverpool Street, E.C.:—

J. Wright, Bromley-by-Bow	£6,939		
R. N. Marrable, Leytonstone	6,870		
Potter & Son, Chelmsford	6,800		
Dobson & Son, Colchester	6,588		
C. Roper, Ipswich	6,500		
Cubitt & Gotts, Ipswich	6,370		
Everett & Son, Colchester	6,270		
B. Birch, Pier Avenue, Clacton	6,238		
Scales & Robins, Cambridge	6,166		
H. J. Linzell, Ipswich	6,099		
W. Chambers, Colchester	5,989		
H. Smith, Clacton	5,967		
J. McKay, Clacton	5,868		

* Accepted. [Architect's estimate, £6,166.]

Darlaston.—Accepted for the erection of a Council school for 1,020 children in Dorsett Road, for the Staffordshire Education Committee:—

H. Gough & Son, Dudley Road, Wolverhampton £7,990 | | |

Ashwell & Nesbit, installation of low-pressure hot-water apparatus, £589 17s.; installation of electric lighting, £125 10s.

Evercreech.—For the erection of a villa. Mr. J. Spire, architect, Glastonbury:—

R. C. Cock, Wells	£898	10	0
S. Dodimead & Son, Shepton Mallet	880	0	0
F. Banfield, Shepton Mallet	836	17	6
T. Lydford, Castle Cary	796	12	0

* Accepted subject to deviations to be arranged.

Falkirk.—For the extension of the post-office at Falkirk, for the Commissioners of H.M. Works and Public Buildings:—

W. Allan & Cowan	£2,293	15	6
A. Cameron	2,054	14	9
W. Shaw & Son	2,000	0	0
E. C. Morgan & Sons	1,915	0	0

Drummond & Crowe	£1,880	0	0
G. & R. Cousin	1,849	4	6
Beattie & Sons	1,738	0	0
J. & C. Dewar	1,844	18	11
W. McPherson	1,794	8	2
J. J. & P. McLachlan	1,776	3	4
J. & A. Main*	1,640	0	0

A. Credit old materials.

* Accepted.

Ipswich.—For the erection of the first portion of Ranelagh Road Schools. Mr. J. A. Scheuermann, architect, Ipswich:—

Oak Building Co.	£13,280	0	0
Jenkins & Sons	12,994	0	0
James & Gower	12,570	0	0
J. C. Smith	12,345	0	0
F. C. Thurman	12,298	8	0
A. Sadler	12,200	0	0
T. Parkinson	12,035	0	0
M. Death	11,993	0	0
H. J. Linzell	11,936	0	0
Kerridge & Shaw	11,881	0	0
J. McKay	11,850	0	0
S. A. Kenney	11,839	0	0
V. A. Marriott	11,800	0	0
C. Roper	11,760	0	0
Grimwood & Sons	11,491	0	0
Spencer, Santo & Co.	11,460	0	0
C. Green	11,340	0	0
W. H. Death	11,235	0	0
C. Barrett	11,240	0	0
Catchpole & Sons*	10,983	0	0

* Recommended by committee for acceptance.

Kinsale.—For the erection of a dwelling-house at Kinsale for Mr. D. O'Sullivan, M.B. Mr. M. A. Hennessy, architect, M.R.I.A.I., &c., 74, South Mall, Cork:—

D. Murphy, Bandon	£2,000		
J. Sisk, Cork	1,997		
D. Duggan, Cork	1,800		
J. Jones, Bandon	1,700		
Kelly Brothers, Kinsale	1,663		

* Accepted.

London, S.W.—Accepted for the erection of workmen's dwellings on the site of 20, 21, 22 and 23, Marshall Street, Westminster, for the Westminster City Council:—

Sabey & Son	£3,700		
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J. Bickley, plasterer, £549.

Portsmouth.—For extension of printing works, for the "Hampshire Telegraph and Evening News" Co., Portsmouth. Messrs. Rake & Cogswell, architects.

Quantities by the architects:—			
J. Croad	£3,320		
F. Corke	3,289		
Light & Sons	3,273		
H. Jones	3,218		
J. Crockerell	3,100		
S. Salter	2,993		

[All of Portsmouth.]

Sacriston.—For the erection of Primitive Methodist schools. Messrs. Davidson & Phillipson, architects, Pearl Buildings, Newcastle-on-Tyne:—

M. R. Draper & Son	£1,405	0	0
T. Dorin	1,376	0	0
E. Dyson	1,375	10	9
F. J. Knaggs & Sons	1,367	19	2
H. C. Howe	1,361	7	3
J. B. Stott	1,314	0	0
W. Lodge	1,300	0	0
R. Thompson	1,294	10	7
H. Smith	1,280	6	2
I. Oates	1,277	0	0
Craig Brothers	1,272	3	0
W. Bradley	1,251	10	0
J. Stobbs	1,250	0	0
B. Bolam, Birtley, R.S.O.	1,221	15	11

* Accepted.

Southwick.—Accepted for the erection of the proposed new public offices in Albion Street, for the Urban District Council:—

Rowland Brothers, Horsham	£1,449		
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Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

DURING THE WEEK ending February 9th twenty-two failures in the building and timber trades in England and Wales were gazetted.

W. WATSON, builder, Bishop Auckland. R.O. Feb. 3rd.
H. H. BULLOCK, plumber, Colchester. Adj. Feb. 3rd.
C. A. CHASE, builder, Bristol. Adj. Feb. 1st.
A. PEAT, contractor, Mansfield. Adj. Feb. 2nd.
G. S. BUTCHER, builder, Kessingland. R.O. Jan. 29th.
J. PARR, builder, West Norwood. Adj. Jan. 30th.
J. SIMPSON, builder, Camberwell. Adj. Feb. 1st.
D. EVANS, plumber, Rhyl. P.E., Magistrates' Room, Bangor, March 8th, at 12.30.

H. WOOD, builder, Winchmore Hill. Liabilities £87,826; estimated surplus of assets £13,530.

A. D. SLOOMBE, builder, Teignmouth. Liabilities £3,430; assets nil.

R. BALDWIN, builder, Small Heath. Liabilities £254; assets £38.

A. H. GOODALL, architect and surveyor, Nottingham. Liabilities £4,487; deficiency £4,400.

W. E. MUMFORD, contractor, Wood Green. P.E., Edmonton C.C., Feb. 26th, at 11.30.

S. W. JONES, painter and decorator, Tredegar. P.E., Tredegar C.C., Feb. 23rd, at 10.45.

A. STYAN, builder, Whitley. P.E., Newcastle-on-Tyne C.C., March 15th, at 11.

C. R. CORRK, plumber and painter, Longfort. R.O. Jan. 29th.

HERBERT & JONES, builders and contractors, Kew Gardens. R.O. Jan. 30th.

G. H. SMITTEN, carpenter and builder, Bristol. Adj. Jan. 31st.

WHITMORE & GAUNTLETT, builders, Liphook. Adj. Jan. 27th.

NORTH OF ENGLAND ASPHALTE CO., Manchester. R.O. Feb. 1st.

H. E. TILLEY, painter and decorator, Market Harborough. P.E., The Castle, Leicester, Feb. 16th, at 10.

T. H. HARDING, builder and contractor, Derby. First meeting, Feb. 14th, at 11. P.E., Derby C.C., March 13th, at 11.

C. F. HOSKIN, painter, Devonport. First meeting, O.R.'s, Plymouth, Feb. 15th, at 11. P.E., East Stonehouse Town Hall, Feb. 16th, at 12.

J. R. FORREST, plumber, Sheffield. First meeting, O.R.'s, Sheffield, Feb. 15th, at 12. P.E., Sheffield C.C., same day, at 2.

CHARLES PICKLES & SON, slaters and plasterers, Halifax. First meeting, O.R.'s, Halifax, Feb. 14th, at 3. P.E., Halifax C.C., March 5th, at 2.

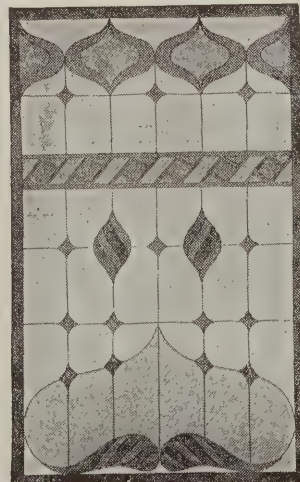
G. SNOWDEN, painter and decorator, Rotherham. First meeting, O.R.'s, Sheffield, Feb. 15th, at 12.30. P.E., Sheffield C.C., Feb. 15th, at 2.

W. COCKER, contractor and building material merchant, London. First meeting, London Bankruptcy Court, Feb. 15th, at 1. P.E., same, March 14th, at 11.30.

DANIEL C. RITCHIE, window-glass merchant, Brixton Hill. P.E., London Bankruptcy Court, March 14th, at 11.

H. GALLETT, builder and contractor, Sutton Coldfield. First meeting, 191, Corporation Street, Birmingham, Feb. 14th, at 12. P.E., Birmingham C.C., March 12th, at 2.

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Coming Events.

Wednesday, February 14.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Bailie W. Fraser Dobie on "The Aesthetic Duty of a Corporation to a City," at 8 p.m.

NORTHERN ARCHITECTURAL ASSOCIATION.—Mr. J. Bruce on "Historical and Architectural Notes on Ravenna," at 7.30 p.m.

INSTITUTION OF CIVIL ENGINEERS.—Students visit to the Bow Road Locomotive Works of the North London Railway.

ARCHITECTURAL ASSOCIATION (Discussion Section).—Mr. Stanley Hamp on "Modern Hotels and Restaurants," at 7.30 p.m.

ROYAL SANITARY INSTITUTE.—A discussion, "Is the Intercepting Trap a Failure?" to be opened by Mr. R. Read and Dr. W. Butler, at 8 p.m.

SOCIETY OF ARTS.—Mr. Claude Johnson on "The Horseless Carriage," at 8 p.m.

ASSOCIATION OF ENGINEERS IN CHARGE.—Mr. H. C. H. Shenton on "Small Water-supplies," at 8 p.m.

Thursday, February 15.

ROYAL ACADEMY.—Mr. T. G. Jackson, R.A., on "Reason in Architecture."

BIRMINGHAM BUILDERS' EXCHANGE.—Mr. F. G. Whittall on "The Housing Problem," at 6 p.m.

WORSHIPFUL COMPANY OF CARPENTERS.—Rev. W. Marshall on "Some Points of Architectural Interest in our Parish Churches," at 8 p.m.

JUNIOR INSTITUTION OF ENGINEERS.—Mr. H. Heathcote Statham on "Architectural Design and Expression," at 8 p.m.

CHEMICAL SOCIETY.—Ordinary Meeting at 8.30 p.m.

SOCIETY OF ARCHITECTS.—Presentation of Gold Medal. Mr. Ellis Marsland on "The Architecture of the Cotswolds, Sixteenth and Seventeenth Centuries," at 8 p.m.

LONDON MASTER-BUILDERS' ASSOCIATION.—Dinner, Hotel Metropole, Charing Cross, at 6.30 p.m.

SOCIETY OF ARTS.—Mr. R. B. Buckley on "The Navigable Waterways of India," at 4.30 p.m.

Friday, February 16.

ROYAL INSTITUTION.—Mr. W. C. Dampier Whetham on "The Passage of Electricity through Liquids," at 9 p.m.

INSTITUTION OF MECHANICAL ENGINEERS.—Annual Meeting at 8 p.m.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—Mr. Percy S. Worthington on "Homes of the Monks during the Middle Ages."

Monday, February 19.

SURVEYORS' INSTITUTION (Junior Meeting).—Papers on "The Management of Urban Property," at 7 p.m.

ROYAL ACADEMY.—Mr. W. R. Colton, A.R.A., on "Enthusiasm in the Pursuit of Sculpture."

ROYAL INSTITUTE OF BRITISH ARCHITECTS.—Mr. E. Guy Dawber on "Furniture," at 8 p.m.

LIVERPOOL ARCHITECTURAL SOCIETY.—Display of Lantern Slides, and Discussion.

ROYAL INSTITUTION.—Mr. M. H. Spielmann on "George Frederick Watts as a Portrait-Painter," at 3 p.m.

Tuesday, February 20.

INSTITUTE OF SANITARY ENGINEERS.—President's Address at 8 p.m.

ARCHITECTURAL ASSOCIATION OF IRELAND.—Mr. P. J. Lynch on "Holiday Rambles with a Camera," at 8 p.m.

ARCHITECTURAL ASSOCIATION CAMERA AND CYCLING CLUB.—Mr. J. A. Gotch on "A Chat on Renaissance Architecture," at 7.30 p.m.

Wednesday, February 21.

SURVEYORS' INSTITUTION.—Annual Dinner, Hotel Metropole, at 7 p.m.

INSTITUTE OF SANITARY ENGINEERS.—Mr. N. W. Hoskins on "Materials in Sanitary Work," at 7 p.m. (Students' Lecture.)

Thursday, February 22.

ROYAL ACADEMY.—Mr. W. R. Colton, A.R.A., on "The Rough-hewed and the Imitation of Life."

WORSHIPFUL COMPANY OF CARPENTERS.—Mr. A. Evan Bernays on "Greek Temples and Ruins," at 8 p.m.

New Companies.

ORMRODS, LTD., to acquire and carry on the business of a brick and tile maker carried on by W. Gornall at the Shipton Brickworks, Halliwell, Bolton. Capital: £5,000.

B. HOBBS & CO., LTD., to acquire and carry on the business of an ironmonger, builders' merchant, &c., carried on by B. Hobbs at Blackheath, Staffordshire. Capital: £1,500.

ANDREW J. SOUTTER & CO., LTD., to acquire and take over as a going concern the business of varnish, colour and paint manufacturers, lead and glass merchants, and sanitary engineers, carried on by A. Gifford Soutter and W. Rickards, at 9, Bury Street, St. Mary Axe, E.C., and Clyde Works, Canning Town, N.E. Capital: £15,000.

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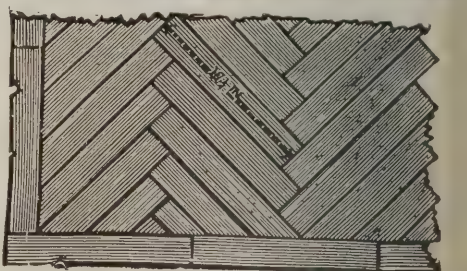
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17 1/2 x 3 x 2	8 3	7 9	11 5
17 1/2 x 3 x 1 1/2	6 9	6 3	9 3



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MONTHLY

FIRE SUPPLEMENT

TO THE

BUILDERS' JOURNAL AND ARCHITECTURAL RECORD.

[Number 17. February, 1906.]

FIRES OF THE YEAR 1905.

BELOW we give a summary from the "Post Magazine" as to the fires of the year. As will be observed, the propaganda of fire-prevention is becoming more and more actively applied; not only in Great Britain but in the United States and Europe it is making itself felt, and the number of large fires continues to be on the decrease.

This is particularly notable in the Metropolis, where both the fire-preventive methods and the higher efficiency of the fire brigade has made an appreciable difference in the fire loss of the last two years. With the advent of another Building Act Amendment Bill in 1907, a few years hence must see a material reduction in the fire loss of the Metropolis, and gradually but surely the annual loss must be reduced within more reasonable limits than the figure of some 17 millions at which it was authoritatively computed at the turn of the century.

Whether the reduced fire loss will mean much reduction in premium for the insurer, we doubt, but in time such reduction will have to be made *volens volens*, particularly in respect to domestic tenement and office property, the premiums on which contribute so largely to the payment of losses in the warehouse and factory risks.

"Beginning with the fire experience at home, there is, we believe, nothing worse to chronicle than the somewhat disastrous outbreak in Long Acre in February last, when considerable blocks of buildings, chiefly in the occupation of coach and motor-car manufacturers, went down, and a large number of motor cars were destroyed, the loss reaching some £100,000. The introduction of the petrol motor has without doubt contributed a new source of danger, as may be seen from the fact that there were several other serious outbreaks, including a motor-car works at Leicester, damage about £5,000; a motor garage at Aberdeen, damage also about £5,000; and a bad fire at a similar risk in Bognor. As a consequence renewed attention has been given to this class of risk, with the object of minimizing the hazard. Dye works, unfortunately, have been much in evidence. Besides the loss of £70,000 in connection with the fire at Steiner's Turkey Red Dye Works, Church, near Accrington, there were five others of similar character—the Bradford Dyers' Association, Halifax; Gee, Samuels & Duggan, Lamberg; Hooton, Stray & Burgess, Colwick, lace dressers; Hall, of Yeaddon; and the Calico Printers' Association, Glasgow—which together absorbed more than £50,000. Drapers have not given quite so much trouble, the worst cases being in Ireland, where two drapery establishments went down in Larne for some £13,000, and a loss of £12,000 was made on a drapers' fire in Tralee. Scotland also contributed a serious drapers' and brush manufacturers' fire at Dalkeith, damage nearly £10,000. Co-operative stores were responsible for two large fires, one in Dewsbury and the other at Tyne Docks, which cost the companies about £6,000 each. Cotton warehouse fires were pretty frequent, Liverpool

alone having suffered from seven outbreaks, the aggregate loss amounting to upwards of £90,000; while there occurred quite a number of bad losses in the industrial and textile classes, including £33,000 and £6,000 on Bristol boot factories, £18,000 at Higham Ferrers, and £5,000 at Colchester on similar risks; £24,000 at Swansea and £15,000 at Sneinton, on hosiery factories; £15,000 on a worsted mill near Bradford; and others too numerous to mention. Perhaps the feature of most general interest in this connection is the destruction of three cotton spinning mills at Burnley, Haslingden and Bolton, with losses of £18,000, £16,000 and £20,000 respectively, which were fully provided with sprinkler apparatus. A loss of some £38,000 on the Peebles hydropathic establishment has drawn attention to the low rates ruling for this class, and the damage of about £7,000 to the Headland Hotel, St. Keverne, by incendiarism, should be noted."

NON-TARIFF INSURANCE COMPANIES.

IT is generally the proud boast of a newly-formed non-tariff insurance company that it will encourage *bona-fide* methods of fire-prevention by according rebates, and for this reason the advent of any substantial non-tariff company is naturally welcomed by large building owners, particularly when the requirements of the local Act necessitate them building better than they otherwise would.

A non-tariff office which was certainly managed on very broad lines in this direction was the Central Insurance Co., and by the attention it accorded to methods of fire-prevention deserved great credit. It also associated itself particularly with the giving of rebates for the installation of automatic appliances for notifying the event of a fire, more generally termed automatic fire-alarms. The Central Insurance Co. has, however, as has been the case with nearly every other non-tariff company of importance, joined the tariff ring, and must thus do its business under tariff-office conditions in future.

The association of this company with tariff offices is practically simultaneous with the announcement that the tariff offices had commenced affording a small rebate to automatic fire-alarm systems. We think we may be safe in saying that the Central Insurance Co. merits, to no mean extent, the credit of having obtained the recognition of automatic fire-alarms for rebate purposes. It also deserves the credit for certain movements—almost imperceptible in themselves, but substantial by their number—to be observed in the modification and improvement of fire-office rules and tariff conditions.

Thus the Central Insurance Co. during its existence as a non-tariff institution has certainly done good in the direction of fire-prevention itself, and has certainly influenced certain of the older offices in their policy. It is to be hoped that with the association of the Central Insurance Co. with the older offices some of its precepts will not be quickly

forgotten, and that the energetic management will yet continue to make its influence felt at the tariff-offices board in the direction of modernization in fire-office conditions, which in the first place means a more open and *bona-fide* recognition of efforts made to prevent fire or to reduce the possibility of spread of fire in warehouse and office risks.

Many expected that the success of the Central Insurance Co. as a non-tariff office would have encouraged the formation of other non-tariff offices on a sound basis, and that eventually there would be a non-tariff ring, similar to the tariff ring. For the present, however, and certainly for many years this is practically out of the question, but it is not unlikely that as years go on and the various old companies, by a process of gobbling up one another, become fewer in number, there will be some great split in the tariff offices on some question of principle, probably connected with the question of fire-prevention, and that if ever there be two distinct organizations in fire-insurance business the creation will be from within and not from without.

There are many little signs, even at the moment, that certain of the older offices, with managers of high business education and broad-minded views, are beginning to see the unwisdom of certain conservative methods which must sooner or later lead to a reaction; and should a group of these gentlemen be formed, it may become a question of a few years only and not of decades until the split takes place.

At all events, architects and builders will do well to remember that the whole of the insurance companies of note are tariff offices, with the exception of the Fine Arts Co.

PROTECTION OF THEATRES IN LONDON.

WE have pleasure in calling attention to the impending very excellent rearrangement of matters appertaining to the control of theatres in the Metropolis by which the London Fire Brigade receives a special theatre engineering department, so that parties having to deal with the London County Council on questions of theatre safety will in future only have to be in touch with the superintending architect and the chief officer of the fire brigade.

At present it is also necessary to be in touch with the chief engineer and the heads of his electrical and mechanical departments, and with a multitude of councillors negotiation was at times difficult. Even the public control department had occasionally to be consulted.

The new arrangement means the appointment of an electric lighting and mechanical engineer, two electric-lighting inspectors, and one heating inspector. The rearrangement of the work comes into operation as from April 1st, 1906. The arrangement should do much to abate a certain amount of dissatisfaction that existed among theatre owners and lessees as to the difficulty of finding out what was required of them.



GENERAL VIEW OF BLOCK B, LONDON OIL FIRE.

A LONDON OIL FIRE.

The Battersea Fire of January, 1906.

THE petroleum fire which occurred at Messrs. Bowley's petroleum store and refinery at Wellington Wharf, Battersea, again reminds us of the greatly increasing hazard in the Metropolis due to petroleum storage generally. The largely increasing number of motors and motor omnibuses, and in fact all forms of motor vehicles for commercial purposes, makes it imperative that petroleum should be stored in many premises entirely unsuitable for this purpose, besides which the sale of petroleum means much larger storage in bulk with merchants and refiners.

The site of the fire, which was on the south side of the river, was about as unsuitable a one for petroleum storage and oil refining as could be found. The buildings were of a highly inflammable character, and was only approached by a *cul-de-sac* of narrow width. On the one side was a dairy in which the timber roofing and a large amount of matchboarding was a conspicuous feature. On the other side were oil tanks. A plan presented herewith shows the general arrangement of the building.

From the plan it will be seen that the depth of the site was extraordinary compared to its width, *i.e.*, it was about 268ft. deep to a width of about 40ft. on the average.

Where the Fire began.

The fire is supposed to have commenced in that part of the building marked "D," and it is supposed that it was caused by spontaneous ignition of oil waste, as linseed oil was being stored in this building.

The section of the building marked "B" was the petroleum store, and the section marked "A" was the petrol store. The section marked "C" was used for the storage of empty casks also for oil boiling.

The other portions of the building were occupied mainly for storage purposes. Section "F" contained the offices.

The fire having presumably started in section "D," spread to sections "B" and "A," but was kept away from sections "E," "J" and "F."

The fire is one that speaks remarkably well for the efficient working of the London fire brigade and the salvage corps under exceptionally difficult circumstances. The

intense heat and the heavy smoke from this fire made the work of the brigade exceptionally difficult; in fact, had the wind been in a different direction, *i.e.*, off

the river instead of off the shore, the work of the brigade would practically have been impossible, and a serious conflagration would probably have resulted. As it was an excellent "stop" was made under most trying conditions; for the fire not only did not spread to the adjoining premises but part of the actual premises involved was saved, including a very important part of the offices, which were of a highly inflammable character—namely, of woodwork and matchboarding.

As a spectacle the fire was one of exceptional beauty, the oil running out on to the river and burning and floating on the top of the water. From a constructional point of view the interest is primarily of a negative character, as indicating in what extraordinary buildings petroleum is housed.

Technical Lessons.

Only in two cases do we find features of technical interest at this fire and that is the construction of the metal-framed doors, one filled with an asbestos packing and one with concrete slabs which both seem to have afforded considerable resistance to the high temperatures of this fire. The asbestos door had to be broken down by the firemen in order to gain access. The concrete door is shown in a photograph. The temperatures may be gauged by the appearance of the wreckage and the buckling of the stanchions, which we illustrate.

It would be well if in oil stores of this kind the doors from one section to another had raised sills to prevent the flow of burning liquid underneath closed doors.



VIEW SHOWING STANCHIONS IN BLOCK C BUCKLED BY HIGH TEMPERATURE.



EXAMPLE OF THE EXTRAORDINARY FIRE-RESISTANCE OF A PAIR OF CONCRETE FIRE DOORS BETWEEN BLOCKS A AND B AT THE LONDON OIL FIRE.

FIREPROOF CONSTRUCTION THE ONLY METHOD OF REDUCING THE NATION'S ENORMOUS FIRE LOSS.

By Alcide Chausee, Superintendent of Buildings, Montreal, Canada.

THIS North America of ours is vast indeed; our natural resources are great, and we have grown to look upon them as inexhaustible. With ruthless abandon we have devastated our forests; we have worked our lands beyond endurance. Our mines, our fields, are handled without regard for the morrow. Within but a few years our economists have called our attention to this useless waste, and indeed we find ourselves already confronted by a scarcity of certain commodities hitherto thought unlimited. People are just beginning to awaken to the true condition of things.

Useless Waste.

Of all the useless wastes that we, as a people, have indulged in, in the United States and in Canada, that of fire is the most inane, for by it property is not only devastated but lives by thousands are yearly sacrificed.

Think of it! In 1904 7,000 people were burned, an average of nineteen fatalities through fire every day in the year, and a record that nearly equals that of all the railroad accidents of the United States and Canada, countries generally considered the most fruitful source by far of fatal accidents. And the record of 1904 was not an extraordinary one, the increase in deaths by fire has been growing steadily. Our present ratio is about nine lives lost by fire every year for every 100,000 of population. In 1900 the ratio was eight, and in 1890 it was five. Unless something drastic is done, what will the ratio be in 1950?

The loss of life is appalling, the loss of property is disgusting. One hates to think that he is part and parcel of such a race of stupids. Not even China and Japan, with their paper and bamboo houses, submit to such a tax as we do. Our fire losses are equal to a tax of 25 dollars per year per family, and that tax shows but the loss of property actually consumed. We have burned up one thousand million dollars' worth in six years. Most losses, so called, are really but exchanges; one product turned into some other form; a loss perhaps to many, but a gain to some. Not so with fire—that loss is final, absolute, and the visual one is actual. The only gain to anyone is an indirect one to the insurance companies who profit just so much more by the added anxiety after a fire that people have to be insured, and the insurance business is not run upon strictly philanthropic lines. The result of the transformation caused by fire is

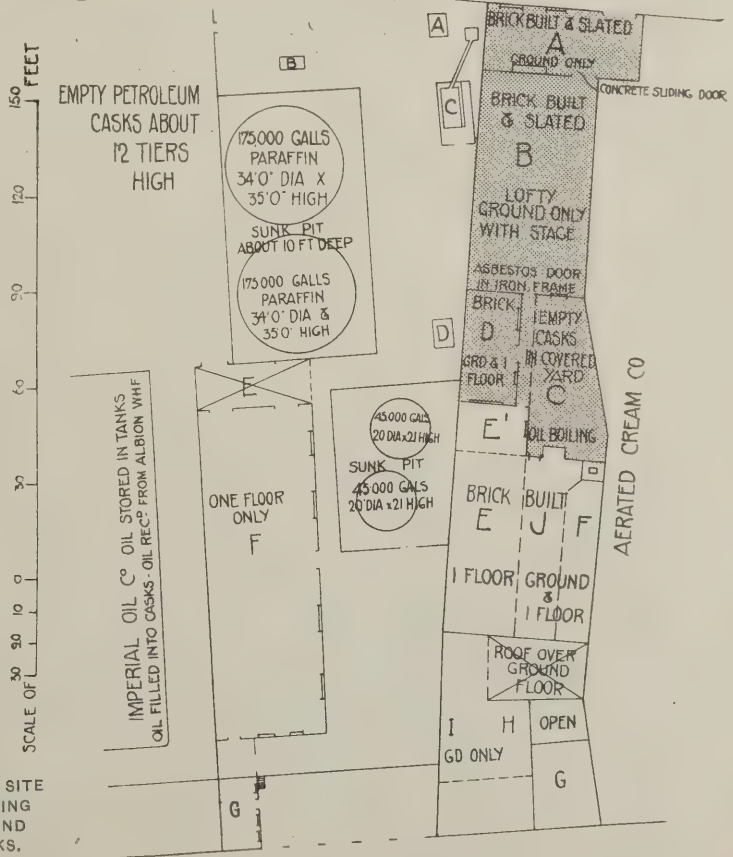
[Nothing But Smoke:

230,000,000 dollars' worth of smoke last year. As with last year's death record, the property loss does not show a spasmodic increase or something very extraordinary and unlikely to happen again. Even including the Baltimore fire, it was but little over the regular increase, a record that hovered about the sixty million figure in the 70's, the 100 million in the 80's and one that has not been under the 160 million limit since 1900.

And, mark you, that is the destruction of property. Along with that we throw away 150,000,000 dollars or so additional in maintaining and perfecting water plants and fire departments—salves to assuage the pain of the sore, not a cure for the malady. Then, on top of that, we go to work and gamble with the fire insurance companies and pay out countless millions more, so that they will reimburse us individually should we suffer a loss through fire.

For every dollar that the individual loser receives as indemnity, the community has

RIVER THAMES
TIMBER QUAY



GENERAL PLAN OF SITE OF OIL FIRE, SHOWING MAIN BUILDINGS AND ADJOINING TANKS.

WELLINGTON ROAD

S. BOWLEY & SONS



LUDWIGSHAFEN FLOUR MILLS BEFORE THE FIRE.

paid out 3 dollars as insurance premiums. That is the average. I have in mind one city that has paid out in a given time 692,000 dollars in premiums, and that has got back 107,000 dollars for its losses by fire during the same period. An intelligent speculation to be sure, but, then, what gambling is intelligent?

Losses Not Reported.

But leaving aside the accessories, so to speak, and restricting ourselves to the actual destruction of property, the 230,000,000 dollars of last year means a daily average of 630,000 dollars. Now, large as that is, we were satisfied some time ago that it did not tell all the story. We draw those facts from the fire department records, insurance reports, &c., more or less fallible sources of information, and that are far from being all-comprehending. We were sure that there were hundreds of fires unreported in interior districts of uninsured property, and where there were no fire departments. So, early in February of 1905, the Society of Building Commissioners and Inspectors prepared a most elaborate system, albeit expensive, to get all the facts concerning fire for at least a short period. The system was in working order by February 19th, and was, I am sure, perfect on the 23rd.

A Million and a Half Dollars Lost a Day.

During the ten days of the test, from February 19th to 28th, there were 1,315 fires, totalling a loss of 14,809,000 dollars, or 1,500,000 dollars a day. True, it so happened that there were some pretty severe fires during that period, but, who tells us that there will not be as severe, or more severe, ones later on during the year as there were previous to that time?

Granted that a record of 1,500,000 a day



LUDWIGSHAFEN FLOUR MILLS AFTER THE FIRE.

will not obtain all the year round, and assuming, indeed, that we will not actually average more than half the amount, still the figure is exceedingly near the mark reached by the new buildings we are daily erecting and that give such a semblance of progress. At the most liberal estimate we build but 1,000,000 dollars' worth of buildings a day, hence we are destroying perilously near as much as we are creating. Talk of race suicide!

New York averages 8,700 fires a year, Chicago 4,100. We burn up three theatres, three public halls, twelve churches, ten schools, two hospitals, two asylums, two colleges, six apartment houses, three department stores,

two jails, twenty-six hotels, 140 flat houses, and nearly 1,600 homes every week of the year. We may say that every person who lives or has business in buildings is more or less exposed to danger by fire, owing to our recklessness or criminal carelessness or ignorance, but setting aside such broad terms, we have estimates that there are 36,000 lives daily in danger, that is, there are many people directly exposed to fire, people who escape from burning buildings, lives that are in imminent peril.

Palliatives instead of Prevention.

And what is being done to prevent this terrible loss? A little, almost hopelessly little, in the way of prevention, though much as a palliative. We throw water upon our fires (we are constantly endeavouring to throw it more scientifically), and expect the next fire to burn less fiercely because thereof. In San Francisco, for instance, there is little being done comparatively to improve the standard of construction. It is notoriously a wooden city, yet insurance rates are fairly low

because, forsooth, the fire department is so excellent. That is like extolling the advantages of a certain locality as a health resort. It may be miasmatic, yellow fever may stalk amuck; its houses and streets may be foul, but, glory be, its doctors are skilful.

As far as cure goes, note how little we have done. In all this broad land there are but 3,000 buildings that can be called "fireproof," and that very largely only in their structural parts, that is, fireproof buildings like those in Baltimore, whose steel frames and terra-cotta floors withstood the attack where all else about them, the stones, the marble, the wood went the way of all things combustible or destructible.

What is the Cure?

But two things will tend towards the accomplishment of that end, and neither water-supply or fire department is one of them. The first thing to do is to surround our old and dangerous buildings with safeguards to correct their worst faults where practicable, and to compel their demolition as soon as possible. The second is to absolutely bar the erection of combustible structures in the future.

Some would say that that would be a hardship upon the individual, for we have grown so accustomed to using wood that it seems to be a fixed mode of construction, sanctioned by time and custom, a sacred inheritance, any tampering with which must needs savour of sacrilege. Therein the folly.

There was a time when wood construction was true economy, indeed the only thing available. To-day wood is almost a luxury. Lumber has gone up so much in price (over 150 per cent. in the last few years), while the fireproof materials, brick, steel, fireproofing tile, cement, &c., have been cheapened in



LUDWIGSHAFEN FLOUR MILLS AFTER THE FIRE.



STEELWORK AND CAST-IRON AT THE LUDWIGSHAFEN FLOUR MILLS.

cost of manufacture. There is absolutely no economy in building even a simple cottage of wood. Granted that the first cost in the fireproof material is 10 per cent. more than wood, but consider the wear and tear, the maintenance, the insurance, and all those incidentals, and your frame cottage will have cost you in twenty years' time 30 per cent. more than a well-built non-inflammable structure would have done.

The deterioration in the value of a well-built fireproof building, fire-resisting in its finish and decoration, is but one-ninth of 1 per cent. a year, while that of the ordinary wood joists and stud partition affair is nearly 4 per cent. a year. Besides, such improved construction has a host of other advantages. Sound-proof, vermin proof, warmer in winter and cooler in summer, and in every respect superior to the old way of building,

No Superhuman Efforts Required.

Some weak-hearted ones would have us believe that to bring about those two conditions would involve superhuman effort, well-nigh an impossibility. But our cities have accomplished other reforms quite as revolutionary—so thought at the time—as this would seem to be. The people sometimes chafe at what they term the restraint of individual liberty involved in the enforce-

ment of drastic curative laws. But not for long. North American intelligence is such as to soon recognize the value of perhaps individual sacrifice involved in so great a public benefit. We may not hope, however, to bring the desired conditions about by mild persuasive preaching. It will take vigorous action, and the only action that will accomplish anything is the adoption of most stringent building regulations, and their strict enforcement by competent executive officers.

Building, in general terms, requires the

clearest definition and restriction, while every class of building calls for a thoughtful and comprehensive special legislation. If we think that theatre builders ought to enjoy certain latitude we have but to scan the record of the Iroquois Theatre. If it be suggested that dock-sheds are hardly worthy of special legislation, think of what happened at New Orleans. If wholesale warehouses be deemed unimportant, note what happened in Toronto. And so it is with every class of building. Nothing can be deemed unimportant, for that very building or class of buildings may prove the ruin of half your city.

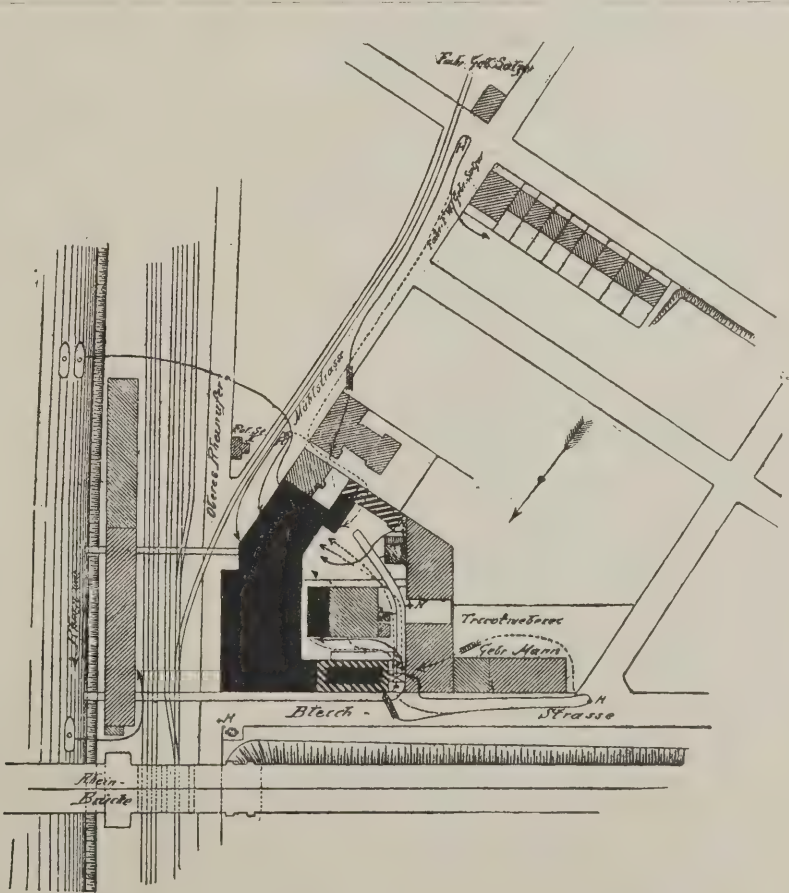
Strict Regulations Necessary.

Strict building regulations, I say, are all-important and supremely necessary. Two hundred and sixty-four of our American and Canadian cities have realized that, for there either have been or are being adopted perfected building regulations in that many cities. One hundred and sixteen cities or considerable towns heretofore unprovided with a special building officer or department have the creation of such office under consideration. There are happy indices of betterment, however we may look, but it is just such societies as this, made up of thinking public-spirited men, zealous in the upbuilding of their several municipalities, that can do a world of good in facilitating this work, and bringing its consummation about even in our own times.

Of all the cities that have given most thought and earnest work to this matter, Cleveland easily takes the lead. Her building ordinances may be said to be the combined work of nearly all the building experts in the country. A vast sum was spent upon its preparation, every item was discussed by experts, and its effect upon the legal side of the question, as well as the technical, were carefully weighed by specialists, and the society of which I am an officer, the Inter-

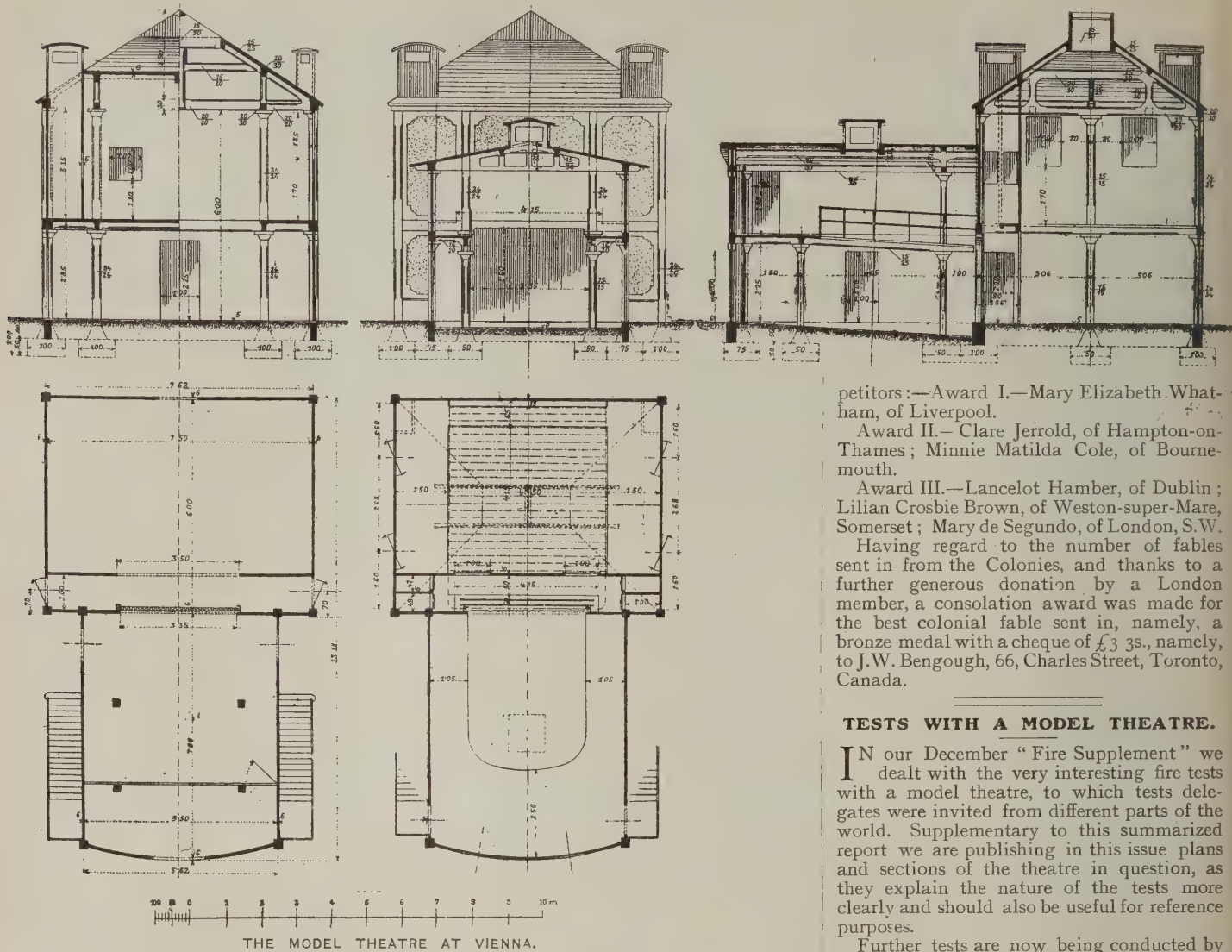


THE LUDWIGSHAFEN MILLS.



PLAN OF THE LUDWIGSHAFEN FIRE.

Blacked-in buildings completely burnt; strongly-hatched buildings partly burnt; lightly-hatched buildings untouched by fire.



national Society of Building Commissioners and Inspectors, has virtually advocated that ordinance *in toto* as its model and standard, and is urging every city in both countries to adopt it also with as little change as possible.

Some may think it verbose. It is complete, and leaves nothing to the misinterpretation or misjudgment of a perhaps too lax officer. Every point is covered.

Lax Building By-laws.

I submit, and readers will readily appreciate, that it would be a tremendous advantage to have a uniform code throughout both countries. As it is now, one city will permit of a certain thickness of brick walls to carry a certain height of stories: a city fifteen miles distant therefrom insists upon an entirely different standard. So it is with allowable strains in framing, &c. The building business of all the cities is so closely related that this everlasting difference is not only confusing, but leads to endless discussion and trouble. A hundred other considerations should compel us to advocate not only good building regulations, but uniform ones, and I sincerely trust that everyone will not only advocate in his own city the necessity of wise and strict requirements, but that he will go a step farther, and strongly urge the council, or whatever power is in charge of that branch of municipal service, to adopt the code that is most worthy of being made standard, and that has already been engrossed upon the laws of so many of the cities of these United States and Canada.

FIRE PREVENTION FOR THE YOUNG.

Fables for Children in respect to the Danger of Playing with Fire.

THE increasing loss of life and property owing to children playing with matches and with fire induced the Executive of the British Fire Prevention Committee to attempt a remedy by impressing upon children the dangers involved thereby. The Executive considered that warnings embodied in fables or stories, which are read at an age when children's minds are very susceptible to such impressions, would act as a deterrent against carelessness with matches and fire for the coming generation.

With a view to furthering this end the Committee were enabled through a generous donation from a Canadian member to offer the Committee's Gold Medal and a purse of £20 for the best fable for children calculated to serve as a warning against the danger of playing with matches or fire, and a competition was organized. This competition, for which 286 fables and stories were sent in, has been decided as follows:—

In the opinion of the Executive no fable merited the award of the Gold Medal and purse of £20. It was decided that the awards take the following form, namely:—

Award I.—A silver medal with a cheque for £10 10s.

Award II.—Two bronze medals with a cheque each for £3 3s.

Award III.—Three bronze medals with a cheque each for £1 1s.

The following were the successful com-

petitors:—Award I.—Mary Elizabeth What-
ham, of Liverpool.

Award II.—Clare Jerrold, of Hampton-on-Thames; Minnie Matilda Cole, of Bourne-mouth.

Award III.—Lancelot Hamber, of Dublin; Lilian Crosbie Brown, of Weston-super-Mare, Somerset; Mary de Segundo, of London, S.W.

Having regard to the number of fables sent in from the Colonies, and thanks to a further generous donation by a London member, a consolation award was made for the best colonial fable sent in, namely, a bronze medal with a cheque of £3 3s., namely, to J.W. Bengough, 66, Charles Street, Toronto, Canada.

TESTS WITH A MODEL THEATRE.

IN our December "Fire Supplement" we dealt with the very interesting fire tests with a model theatre, to which tests delegates were invited from different parts of the world. Supplementary to this summarized report we are publishing in this issue plans and sections of the theatre in question, as they explain the nature of the tests more clearly and should also be useful for reference purposes.

Further tests are now being conducted by the local authorities with various minor matter appertaining to theatre safety, and eventually a report will be issued embodying the various results of the tests, and also the results of the conference that was held at Vienna at the conclusion of the tests already described.

The model theatre was erected entirely in reinforced concrete, but was not subjected to any high temperatures, the fires also only being each of a few minutes' duration.

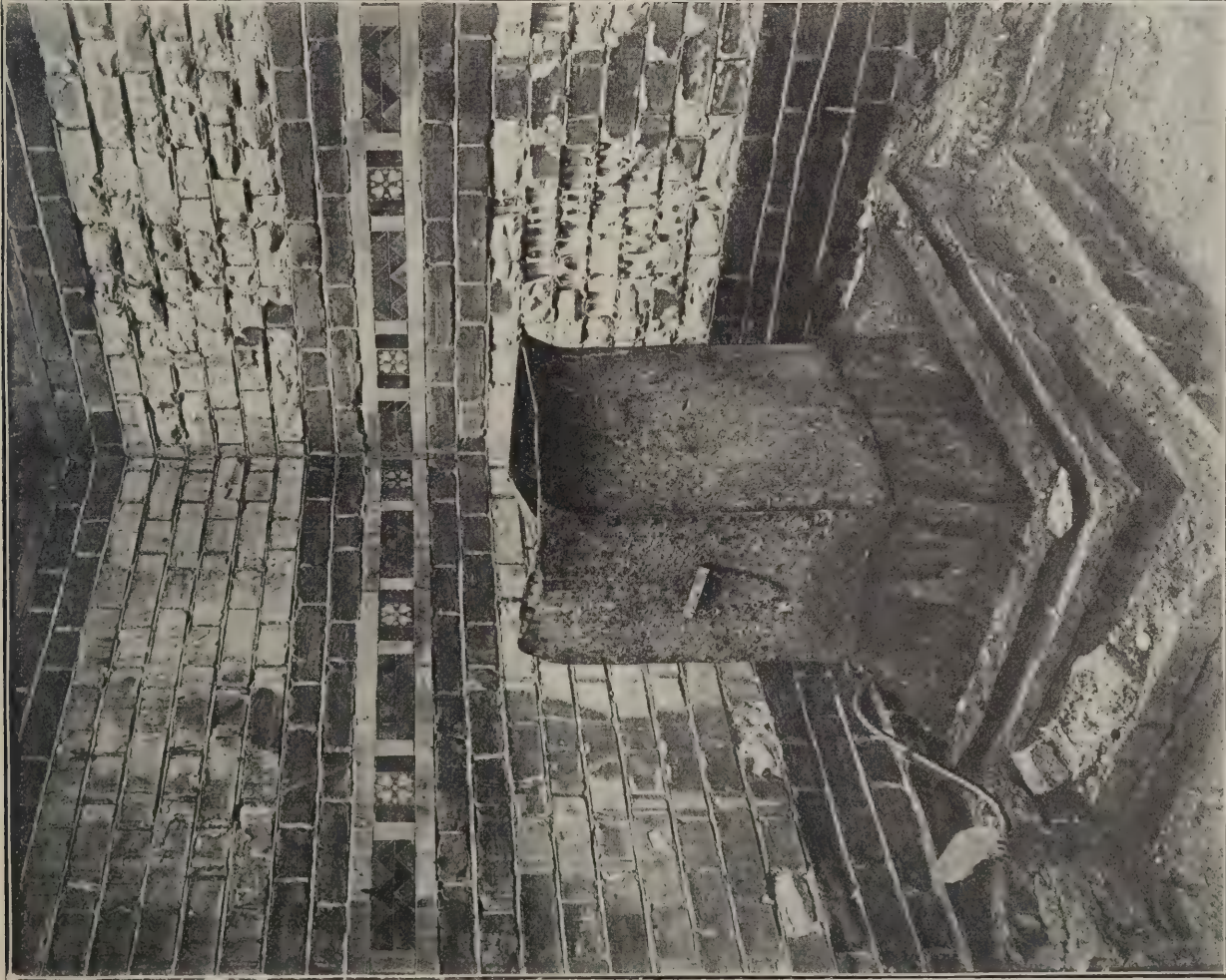
THE LUDWIGSHAFEN FIRE.

THIS fire, which we illustrate in some detail, is that of a very large flour mill on the River Rhine, which started in the early morning hours of December 13th last and resulted in the entire wreckage of these very extensive premises.

A plan showing the general arrangement of the building is presented herewith, and it will be observed that the buildings stand on their own land. Sections marked solid black were entirely gutted, whilst sections hatched were partially destroyed. The plan indicates the means of attack adopted by the local fire brigade, and we observe three floats were in operation.

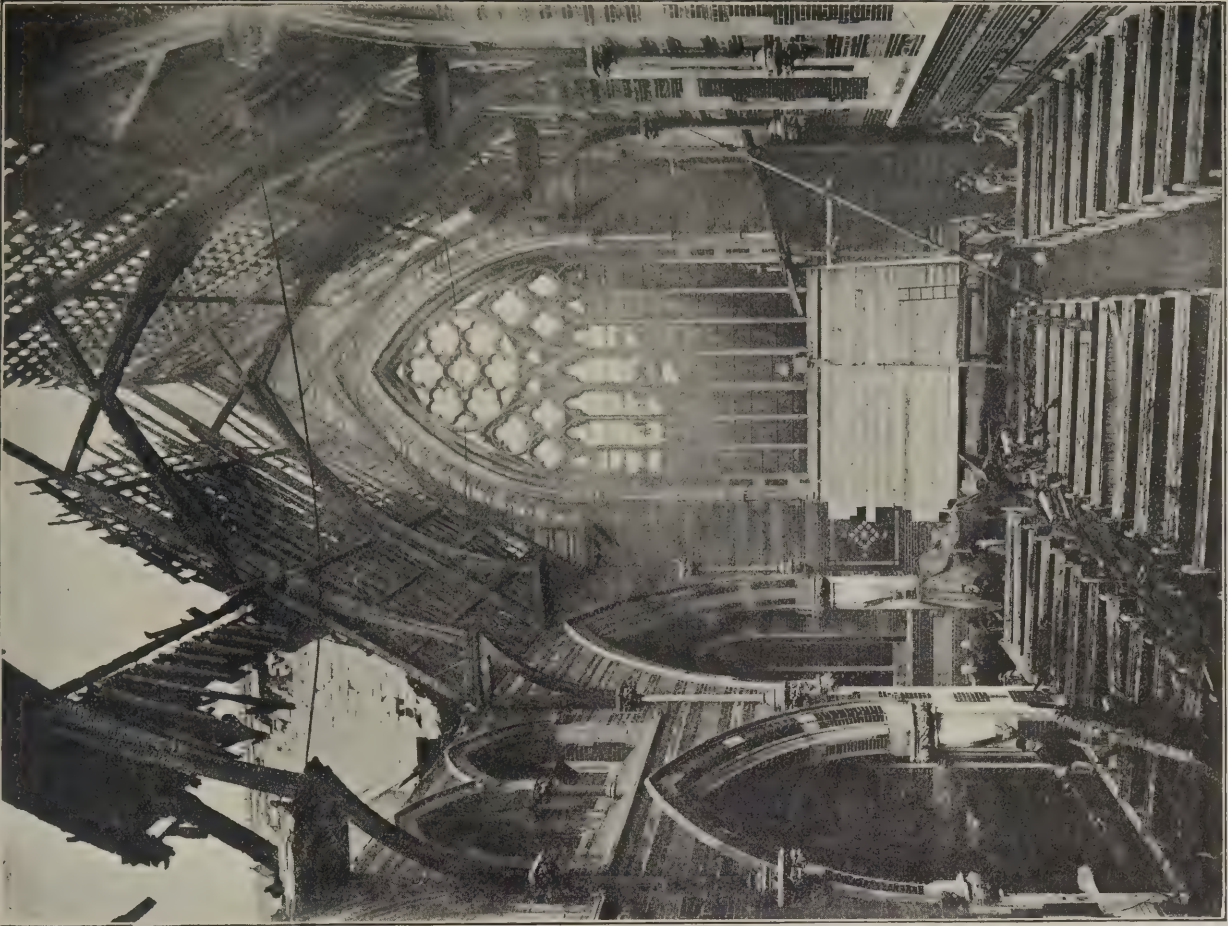
The water-supply was of course unlimited, owing to the neighbouring river, the Rhine, but the hydrant service was apparently not satisfactory.

The views taken show the building before the fire, and further several views of the general wreckage. One of these shows how the whole of the ordinary single iron doors gave way, another to what extent the unprotected steelwork was damaged.



View showing heating apparatus and fused brickwork.

THE FIRE AT CHRIST CHURCH, DOWN STREET PICCADILLY LONDON, W.



General view showing damage to interior.

THE INTERNATIONAL FIRE SERVICE COUNCIL.

THE International Fire Service Council has just issued its fourth report dealing with its work during 1904-5. From the architect's point of view perhaps the most important step has been the organization of the special sections of the Council dealing with the various subjects that comprise fire-protection, and that one of these sections should be entitled the fire-preventive section.

The Council represents the whole fire and fire-preventive service of the civilized world, and we, in fact, observe that none of the most important countries of Europe are missing from the list of delegates. The delegates are appointed in certain ratio, in accordance with the population of the different countries. The fire service and fire-preventive societies represented have a membership of no less than three millions—an enormous number, who, generally speaking, by their loyalty to the cause of fire prevention which they have at heart become not only a great power on the subject in which they are specially interested, but also a power of considerable importance for the international relations and the amity of nations, a subject which, by-the-by, is also accorded a special section in the Council, and one of no mean order.

The president of the Council for the current period of four years is Lieut.-Colonel Meyer (Copenhagen), and the vice-presidents in alphabetical order are Mr. Cazier, of France; Mr. Edwin O. Sachs, of London; Count Szechenyi, of Budapesth; and Chief Officer Westphalen, of Hamburg. The second vice-president named, together with Chief Officer Dittman, of Bremen, Mr. Ellis Marsland (district surveyor of London), Mr. Modersohn (city surveyor, Unna) and Professor Woolson (of the testing laboratories of New York), comprise the sectional committee in fire-preventive matters.

That fire-preventive matters have not been neglected by the Council in their arrangements for the various conferences can be easily seen from the records of the fire-preventive congresses that have taken place; and it is a matter of interest to observe that the question of the fire-resistance of reinforced concrete is on the agenda paper for discussion at the next International Conference at Milan.

The Council has the advantage of a great influence, moderate means, and a large number of skilled voluntary workers, and it may be anticipated that its work and sphere of usefulness will rapidly increase.

Obituary.—We regret to announce the death of Mr. Grinnel, the inventor of Grinnel sprinklers. He was a resident of the United States.

FIRE TESTS.

AS we go to press we observe that the British Fire Prevention Committee is again undertaking an important series of tests during next week, i.e., on the 21st and 22nd inst.

Of highest importance will be the second experimental test undertaken by the Committee with a concrete floor measuring 22ft. by 15ft., supported by broad flange girders, the bays being reinforced by light metal joists. This test is a continuation of a previous test of last autumn in which Thames ballast concrete was used, but in this instance clinker concrete will be used for the bays, whilst coke-breeze concrete is used for protecting the broad flange girders, this coke-breeze being supplemented by expanded metal lathing and being 2ins. thick. Comparison between the two tests should be very interesting and of the utmost value, for nowhere have tests been so conducted on as large a scale with materials in common use with a view of obtaining comparative results. It is pleasant to observe that Messrs. Skelton & Co. have in both places provided the broad flange girders and have assisted the Committee in the preparation of the test, whilst the New Expanded Metal Co. have provided the lathing and executed the concreting, and the Associated Portland Cement Manufacturers have provided the Ferrocrete cement.

The conditions of test are similar to those for the full protective class—namely, a four-hours test, followed by the application of water for five minutes, at temperatures exceeding 1,800 degs. Fahr., the load being $2\frac{1}{2}$ cwts. per ft.

The second test will be with a floor measuring 22ft. by 10ft., constructed by the New Expanded Metal Co., comprising bays of broken brick concrete, reinforced by expanded metal lathing supported by ordinary joists, one protected by concrete, and the other with a form of plastering, in both cases on expanded metal lathing. The conditions of test will be identical, and it will be eminently interesting to compare the results of the effect of fire and water on the broken-brick concrete in comparison with the clinker concrete referred to above. Ferrocrete cement has been used in this aggregate as in the previous test, so that the cement factor is identical in both cases.

Two further tests during the week will be with a roller shutter door on the Kinnear principle, fixed by Messrs. A. L. Gibson & Co. in continuation of a test already reported upon in these columns in our supplement of November last. In the one case a single door will be tested and in the other a double door, and the study of the question of the expansion of these metal surfaces will, no doubt, be eminently instructive, seeing that their expansion is provided for by a system of slits to all rivets in the metalwork.

Next in rotation to these tests there will be a further second test with a reinforced concrete floor on the Coignet system in continuation of a test that took place last autumn, the dimensions of the floor to be 22ft. by 15ft., and the test for the "fully-protective" class. There will also be some tests with some wired-glass casements.

A series of non-proprietary tests are in contemplation in respect to bays of concrete with the various clinker, coke, and slag aggregates, in continuation of earlier tests in this direction, and with the particular view of examining the effect of fire on materials which have already passed through the ordeal of fire, such as clinker.

THE RECENT CHRIST CHURCH FIRE.

WE are showing two photographs of interior views from the fire at Christ Church, Down Street, Piccadilly, one of which is a general view, and the other, which is more important to the architectural profession, shows the heating apparatus.

The heating apparatus, which was of a type common to a very large number of churches, is clearly indicated, but what is even more interesting is that the brickwork is shown, which presents an appearance that is only obtainable after being affected by very high temperatures for protected periods. It would be well to remember that in these systems of hot-air heating the actual temperature reached at the stove and close around it is extremely high, and that there is a very considerable danger of a fire being started where the stove or the hot flues come into contact with combustible material. The isolation of the heating apparatus and its flues is of the utmost importance.

The church, which is a well known one, is covered by insurance. If we are not misinformed, the church was the scene of a small outbreak about a year ago, apparently from the same cause, which was, however, quickly got under.

The Calendar issued by the North British and Mercantile Insurance Co. gives an exceedingly interesting list of fires since 1870, and it is interesting to observe the losses on the various fires, which are as follows:—

28 millions sterling for the Paris fire of May 1st, 1871.
30 " " " " Chicago fire, October 8th, 1871.
40 " " " " Boston fire of November 9th, 1872.
6 " " " " Kingston fire (Jamaica), 1882.
10 " " " " Baltimore fire of 1904.

The Toronto fire of 1904 insurance loss was valued at £1,675,000. The great Cripple-gate fire of 1897 loss was valued at one million pounds. The year 1905 has been practically free from great conflagrations, the greatest fire apparently being the two New Orleans fires of February 26th and 27th, being £800,000 and £600,000 respectively.

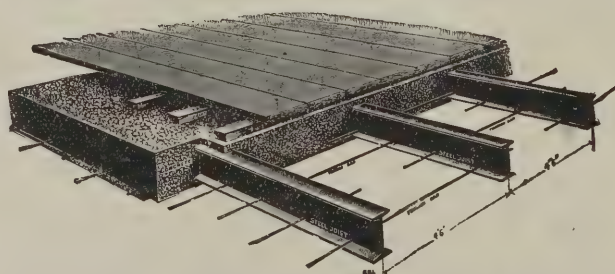
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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

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Another permanent enlargement of THE BUILDERS' JOURNAL will be initiated in our next issue in the shape of a "Contractors' Supplement." This, like our "Fire Supplement," which has been so much appreciated, will be published once every four weeks without any extra charge. The "Contractors' Supplement" will be devoted to the publication of matters of direct business interest and utility to those engaged in the building trade, and will contain several novel features.

A new House of Commons. It is very surprising that with all the agitation about the seating accommodation of the House of Commons whenever Parliament meets, no reform has been effected, but the reason is apparent when it is recalled that after a week or two at the beginning of each session the enthusiasm of members wanes and the House then has ample accommodation for the members in attendance. The agitation has proceeded for a long time. Forty years ago a Select Committee was appointed to enquire into the inconvenience occasioned by the smallness of the House. It is strange that Sir Charles Barry should not have made the House larger, for, seventy years ago, when the House was built, the Commons numbered 658 members. Of these only 306 can find a place in the chamber, although 122 additional members can be accommodated in the side galleries, but these are practically outside the area of debate, the reason being that members seated there cannot catch the Speaker's eye, as the galleries are level with the canopy of the chair. The Select Committee appointed in 1867 considered several

schemes for overcoming the difficulties, and the scheme that found considerable favour was to remove the walls dividing the House from the division lobbies flanking it, thus throwing this additional space into the chamber. This was abandoned, however, because the roof was found to be supported on the inner walls. Mr. Barry, son of Sir Charles Barry, the architect of the building, worked out a scheme of enlargement which was unanimously adopted by the Committee because it provided an increase of accommodation without interrupting the proceedings of the House. He proposed to erect a new House for the Commons in the Commons' Court adjoining the existing House. Here he found it possible to accommodate 569 members, 419 of whom could be immediately under the Speaker's eye on the floor of the House. The accommodation for strangers was also increased to 330. In addition, there were provided division lobbies, dining-rooms, tea-rooms, smoke-rooms and newsrooms; also suites of private rooms. It was estimated to cost £120,000, which would be doubtless considerably exceeded now. The old chamber was proposed to be untouched, except that the glass roof which was erected to overcome the bad acoustics of the chamber when the roof was open to the fine timber construction (still remaining above, obscured by the glass below) was to be removed. Of course, at that time the problems of acoustics were not understood, and no doubt this seemed an insurmountable difficulty, but nowadays we need not be troubled by the bad acoustics of the chamber without this false roof. It would be easy to overcome it by the provision of absorptive materials, such as felt on the walls and floors, padded seats, &c. The problem of providing additional accommodation has therefore rather a different aspect to-day, and we are inclined to think that a better solution could be offered than by the erection of a new chamber in the Commons' Court. Of course the question of interrupting the business of the House is a difficulty, but we are able to undertake building operations more speedily nowadays, and there is no reason why we should not be able to enlarge the present chamber, without seriously disturbing the business, by utilizing to the full the recesses between each session. The division lobbies could easily be thrown into the house and the roof supported by girders, while the compartments furthest removed from the Speaker could be thrown into the House without any trouble. If the galleries were then placed further away, the Speaker could, from his present position, see members seated there. Indeed, if his chair were raised, the canopy need not prevent him seeing the members at present. The acoustics, as we have said, could be better dealt with than by the provision of a false roof, and we could have the old carved roof exposed. The acoustics are complicated somewhat by the

ventilation arrangements, and if any reconstruction of the House takes place it would be a favourable opportunity to do away with the existing system of pumping air through gratings in the floor.

Cheap Chapels. In the "Methodist Times" we find the Rev. Herbert Windross seriously suggesting that the Manchester Committee might do a worse thing for Methodism than organize a "cheap chapels exhibition." He has in mind, of course, the Letchworth exhibition, which, he says, "demonstrated that it was possible to erect convenient, substantial and artistically-designed cottages for £150, instead of twice that sum, as usually charged." The Letchworth exhibition, of course, demonstrated nothing of the kind. But to return to chapels. The Rev. Mr. Windross is inclined to think that the people may feel that Methodist services and their buildings are out of harmony with the homeliness of their daily lives, and for this reason partly stand aloof. He says: "Let us look briefly at contemporary Methodist architecture. Open any recent issue of the Chapel Committee's report and it is obvious that of late years there has been a marvellous transformation in Methodist church architecture. John Wesley laid down rules for chapel-building which were observed for many years after his death. For generations Methodism built the plain square chapels, of which Carver Street is a type. But all such designs are now abandoned, and we are treated to architectural concoctions in imitation of every period of Gothic, from the purest style to the most debased, and all with towers, spires and pinnacles galore. Weird developments of Renaissance greet our bewildered vision, and the plain old chapels such as our grandfathers loved will be seen no more. Now we do not contend that it is advisable to return to this mediæval style of Methodist architecture. But we cannot forget that, according to all accounts, in those sometimes despised mediæval times the plain old chapels were filled, and filled with 'the common people.' In the plainness and homeliness of their chapels there was something with which the people were familiar, and they felt at home. Is it so in some of our modern Methodist mimic cathedrals?" There seems a grain of truth in this, for there is no need to imitate the form of buildings that served different ecclesiastical ideals, and there is no reason why a Nonconformist chapel should not be plain and simple and yet be artistic and refined; but the "mediæval" Methodist chapels—? those of early nineteenth-century date—hardly offer such examples, though we are willing to admit that there is undoubtedly too much over-elaboration of modern ecclesiastical buildings simply because the architects feel their inability to satisfy their clients with a building that is good unless it is bespattered with ornament.

CONCRETE MIXERS.*

By J. S. OWENS, M.D., B.A., A.M.I.C.E.,
F.R.G.S.

THE proportioning of the ingredients for making concrete, and the subsequent mixing together of those ingredients, are two distinct processes. It is impossible, however, to separate them in a paper of this kind. In some mixers the one machine performs both functions; in others the gauging of the materials is left to manual labour. There is, again, an intermediate type of machine which gauges the ballast but leaves the cement to be measured by hand. As the measuring of the ingredients must always precede the mixing it may be well to devote some consideration to the methods adopted for the purpose of ensuring correct proportions of the various materials before going on to consider the mixing machines proper.

Four Kinds of Materials to deal with.

The materials with which we have to deal have very different physical properties, and a method which is successful in measuring cement may fail entirely if applied to the measurement of broken stone or ballast. Concrete usually consists of a large proportion of coarse particles, such as gravel, broken stone or brick, cemented together by a mortar composed of sand and cement or sand and lime. This mortar must completely fill the interstices between the larger particles, and upon its strength (other things being equal) depends the strength of the concrete. We have, therefore, four separate materials composing the concrete:—(1) Broken stone, brick or other hard material such as slag or clinker; (2) sand; (3) cement or lime; (4) water. All these must be in their correct proportions. Sometimes the coarse particles and the sand are found forming a natural deposit having the proper quantities of each, such as Thames ballast. Our labour is then simplified to gauging three materials instead of four.

The ordinary method of gauging the ingredients for concrete by hand consists in filling the ballast or cement into boxes of known capacity. The quantity of water is determined by noting the consistency of the concrete; there is, therefore, considerable opening for variation in the amount, the personal factor having full play.

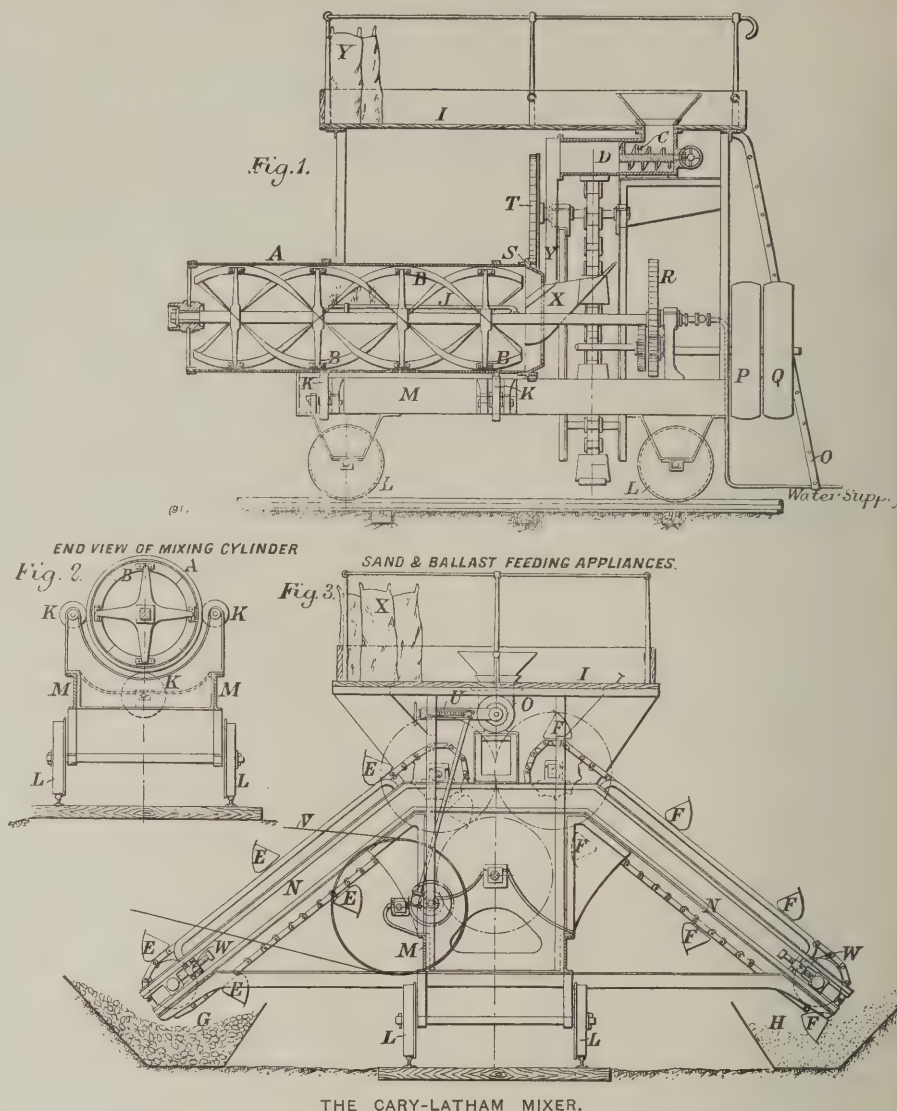
Turning now to

Mechanical Gauging.

the conditions to be fulfilled forbid complication or delicacy of parts. The measuring mechanism must fulfil its functions properly: it must not wear rapidly, and so require constant repairs or renewals; it must not clog with the cement dust or sand, and must work well with either damp or dry materials. The work must also be done either cheaper or quicker than it can be done by hand. The necessity for varying the relative proportions of the ingredients imposes a condition which it is very difficult to fulfil in a practicable machine. The result of experience of these difficulties has been to produce in some machines a compromise between hand and mechanical gauging, and in some of the most generally useful machines at present in use the gauging of the cement is still left to manual labour. This at once removes the trouble incidental to varying the proportions mechanically; the bulky materials and water are measured by the machine and the cement by hand. This method is adopted in Fawcett's patent mixer, in Arthur Koppel's, in Oehler's and others, and the result obtained is very satisfactory.

In mixers of the continuous type, which mix and deliver a continuous stream of concrete, the first essential to success is a continuous feed which will be accurate and not be affected by varying conditions of

* A paper read before the Civil and Mechanical Engineers' Society on December 7th, 1905.



THE CARY-LATHAM MIXER.

A, Mixing-cylinder; B, mixing-blades and scrapers; C, worm for delivering cement; D, cement-box; E, buckets for measuring ballast; F, buckets for measuring sand; G, ballast-hopper; H, sand-hopper; I, cement-hopper platform; J, water-pipe for mixing-cylinder; K, rollers for supporting and steadying mixing-cylinder; L, road wheels; M, framing for supporting machine; N, ladders for carrying sand and ballast bucket-gear; O, ladder for getting on cement platform; P, strap-driving pulley; Q, loose pulley; R, gear for driving mixing-blades; S, gear for driving mixing-cylinder; T, gear for driving sand and ballast buckets; V, arrangement for regulating delivery of cement; W, driving-belt; X, pitch-chain adjustment; Y, bags of cement.

the materials. The following methods of measurement may be mentioned:—

The Worm or Screw Conveyor.

This has been used with success for gauging the cement, the quantity delivered being regulated by changes of speed or by a sliding gate. This method is, however, seldom used now, as it is found to be practically as economical to measure the cement by hand. The Cary-Latham mixer (see Fig. 1) is, I think, the only machine in this country now using the screw for this purpose. Sand and broken stone are unsuitable for measuring by means of a screw, owing to the wear and tear which would result; a different method has, therefore, been adopted for dealing with these in the above machine. A bucket elevator, having a number of small buckets at intervals upon a chain, working over sprocket wheels, is made to take sand or stone from a hopper at the bottom and deliver it into the mixing apparatus at the top. This method is not often used where very accurate measurement of the materials is required. The amount of power consumed in scooping up each bucketful is considerable, and it is difficult to ensure each bucket being filled to the same extent from the hopper. With damp ballast containing sand clogging takes place and the capacity of the buckets is reduced. As an elevator, to bring material to such a level that it can be fed into the machine, the arrangement is very satis-

factory. When carefully attended to and in well-designed machines very excellent results have been obtained. The author is informed that the Cary-Latham machine (constructed by Messrs. J. H. Wilson & Co., Ltd., of Birkenhead) produces concrete having practically no variation in the proportions of the ingredients throughout the mass.

Another Method of Measuring

used is the revolving table, provided with pockets or boxes receiving material from a spout and delivering it through valves or doors to a hopper below. This is rather an ingenious method, and was used by Le Mesurier on his mixer designed for the Birkenhead Docks. He provided a belt elevator which passed beneath the revolving table. This table had hoppers of about 2 cub. ft. capacity arranged round the periphery, which were filled either by hand or direct from a stone-breaker, and on reaching a point over the end of the elevator they discharged their contents through a valve on to the band of the elevator. A similar means of measuring the materials has been used in a large Cary-Latham mixer, to be described later.

A Single-Bucket Device.

A measuring device somewhat akin to the chain and bucket elevator is used successfully on some of the best mixers, especially of the portable type. This consists of a single bucket designed to hold the exact quantity

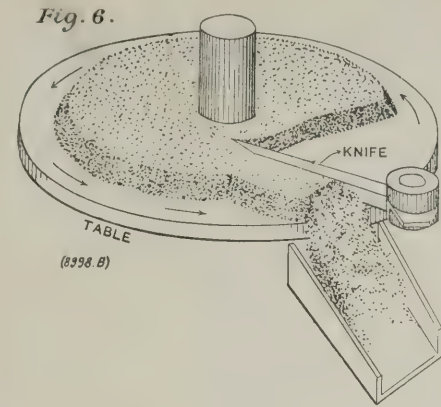
of material required for one mixing; the bucket is made to ascend along a pair of guides by means of a wire rope attached to it; the rope is wound on to a drum which is actuated by a friction wheel. On arrival at the top the bucket is tipped automatically and the contents emptied into the drum of the mixer. To lower the bucket again it is only necessary to release the friction gear and manipulate the brake provided. When lowered it is again filled either by hand or by small tipping trucks which carry the stone or ballast to the elevator.

No provision is made in this arrangement for mechanically measuring the cement, which must be gauged by hand and thrown on to the materials in the bucket before it ascends with its load. This principle is adopted in the three machines previously mentioned—Oehler's, Fawcett's and Arthur Koppel's (see Figs. 4 and 5, illustrating the last machine). The measuring of the water is in some cases done by hand, the water being directed into the drum of the mixer in a spray until the proper consistency of concrete is attained. In Fawcett's and Arthur Koppel's machines the water is measured automatically in a tank provided with a ball tap and discharged into the drum of the mixer in a spray controlled by a lever.

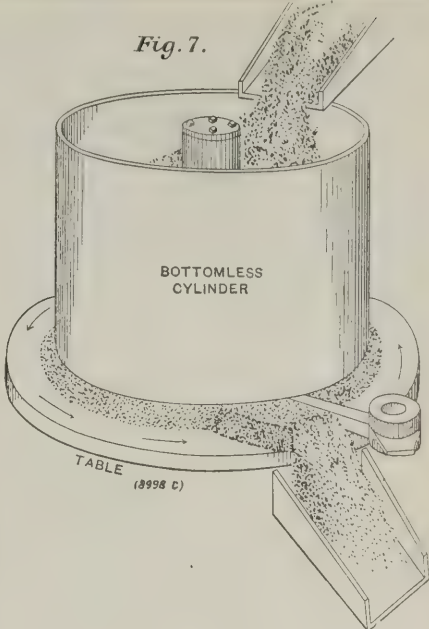
This method of gauging the materials for concrete is applicable to "batch" mixers only, that is, to mixers which deal with the concrete in batches or charges as distinguished from the continuous mixers previously referred to.

In a paper read before the American Society of Mechanical Engineers last June by E. N. Trump, on "Continuous Measuring and Mixing of Crushed or Powdered Materials in Accurate Proportions," is a description of perhaps

The Most Ingenious Measuring Machine yet referred to. The principle upon which the Trump machine works is as follows:—If a revolving table of relatively large size has the material to be measured distributed in a thin layer upon it (as shown in Fig. 6), and a stationary knife or diverting blade is



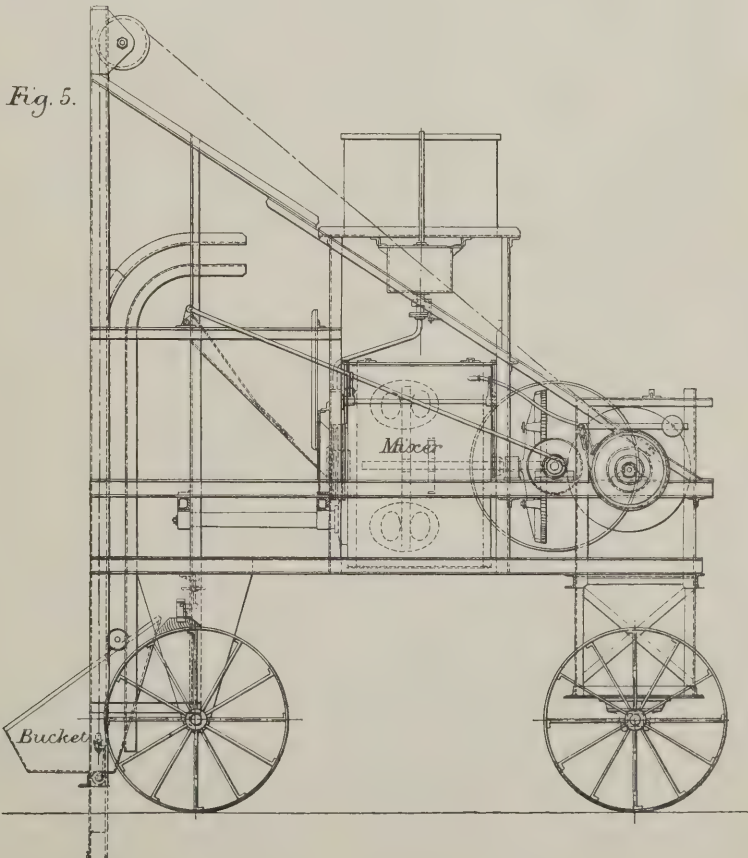
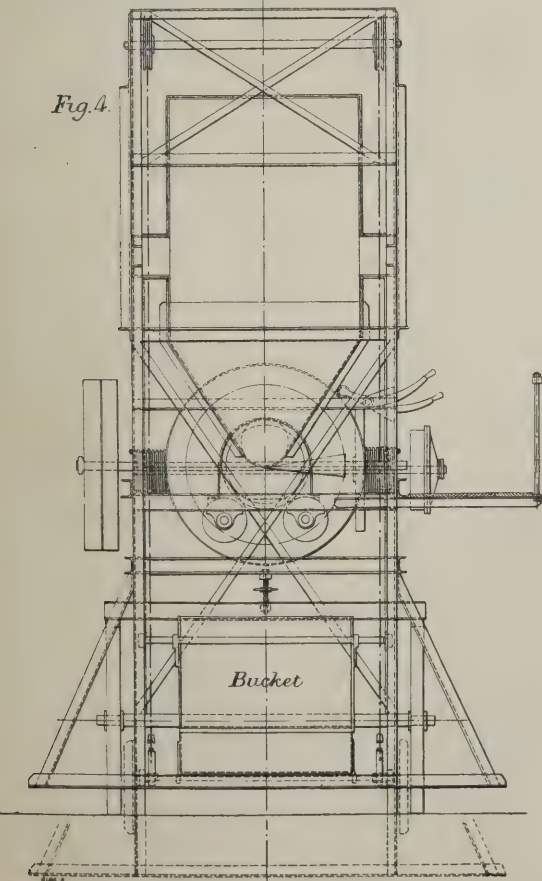
pivoted so as to take off a predetermined quantity in one revolution of the table, as the layer of material is thin variation in the natural slope of the edge affects the accuracy very little, and as the table revolves the stationary knife diverts the material in front of it over the edge of the table and it falls in a continuous stream into the chute. This explains the principle. Now if the material is replenished on the table so that the layer taken off by the knife is restored to exactly the same shape as before and is continuously removed by the knife, an accurately measured quantity will be diverted. To arrive at this result a bottomless storage cylinder supported by arms from a central spindle, and revolving with the table, is added (Fig 7). The cylinder is somewhat smaller in diameter than the table and has its lower edge spaced a distance above the table sufficient to clear the knife. The material to be measured is filled into this cylinder and flows out a little under its lower edge, taking its natural slope. As the material composing nearly the whole base of the cylinder is cut away by the knife the space behind is continuously filled from above. The factors which influence the amount of material measured off in a given time by a machine of fixed dimensions are (1) the distance between



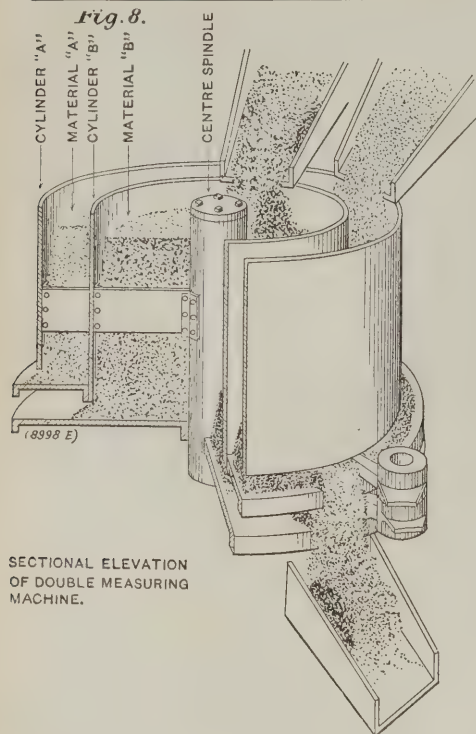
the bottom of the cylinder and the table, (2) the width of the knife, (3) the speed of rotation, and (4) the depth of cut of the knife. The first two are fixed and the last two made adjustable.

The proportioning of two or more materials is only a matter of the combination of two or more cylinders and tables (Fig. 8, next page). The tables are set one above the other and the cylinders arranged concentrically on the same spindle. Each table has its own storage cylinder or annular space and its own knife. As the material is directed over the edge of the upper table it falls into the material coming from the knife next below, and these two quantities fall into that from the third table, and so on.

It is stated by the inventor that the variations in size of the particles composing the material may extend from fine powder, like



ARTHUR KOPPEL'S MIXER.



cement, to rocks 6ins. cube. As an example of the accuracy of measurement with coarse material: In the case of a table 12ft. in diameter feeding rocks of 6ins. cube, the variation of delivery for a single revolution showed less than 2.5 per cent. and for ten revolutions less than 0.5 per cent. of the quantities delivered. About 6,000 lbs. were measured by the machine per revolution. With finely-powdered materials the variations in quantities by volume are considerably less than this. Compared with a hopper scale weighing the materials, the results of the Trump measuring machine are said to have been as accurate as the scales.

Mr. Appleby in his handbook of machinery thus describes a method of measuring used with the continuous mixer: "It consists of a machine . . . with two pairs of bins fixed over the mixer hopper and drop doors opening into it with appliances for controlling the deliveries. The larger pin of each pair contains the broken stone, shingle, &c., and sand, and is generally 1 cubic yard capacity; the other is of the size required for the specified proportion of cement. These bins being side by side, and each pair opening simultaneously (whilst the others are being re-filled), it follows that the contents become distributed before they enter the mixing vessel. The time occupied in filling the bins is rather less than that required for complete mixture . . . so that with the two pairs of bins the operation can be continuous if so desired."

The measuring is also sometimes done by running the ballast or stone to the mixing platform in tipping trolleys of known capacity, or hoisting it in skips holding a known amount.

There is also a method adopted in some American machines in which a series of hoppers are arranged side by side over a large roller, with a certain space between the outlets of the hoppers and the surface of the roller. These are kept filled with material by suitable means, and the revolving roller carries away a fixed quantity, depending upon the space left under the outlets of the hoppers and upon the rate of revolution of the roller. A machine on this principle is made by the United Concrete Machinery Co., New York, called "The Gilbreth Accurate Measurer and Feeder."

The same firm make a machine for "weighing and feeding," but the materials for concrete do not permit of accurate pro-

portioning by weight in practice. A little moisture in the stone or sand makes a great difference in the weight. There is also a tendency for moist sand to stick about the hoppers.

(To be concluded next week.)

Correspondence.

R.I.B.A. Fellowship.

To the Editor of THE BUILDERS' JOURNAL.

SIR,—Is it not time that the Council of the Institute settled the real function and purpose of the Fellowship? Is it (1) a means of providing money for the exchequer? (2) a means of keeping the Associates in check? or (3) a means of recognizing eminence in professional work?

The recent nomination and election of the group of really leading men might imply that (3) was the motive, and that the Institute wished to honour men of power and eminence, but many of us wish to know whether the secretary informed these gentlemen how the members of the profession have been implored and entreated to become Fellows (not, be it noted, Associates), and what a brilliant company of colleagues in the Fellowship has been and is being provided for them.

I should like to have an opportunity of expressing the widespread disgust and scorn with which the action of the Institute is regarded by all whom I meet; and as showing that this is not a merely personal expression of opinion I may state that I hold letters from most of the leading provincial allied societies strongly endorsing the protest of the Leeds and Bradford Associates, which I was instructed to forward to you and to them.

If the Institute sees fit to flout the strongly expressed protest of the allied societies in this way, and if the London men are content to be ignored, it will become necessary (and not for the first time) for the provinces to lead; and I think I can promise them an opportunity of voting by ballot on some of the nonentities who are rushing in to what was once thought to be the most honourable class of membership.

There are, of course, other methods still possible of bringing our views before the members of the Institute; and our members here feel so strongly on the matter that we intend to make it a test question in voting at the forthcoming Council election.—Yours truly,

FREDK. MUSTO, A.R.I.B.A.

LEEDS.

THE ACADEMY LECTURERS.

THE vacancies at the Royal Academy caused by the resignations of Mr. Alfred Gilbert, R.A., and Mr. George Aitchison, R.A., have not yet been filled, and the Professorships of Sculpture and Architecture still remain unassigned. The efforts to find members willing to undertake the duties of these positions have, says the "Morning Post," so far proved unavailing, in spite of the fact that the payment for the course of lectures is upon a more liberal scale than it was two or three years ago. The architect- and sculptor-members of the Royal Academy are all fully engaged with commissions just now, and to busy men unaccustomed to literary composition the preparation of lectures is a serious affair not lightly to be undertaken. For the present season a temporary substitute for Mr. Aitchison was found in Mr. T. G. Jackson, R.A., while Mr. Gilbert's place is being taken by Mr. W. R. Colton, A.R.A., Mr. W. Goscombe John, A.R.A., and Sir William Richmond, R.A., who will between them deliver the series of six lectures on sculpture. In the earlier days of the Royal

Academy the lecturers could say what they chose, and it is well known that Barry when Professor of Painting abused Sir Joshua to his face when the great president came to hear the addresses. But the lecture that caused the law to be made concerning the mentioning of living artists was delivered in January, 1810, by Sir John Soane, the founder of the Soane Museum in Lincoln's Inn Fields. Soane, an irascible and curiously obstinate man, showed in his lecture a number of drawings of architecture, ancient and modern, and pointed out to the students the faults and beauties of the examples chosen. The drawings included sketches of portions of Covent Garden Theatre, which had just been re-erected from the designs of another Royal Academician, Sir Robert Smirke, and these drawings were shown by Soane as examples of "gross incorrectness." Naturally this caused a sensation, and the lecture was speedily followed by the passing of a resolution of the Royal Academy council forbidding any comment or criticism on the opinions or productions of living artists.

Mr. T. G. Jackson, R.A., in his series of lectures completed last week took as his theme "Reason in Architecture."

NOTES ON COMPETITIONS.

Proposed Public Library, Southwark.

"The Council has appointed a committee to act as assessors in this competition," so reads the second clause of the particulars and conditions of the proposed public library, Old Kent Road, S.E. One's first impression is a thrill of pleasure that at last the principle of the jury system has been absorbed by an enlightened borough. The impulsive conclusion gives way to doubts that the thing is too good to be true, and enquiry proves that the millennium has not yet arrived, for the committee of assessors is to consist of laymen, councillors, assisted by the borough surveyor. And so the pendulum takes a big swing backwards, carrying with it yet another Carnegie library to be dealt with in the manner of a bygone generation. It is satisfactory to remark that the copy of the conditions on view at the library of the Royal Institute of British Architects bears a note that this matter is receiving the attention of the Institute. No doubt other interested bodies, as well as individuals who have applied for conditions, are endeavouring to show the promoters the error of their ways. Unfortunately for individuals in this case, as in many others, there is the difficulty of the deposit to contend with, this being only returnable (according to a baneful custom) upon the receipt of a *bona-fide* design. Those who have obtained conditions would do well to notify their bankers for the stoppage of their cheques, which done, the conditions should be returned with a letter stating the reasons for so doing.

Although every competition should be the subject of careful expert assessing, this is especially necessary in the present instance, owing to the difficulties presented by a very inadequate site. This occupies a position at the junction of Old Kent Road and New Kent Road, and is, roughly, in shape an equilateral triangle with sides of about 50ft. and a slight excrescence below the base. The site was a gift and appears to have been accepted with due regard to the advice given in connection with the proverbial horse. Except that the streets are noisy, the position is fairly good, but the area is insufficient. This will necessitate a library on several floors, with an accompanying complication of supervision; and taken in conjunction with the apparent impossibility of planning quiet reading-rooms, it constitutes the difficulty of the problem to be solved, and the reason why the highest expert

knowledge should be brought to bear upon the designs submitted.

A bad clause always appears more glaring when in the company of others which are sound. With the one exception the conditions of the Southwark library are good, and show evidence of care. This only makes it more regrettable that all are not equally as satisfactory. If by good chance the promoters should see their way to appoint a qualified assessor, they should also extend the time for receiving enquiries from competitors, the time mentioned in the conditions having already expired. The date for the receipt of plans should also be extended beyond April 2nd in order that those who have stood aloof may have a reasonable time in which to mature their schemes.

Some Thoughts on Carnegie Libraries.

The frequent failure of members of public bodies to realize their responsibilities towards those they represent, by neglecting to adopt the best means possible where the question of obtaining new public buildings is concerned, of which the case of the Southwark library is only another instance, brings uppermost once more the regrettable fact that Mr. Carnegie has, by his persistent refusal to interfere with such matters, lost an opportunity of benefiting to the fullest degree the recipients of his generosity. The public and architects both suffer; the former through not getting the most and best out of the gifts presented to them, the latter through being participants in competitions which end in disaster as regards the selection of the best designs, and through conditions being otherwise unfavourable. Nor does the evil end here. The greatest loss is that sustained by the noble art of architecture, by an elimination of the men most capable of producing fine buildings, through the ignorance and self-sufficiency of so-called responsible persons who support methods which no self-respecting architect can associate himself with. The R.I.B.A. has, as is well known, failed to move Mr. Carnegie to a recognition of these facts. Might it not be that a petition largely signed by architects, especially those in the habit of competing, would have a better result? The experiment anyhow would be worth making, for even if nothing were gained there is nothing to lose, and persistent solicitation often secures the desired end.

Perth Guildhall.

A special meeting of the Perth Guildry Incorporation was held recently to consider the report by Messrs. M'Laren & Mackay, architects, regarding the stability of the present Guildhall. The architects stated that they had examined the hall on May 26th, 1905, and found that the front wall was 7 ins. out of the perpendicular, while the interior was 9 ins. out of plumb. New cracks had developed, and old cracks had widened since they first reported on the matter. They considered the state of the building most unsatisfactory. Three different proposals were put forward at the meeting—one that the building should be sold, another that the front should be rebuilt and the interior remodelled, while the third was to build an entirely new hall and other premises and invite local architects to send in competitive plans. After considerable discussion the last-named proposal was adopted.

Hackney Central Library.

The designs submitted in the competition for a new central library at Hackney will be on exhibition in the King's Hall, Hackney, on Monday, Tuesday and Wednesday next, February 26th, 27th and 28th.

In reference to this competition Mr. Edward A. Jollye, A.R.I.B.A., of London, writes to us as follows:—

"Recently the promoters of the Hackney library competition issued to me, on application, a set of their conditions together with a plan of the proposed site for the library, for

which I forwarded £1 rs. After receiving these particulars I set to work upon sketch plans, but at the expiration of some ten days I had work brought to me to be executed at once, and had further work to do on completion of it. Seeing that my time was likely to be fully occupied, I had to abandon the proposal, and wrote to the town clerk explaining this fact and returned to him the particulars as they were sent to me and asked him if he would return the deposit. Eventually I received a letter from him saying his committee had decided to return me one-half of the deposit, namely, 10s. 6d., as I had not fulfilled the stipulation and sent in a design. Quite so, but as a perusal of the conditions must be a precedent to commencing a design, does it not seem a little ungenerous to take advantage of any intending competitor to charge 10s. 6d. for learning the advertisers' requirements? I explained that I had spent ten days on working at the scheme, which was an entire loss to me, whilst they received back their documents and they could reissue them, if demanded, to another would-be competitor. It is a small matter, but it involves a principle, and it would be interesting to know if this is the general custom."

A South-Coast Estate.

The Ashburton Building Co. have accepted (in competition) the designs prepared by Mr. R. Montague Luke, architect and surveyor, of Plymouth, for villa residences and the laying-out of the Druid Estate, and Mr. Luke has been instructed to prepare plans for the erection of two villas at an estimated cost of £1,000.

New Municipal Offices for Holborn.

At last Wednesday's meeting of the Holborn Borough Council it was decided that the present town hall in Gray's Inn Road should be sold and that new municipal buildings should be built, for which not more than six architects should be selected to submit preliminary plans, "and that they be paid an honorarium of 20 guineas each; that they be furnished with plans of the site and of the existing buildings; that in the consideration of the plans preference be given by the Establishment Committee to those showing an economical use of the land; and that the committee be empowered to consider the plans when received and submit a further proposition upon the matter."

Luton Secondary School and Technical Institute.

Mr. H. Percy Adams, F.R.I.B.A., the assessor in the competition for a secondary school and technical institute at Luton, Bedfordshire, has awarded the first premium to Messrs. Spalding & Spalding, of 15, Queen Street, Chapside, E.C. The designs submitted will be on public exhibition at the Luton Town Hall on Monday and Tuesday next, February 26th and 27th, from 10 to 4. The cost of the buildings was suggested originally at £6,000, but this sum has been considered by competitors as insufficient, and it will most probably be exceeded.

The Opinions of Two Noted American Architects.

The following opinions on competitions expressed at the recent annual convention of the American Institute of Architects by Mr. George P. Post and Mr. John M. Carrère, two of the best-known architects in the States, will be of interest to readers:—

Mr. Post said: "I think we must accept competition as a necessary evil, and then use our utmost exertions as individuals and as an Institute to see that competitions are properly inaugurated and conducted, and that the awards are made with fairness and propriety. Personally—and I speak with considerable experience in the matter of competitions, for I have during a rather long period of practice erected over fifty million dollars' worth of buildings, the greater part of which was gained in competition—I have not altogether a perfect reliance on the

ordinary expert jury. Except in the matter of competition for a design like that of a great monument, which is purely artistic in character, the expert should always be a practising architect or several practising architects, who know the practical solutions possible, and who can see, as the theorist cannot see, the whole problem as controlled by practical considerations. . . ."

Mr. Carrère said: "I have entered a great many competitions. I cannot tell you the exact number, but I think in my twenty-one years' of practice I have entered over forty. I have won five. I cannot say that it has been a profitable investment. Neither do I feel that I would not have arrived at the same end without going into these competitions. The spirit of competition, of friendly and legitimate competition, is born in us through the methods by which we work, and though there will always be competitions, and rather discouraging competitions, we should try to make them fruitful. There can be only a few reasons for a competition. One is the desire of the practitioner to increase his practice, and I think that is admittedly a failure. The same amount of effort, money and skill spent in other directions would produce better results. The other reason is to obtain the very best design, and I fail to see in this country or any other country that the most noted competitions have brought about results which could not have been obtained by direct selection. A third reason which is prevalent and which is natural is the desire to discover new talent. I do not sympathize with that at all. If a man has talent his day will come, and it should not come until he is prepared to make use of it. . . ."

"The danger with a system of competitions for the Government work is that it establishes an official type of architecture, which would not be the case if the men would start their design without the idea of winning the prize. To particularize: I do not believe there is a successful example anywhere in the world of a monumental building in which an order is the main feature unless there are two storeys. Now, the Government type requires four, five and six storeys, and our architects are obliged to crowd innumerable storeys into that order. But if I were invited into any such competition I would put in more than two storeys, and I have myself decided that way because it seemed the best solution presented. As I look around me in this country and pick out the buildings which to me seem most successful, I do not believe that the great majority of those buildings would have won the prize in any competition."

Obituary.

The late Mr. R. A. Withall, architect, of Putney, formerly of 29, Great George Street, Westminster, who died on January 28th, left estate which has been valued at £63,056 gross.

Hydraulic Power.—The annual report of the General Hydraulic Power Co., Ltd., has just been issued, and shows that there has been an increase in the receipts of the London and Liverpool undertakings from £123,548 in 1904 to £123,761 in 1905. A dividend of 7 per cent. is to be declared, an interim dividend of 2½ per cent. having been paid, and the balance to be carried forward is £1,126. The mains in London streets have been extended by 4 miles during the year, making a total length of 154 miles. At the end of the year there were 5,938 machines contracted for supply, of which 5,823 were connected with the mains, this being an increase of 225 and 274 respectively. At Liverpool the number of machines contracted for is 1,028, of which 1,026 are connected, the increases being 47 and 44 respectively.

THE SOCIETY OF ARCHITECTS.

Presentation of Gold Medal; Old Houses of the Cotswolds.

A MEETING of the Society of Architects was held on Thursday evening last at Staple Inn Buildings, Holborn, the chair being occupied by the president, Mr. A. E. Pridmore.

The Gold Medal of the Society was presented to Mr. Walter W. Thomas, J.P., of Liverpool, ex-president.

Mr. Ellis Marsland then read a paper on "The Architecture of the Cotswolds in the Sixteenth and Seventeenth Centuries."

The Effect of Materials on Design.

The keynote of this architecture was, he said, its simplicity, due in great measure to the isolation which the district enjoyed, but also to some extent to the sparseness of local materials. The staple was stone, good, plentiful and quarried on the spot. The oolite formation stretching right across the district provided for all necessities. Stone was used for walls, floors, roof coverings, chimney-stacks and chimney openings.

The only other material was wood, also plentiful, but of the hard variety and consisting mostly of oak, chestnut and beech. Of soft wood there was little; consequently the joiners' work was confined to doors and panelling. Window openings had the glass glazed directly into the stone mullions. Iron was scarce and confined to hinges and casements.

Dearth of Lead.

Lead had to be procured from a distance, and, therefore, was not available for roofs or flashings, but restricted to the setting of the window glass. This dearth of lead was obviated by the omission of all hips, and the roofs were carried through to gable ends, thereby producing the leading feature of the style. Yet, in spite of the absence of lead, the roofs were made sound and watertight.

The Masonry: Scarcity of Lime.

It had been urged that the stone walls of the Cotswolds, though of ample thickness, were imperfectly bonded, and the interior not solid but containing a good deal of loose material. As to the latter, that was undoubtedly true, but it should be remembered that lime was difficult to obtain and had to be sparingly used and confined to bedding and pointing the stones; a prodigal use of mortar was prohibitive by reason of its scarcity; lime had to be burned, and the only fuel available was wood, and the process was long and tedious. But although the walls were not altogether solid, yet the masons abundantly made up for this deficiency by reason of the excellent jointing of the stonework, which required little help from the cementing material, as many dry-stone walls testified.

Details.

The Cotswold style was a transition from the Tudor of the preceding century adapted to the materials and needs of the inhabitants. The landowner's occupation was the rearing of sheep; and although he prospered considerably, yet a certain economy was desirable in his building operations, so that there was little circular work or superfluous ornament, plain solid lintel and mullion being all he could afford. There was, however, an exquisite proportion in the work.

String-courses and labels were identical, always about 6 ins. deep, splayed and hollow moulded. The mullions were varied in section as time proceeded, having been originally hollow, then chamfered, and finally ovolo moulded, but always in the same proportion. The openings were from 15 ins. to 16 ins. wide, and the height varied from 3 ft. 6 ins. on the ground floor to 3 ft. in the gable—sometimes 3 ins. less.

The Gables.

so marked a feature of the style, were set at about an angle of 52 degs. In the minor buildings the roofs were carried over the walls, but the more important buildings had copings, the section of which was varied—sometimes flat, but more often in the earlier examples moulded. These projected over the walls just above the slates, and the space so formed was pointed up, thus obviating the necessity for lead or other flashings. A gablet or finial of stone made an appropriate termination.

The Chimney-stacks

were also a prominent and ornamental feature, rising squarely and solidly through the roof. They terminated with a hollow string-course. The flues were in most cases carried up separately and diagonally, forming in the process a pyramidal stopping to the base of the shaft and finished by a moulded cap, the detail of which became more elaborate as the Renaissance influence became stronger. The stone weathering worked on the base of the shaft was to be noted, coinciding with the pitch of the roof, under which the stone slates were tucked and pointed—again avoiding the necessity for lead flashing.

The Roofs

had to be strongly framed and pinned to support the heavy covering of stone slates. These slates were obtained from certain beds of the oolite by exposing the blocks of stone to the action of frost, which caused them to split up into laminations of the required thickness; these were shaped and sorted into a variety of sizes, the larger ones being used at the eaves, and others diminishing in size to the ridge; one or more holes were drilled in each slate into which oak or deal pegs were driven; the slate was then hung over the tile batten, and the underside between the rafters plastered with coarse plaster.

The valleys were formed by rounding the bed and cutting and shaping the tiles to fit the hollow in a very ingenious manner, so that no leadwork was required. The covering to the ridge was made from the ubiquitous stone.

Doorways and Porches.

A word might be said as to the entrance doorways. These had usually a deep stone lintel, over which the label or string was carried, and the sides and head were either chamfered or moulded according to the relative importance of the doorway or the character of the building.

Porches were not generally a feature, but at a later period they were added to the main building, as also wooden pents of a Renaissance character.

Planning.

If the dominant note of these old buildings on the outside was simplicity, the interiors also showed the simple life of the inmates.

The prevailing plan was a parallelogram, surrounded by stone walls, divided up by wooden partitions into more or less square rooms, and one marvelled in these days, even in the largest of the houses, at the absence of minor offices. Other buildings were L-shaped in plan, others H, but all were wanting in the modern ideas of comfort and privacy—one room opening out into another and doors opening straight into rooms. Yet they were comfortable enough so far as the individual rooms were concerned. The thick walls provided convenient window seats, and the wide and deep chimney opening suggested warmth and comfort; the limit of the length of stone obtainable made a compromise necessary between the lintel and the arch, so that we found a flat four-centred arch spanning the opening, yet not an arch, but formed of two pieces of stone acting as cantilevers with a vertical joint in the centre and a wood beam above tying the whole together.

Floors and Walls.

The floors were carried by stout oak or chestnut beams appearing below the ceiling, and with splayed or moulded edges appropriately stopped. Heavy wood lintels were placed over the window openings, into which the floor beams were framed, thus binding the whole house together.

The walls were either plastered or panelled in oak according to their relative importance, and the floors laid with oak or chestnut planking, or, if on the ground level, paved with stone.

The use of ironwork was limited, yet one came across some charming remains of case-ment stays and fastenings, iron scrap hinges and door knockers.

The Change.

This old Cotswold style lasted for about 100 years, and gave place to the Renaissance which eventually penetrated this remote district. Its coming was heralded by certain alterations being made in the old work, and subsequently when new buildings were erected the old style was given up and new forms took its place. This was inevitable. The old had its limitations in the height of rooms, which rarely exceeded from 7 ft. to 8 ft. The craze for lofty rooms, to meet the prevailing fashion, could not be met, except by altering the whole proportion of the architecture; so it went.

Mr. PERCY ADAMS ON SANATORIA.

AT the last meeting of the Leeds and Yorkshire Architectural Society Mr. H. Percy Adams, F.R.I.B.A., delivered a lecture on "Sanatoria." He said these might generally be divided into two classes—the American or cottage type, and the concentrated or hotel type. He expressed the opinion that for accommodation for anything like 100 patients the hotel type of sanatoria was a practical necessity, but for small establishments of about twenty beds the cottage type was probably the best from a purely medical point of view. No sanatorium built in England on the cottage plan had more than twenty beds, but on the Continent they sometimes had more than fifty patients. He argued that there was no economy in erecting buildings of a purely temporary character because there was so much in common between such structures and those of a permanent character. Speaking of the Germans as having been the pioneers of these institutions, many of which had been erected by insurance companies, Mr. Adams showed views and plans on the screen of a number of sanatoria, many of which he had visited, and gave details of their arrangements. He then proceeded to give the history of the movement, which resulted in the conception of the King Edward VII. sanatorium at Midhurst (now nearing completion), of which building he is the architect. Mr. E. R. Dolby, engineer, of Westminster, who has been associated with Mr. Adams in the erection of the King's Sanatorium, described details of its heating, hot-water service and electrical arrangements.

Remarkable Damage to a Church by Lightning.—During a recent storm the roof of Barsham Church, Norfolk, was struck by lightning near the top of the east window, the glass of which was perforated as if by a fusillade of shot. The current seems to have travelled down by the tracery—the mullions being damaged both inside and out—and in its descent to earth wrecked a large slab of Purbeck marble which formed the altar table, casting the pieces in all directions. The marble altar steps were torn up, a great hole was made in the east wall, and the chancel step splintered. The altar-cloths were torn to shreds and the carpet twisted up as though by a whirlwind.

Law Cases.

The Covering-in of Wells.—At Lincoln County Court last week a bricklayer named Randall brought an action against Messrs. S. & R. Horton, builders and contractors, for £50 damages under the Employers' Liability Act. In June last year Randall was engaged in lining a well, working about 15ft. down. The top was partly covered by boards, but a hole was left for lowering bricks. A brick fell through this hole and struck Randall, crushing his shoulder and collar-bone, and he was unable to work for about fourteen weeks. For the defence it was contended that negligence had not been proved, and that the covering to the well was constructed in the ordinary and proper manner. The jury found a verdict for the defendants, and Judge Sir Sherston Baker gave judgment accordingly, with costs, but he made plaintiff an award for £12 7s. 4d. under the Workmen's Compensation Act, and costs under Scale A.

A Question of Old Plans.—At Plymouth Police Court last week Mr. Francis L. Jillard, builder, was summoned for failing to give notice of his intention to erect a building in Francis Lane, and with erecting such building with insufficient frontage (contrary to the by-laws, section 53, 1883) and insufficient space at the rear (as required by section 3, by-laws, 1893). The facts were as follows:—In 1881 plans were submitted by a Mr. Steer, the then owner of the property, for the erection of two cottages on the land in question and on an adjoining piece. A cottage was actually erected on the latter piece. The land was sold at the beginning of 1882, and a Mr. Coode, the owner, put in a plan for a workshop on the site of what might have been the second cottage. The plan now brought forward was of this second cottage, which was not built. Mr. Jeffes, for the Corporation, said that if a man deposited plans in 1881 for a building, if that building was not erected and he parted with possession of the land, and if the next owner brought up a plan in 1882 for premises of an entirely different nature, then, as a matter of fact, the plan of 1881 was withdrawn. Up to the beginning of December last the workshop still stood on the premises. Then defendant left a notice at the surveyor's office asking for one of the inspectors to go and pass the foundations of the cottage, and he added a pencil note showing that plans were passed in 1881. The inspector at once told defendant that as no plans had been deposited he could not go on building. The surveyor gave defendant notice that complete plans must be submitted before the work could be proceeded with, as the plans submitted in 1881 did not hold good now. In 1883, 1893 and 1900 new building by-laws were passed repealing the by-laws previously in force, and it was a question for the Bench to consider whether it was ever intended that plans under certain by-laws should be brought up more than twenty years after, when fresh by-laws were in force. The by-laws under which the old plan was approved were made in 1860. Mr. J. W. Bickle, for the defence, contended that plans had been deposited in respect to the very building which had been erected, although deposited so far back as 1881. It was quite true that his client was not the owner of the property at that time. It had changed hands twice since then, but the purchaser would take the benefit in his purchase of all plans passed prior to his purchase in respect of this property. He did not believe there was any limit of time during which, after a plan had once been approved, a building should be commenced. It was quite true the building was only commenced in November last, but there had been a workshop there, and the walls were not taken down, nor were the



SCHOOL-KEEPER'S COTTAGE, COUNCIL SCHOOLS, SOUTH EALING.
F. H. GREENAWAY AND J. E. NEWBERRY, ARCHITECTS.

foundations destroyed. The same foundations were the foundations of the present house, and the walls of the present house included the two walls of the workshop. Plans passed in 1881 were good now, as then.—The chairman said the Bench were satisfied that no plans were deposited in accordance with the by-laws of 1883, and that the defendant was not at liberty to proceed to build upon the plans submitted in 1881 under the by-laws of 1860. But having regard to all the circumstances, they considered the demands of justice would be met by the infliction of a nominal penalty, and they accordingly imposed a fine of 20s. and costs, or a month.

Who is Responsible for lighting Obstructions.—At the Halifax Borough Court recently Messrs. Wadsworth & Sons, joiners, and Mr. H. Mitchell, builder, were summoned for not causing sufficient light to be placed near a street obstruction in connection with building alterations at Bull Green. Messrs. Wadsworth said that "providing a danger lamp was a mason's job," and the mason's contractor said the contract specified that the joiners should see to the obstruction. Mr. Lister Coates, architect, was called to speak as to the custom of the trade, and his evidence was that the contractor for the masonry was usually responsible.—The summons against Messrs. Wadsworth was dismissed; while Mr. Mitchell was fined 10s. costs.

Dispute about a Reservoir Contract.—In the Scottish Court of Session recently Lord Ardwall closed the record in an action in which Messrs. Low & Thomas, contractors, of Glasgow, sued the Western District Committee of the County Council of Dumbarton for the

reduction of the contract for the construction of a reservoir on Finlas Burn, near Luss, Loch Lomond, the ground of reduction being that the plaintiffs' offer had been formed in reliance upon the opinion of one of the defendants' engineers that the clay on the ground would be suitable for the puddle wall, whereas after the contract was entered into the defendants' engineers refused to pass the clay found on the ground. If the clay is got elsewhere the contract price will be doubled, and the plaintiffs seek the reduction of the contract on the ground that they entered into it under essential error. The defendants contend that the plaintiffs must abide by their contract, as they knew what was required of them.—The judgment of the Court will be given in due course.

"Legal Hour" for Dismissal.—An important point was decided in an action brought by the Birmingham Operative Bricklayers' Society at the Acock's Green Police Court last Thursday. A bricklayer named Marsh, engaged in building a station bridge at Acock's Green, was on January 29th given an hour's notice to leave, the notice terminating at two o'clock. The contention of the Society was that whenever the notice was given it should be regarded as given prior to the proper hour of finishing work, so that the man could complete his day. The defendants, Messrs. Henry Lovatt, Ltd., builders, Wolverhampton, held that they could not be bound by the Birmingham rules. It was the case of an unsatisfactory servant being complained to, taking offence, and leaving. The Bench, taking into consideration the whole of the facts of the case, decided for the Society with costs, but withheld the solicitor's fee.



NORTHFIELDS COUNCIL SCHOOLS, WEST EALING: VIEW FROM SOUTH-EAST. F. H. GREENAWAY AND J. E. NEWBERRY, ARCHITECTS.

OUR PLATES.

THE new elementary schools at South Ealing, illustrated in this issue, were completed last year, the architects being Messrs. F. H. Greenaway & J. E. Newberry, of 21, Queen Anne's Gate, Westminster. The design was selected in a limited competition, for which Mr. E. R. Robson was the assessor.

The site has an area of about 2 acres, with frontages to Little Ealing Lane and Weymouth Avenue. There are two main groups—a senior school of two departments for 400 boys and 400 girls, and a mixed school for 446 infants. The senior school, for boys and girls, is placed on the north-east part of the site fronting Weymouth Avenue, and the infants' school on the southern portion. The children's entrances are in Weymouth Avenue, and, therefore, away from the main road—a point of some importance. The school-keeper's cottage occupies the south-west corner of the site, with its entrance in Little Ealing Lane. It comprises three bedrooms, parlour, kitchen and small scullery, with a good yard for drying clothes.

This disposition of the buildings leaves playgrounds of ample size, good shape and entirely open to the sun; the natural fall of the land is advantageously away from the buildings, and the boys' and girls' playgrounds are well screened from the roads by the school. The infants' school has two entrances leading into broad and short corridors, from which well-ventilated cloakrooms and lavatories open. Double doors at the ends of the corridors lead into a central hall, around which are grouped eight classrooms. Convenient teachers' rooms and store-rooms are contrived over the cloakrooms—an arrangement which avoids waste of space. The senior school for boys and girls is designed on the same lines as the infants' school, and has four entrances (two for each department), with cloakrooms and lavatories adjoining. Broad corridors lead into a large central hall, with sixteen classrooms grouped around it. The hall is fitted with a movable screen, rendering each department self-contained. Teachers' rooms and store-rooms are arranged over the cloakrooms, with windows that command the playgrounds and allow of ample supervision. Spacious covered play-sheds are provided in each playground, so planned as to form covered approaches to the outbuildings.

The drainage and sanitary work throughout has been most carefully considered, it being of the highest importance to minimize the danger of spreading infectious diseases

in buildings where so many children are gathered together. The walls and ceilings are plastered, and a dado is formed of salt-glazed bricks around all the rooms, halls and corridors. The floors are solid throughout, those in the classrooms and halls being of deal, and those in the cloakrooms and corridors of granolithic paving. The warming of the school buildings is effected by a low-pressure hot-water installation, supplied from a large boiler in a central heating chamber. Fireplaces are also provided in the infants' school and for the teachers' rooms. The ventilation is effected (in addition to the windows, which are all made to open) by specially arranged air inlets, some of which are warmed in winter, and by outlets constructed in the ceiling of each classroom communicating with powerful extract ventilators in the roofs. The central halls are efficiently ventilated by what are known as "split ridges," extending the whole length of the halls.

These schools are said to be as economical as any that have been built to comply with the present requirements of the Board of

Education. The cost has worked out at about £13 per child, including heating, lighting, tar-paving, boundary walls, &c., but, of course, excluding cost of site. From published statistics we find that recent schools of similar character built by the late London School Board average considerably over £18 per child.

The general contractors for the South Ealing schools were Messrs. Joseph Dorey & Co., Ltd., of Brentford. The heating and electric-light work was carried out by Messrs. Strode & Co., of Osnaburgh Street, Regent's Park, and the tar-paving to playgrounds laid by Messrs. Constable & Hart.

The schools gave such satisfaction that the Education Committee decided to repeat them on a similar site at West Ealing—on the Marder Estate. These schools are known as the Northfields Schools. We give two illustrations of them on this page. The general contractor for this group was Mr. W. J. Dickens, of Ealing, the heating, electric-lighting and tar-paving contractors being the same as at the South Ealing schools.



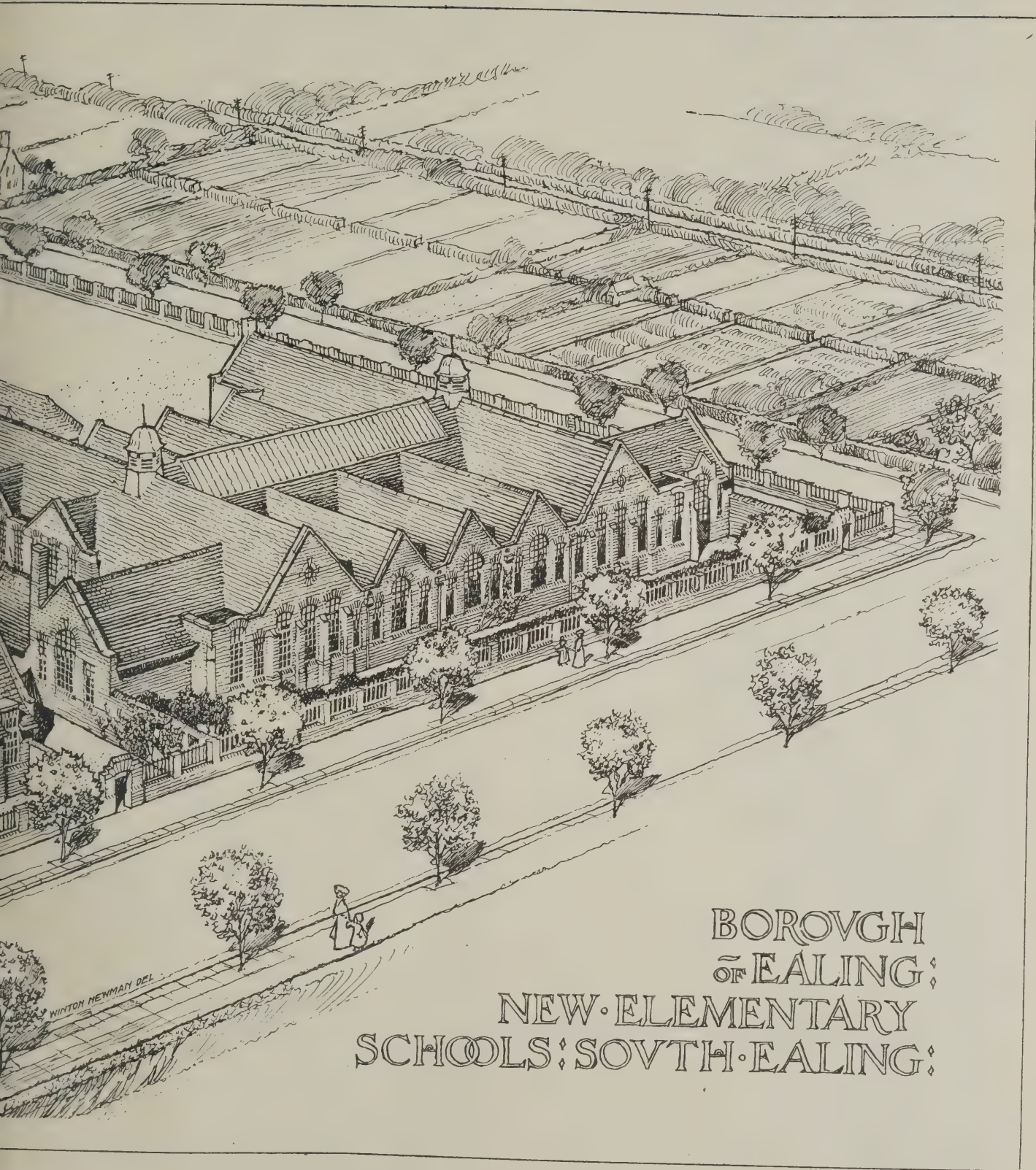
NORTHFIELDS COUNCIL SCHOOLS, WEST EALING: BOYS' AND GIRLS' CENTRAL HALL.

[Note: This view also applies to the schools at South Ealing.]

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Supplement to
THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD,
Wednesday, February 21st, 1906.





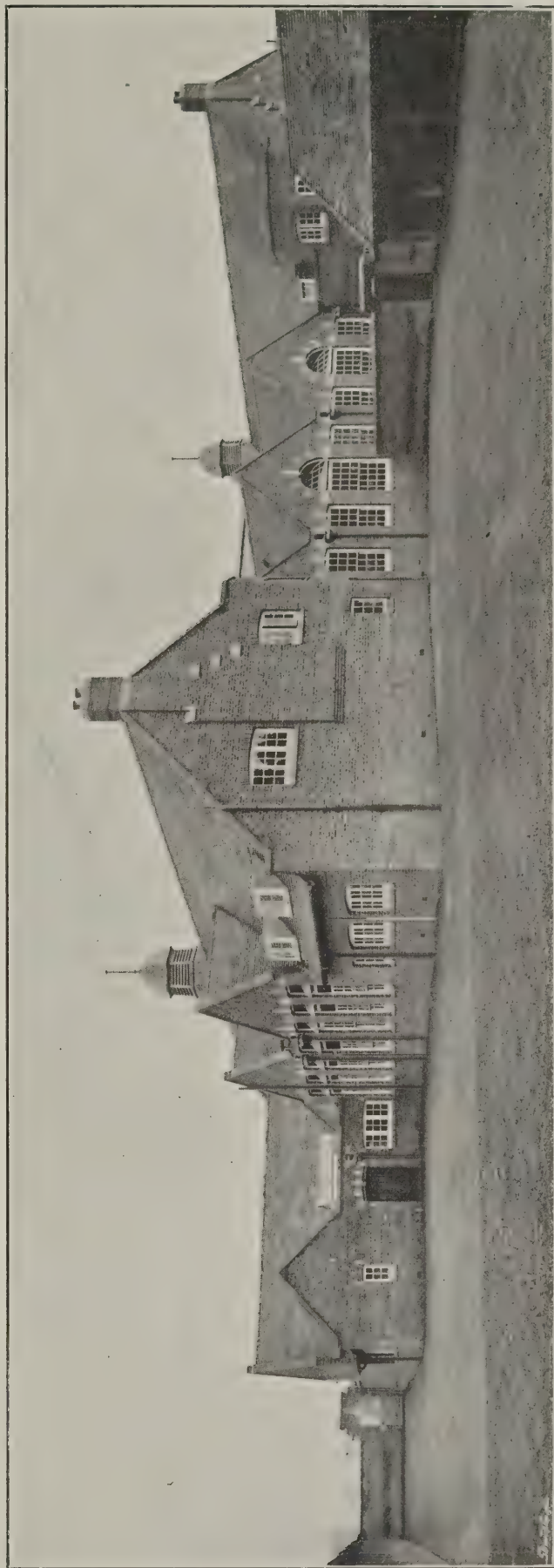
BOROUGH
OF EALING:
NEW·ELEMENTARY
SCHOOLS: SOUTH·EALING:

WINTON NEWMAN DEL.

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View from South-east.



View from North-west (in Boys' Playground).
COUNCIL SCHOOLS, SOUTH EALING. F. H. GREENAWAY AND J. E. NEWBERRY, ARCHITECTS.

R.I.B.A.

Mr. Guy Dawber on Furniture.

A MEETING of the Royal Institute of British Architects was held on Monday evening, the chair being occupied by the vice-president, Mr. Leonard Stokes.

Mr. E. Guy Dawber, F.R.I.B.A., read a paper on "Furniture," with lantern illustrations.

Tracing the development of furniture in England, the author said that nearly all the examples shown in MS. illustrations down to the middle of the sixteenth century were of an ecclesiastical character. Throughout each successive period the style of the furniture had followed that of the architecture, and if any special piece was required the same craftsman who built the church, monastery or castle made it, or at any rate had such control that in character and detail it assimilated with the building. Household furniture in the sixteenth and seventeenth centuries was characterized by simplicity and stability of construction; and as much of it had to be

Shifted from One Castle to Another

when any great personage moved, its supply was necessarily limited, and rooms were consequently sparingly furnished. The influx of foreign workmen from Italy and the Netherlands had hindered the development of a distinctive and national taste, and up to the close of the sixteenth century there was hardly a definite and decided tradition. After the design of furniture began to break through its ecclesiastical environment, when the Renaissance in Italy had developed in England, then we find a real national style gradually being evolved. Perhaps the most constructively perfect period of English furniture was the end of the sixteenth and first half of the seventeenth centuries, and though its design was based almost entirely on classical influences and detail, and the outlines may suggest extraneous origin, it retained a character essentially English and soon lost any trace of foreign influence. During the reign of Charles I. and for many years previous much furniture had been imported from Italy as well as the Netherlands. The Restoration, in 1660, caused a further influx of furniture and workmen from Holland, Flanders, Spain, and France.

In the eighteenth century many schools of craftsmen and cabinet-makers based their designs almost exclusively on the models of the leading architects of the day.

Sir Christopher Wren

had gathered around him a school of designers and carvers whose influence upon furniture makers was very marked. It was the age of constructive joinery and beautiful carving, and, whether in oak or deal, one single style and tradition permeated the whole country. The architect was the chief director in all matters of style, proportion and arrangement, and a great deal of the actual furniture was designed by him.

Two facts mainly contribute to the charm and interest of the furniture of bygone days: the first, that its form and detail were so admirably adapted to the material it was made of; the second, that it was always so singularly suitable to its environment.

Towards the close of the eighteenth century, though the design of furniture was still influenced by the architectural features and character of the houses it adorned, it began to show that the necessity for the two being absolutely in harmony was not considered essential, for a great school of specialists in furniture-making had arisen, and the association between the architect and the cabinet-maker was beginning to weaken, until it ceased to exist. About half a century ago, when perhaps domestic architecture in

England was at its lowest ebb, things reached such a pass that the fashion in furniture became absolutely regardless of architectural principles or fitness, and only the idea of comfort and luxury prevailed, until

The Inevitable Reaction set in,

and people, as they could no longer get new furniture which was not an eyesore, reverted to the opposite extreme, viz., the older styles of former days. Then came the difficulty which still exists—which particular style amongst those of the past to select. All, perhaps, are equally incongruous in modern houses, yet all appeal to people in different ways; and now that in the mind of the general public architecture and furniture have been definitely divorced from one another, it is the fashion to pick up pieces of furniture, quite indiscriminately, because they happen to be beautiful, quaint or old, and people fill their houses utterly indifferent to the effect produced. All this brings us back to one thing worth noticing—that throughout the periods when architecture flourished and was a living art furniture was the same, and very beautiful work was the result; but when there ceased to be any real tradition in architecture, at the same moment furniture died out.

Architecture and Furniture Inseparable.

The two are inseparable—they always have been and always will be; and just as to-day we have a real living common-sense style of domestic architecture, so also, with its development, will a real style of furniture arise. There is, undoubtedly, a great effort being made at the present time amongst many of our ablest designers and craftsmen to remedy this by producing designs for furniture original and artistic in treatment. There is still, however, too much inclination, in aiming at simplicity of form, to neglect the beauties of form altogether. Because mouldings have been excessively or wrongly employed, there is a tendency to abjure them altogether, so losing one of the main factors in creating beauty and interest. Of course, to class the whole of the modern furniture produced to-day in such a category would be absurd, for we have designers and craftsmen who, if only given the opportunity, can design and make furniture which can rival the productions of past ages. But until there is some settled standard of thought and tradition permeating the whole country, any efforts at design in furniture must be but isolated and individual.

The Architect's Duty.

The author said he did not suggest that an architect should design furniture, but he should have in his mind the house he is building finished and furnished complete, just as a painter has a mental impression of the last state of a picture he may only be beginning to put on canvas. That impression may be modified and improved in detail as the work proceeds, but the general scheme, the broad idea, will remain. For the architect, however, who is more thorough in his work and is not content with constructing the mere shell of his house there is much scope for excellent effects, by planning permanent fittings, such as book-cases, cupboards, side-board recesses, and so on. With the improvement in domestic architecture, which is so marked, the author felt sure that it would only be a matter of time before the public realized that good sensible modern furniture could be equally well obtained at a reasonable cost; and this result would be greatly helped if architects generally gave more thought and care than they do at present to the finishings and furniture of the houses they design.

Mr. Percy Macquoid proposed a vote of thanks to Mr. Dawber, which was seconded by Mr. J. D. Crace and supported by Mr. Maurice B. Adams, Mr. H. D. Searles Wood, Mr. Arthur Penty and Miss Eleanor Rowe.

THE SPOILIATION OF EDINBURGH.

BAILIE DOBIE dealt with "The Æsthetic Duty of a Corporation towards a City" before last week's meeting of the Edinburgh Architectural Association.

Referring to the retention and preservation of old buildings in towns, as at Nuremberg, where no building is allowed to be altered or rebuilt without the permission of the local authorities, he said that if this principle had been adopted as recently even as sixty or seventy years ago in connection with the "Royal mile" from Edinburgh Castle to Holyrood, and all the northern slope of the ridge; and if their forefathers had been wise enough, instead of filling up the Nor' Loch, to have deepened it and kept it clean and fresh, and at a later date had prevented the railway company from irretrievably destroying that splendid valley, they might have had in their very midst a picture which, he ventured to say, could not be equalled anywhere else in the world.

In another connection he cited the case of Paris and its regulations. There, he said, if a new building of importance was to be built, a model of it and the surrounding buildings was made so that the effect could be judged from all points of view. If such a course had been adopted in Edinburgh, would there not have been an outcry before it was too late against the mass of the North British Station Hotel, which dwarfed and destroyed by contrast the post-office and register house, and even seemed to put the Calton Hill itself out of scale, and would they have permitted the straight line of the Caledonian Station Hotel to cut off one of the finest views they had in Edinburgh?

Two Things to be done.

There were two matters which had to be considered—first, preventing the individual from doing anything which would impair the beauty of the city; and, second, the Corporation themselves making improvements, which meant the spending of money from the rates. With regard to the former, there were many ways of limitation. Feuing plans should be laid out for whole districts, instead of for merely the small piece belonging to a particular owner, regardless of the plan of his neighbours; and the local authority, which was at present both the Town Council and the Dean of Guild Court, should be strengthened from outside by artistic advisers, constituting a committee of taste. This committee might have a certain control over the decorative quality of the architecture, of the heights of buildings, the kind and colour of material to be used for construction, and generally with everything which affected the amenity of the city.

For many years Edinburgh has spent very little money on anything that assisted materially to develop municipal art. The rebuilding of the North Bridge was a striking example of a missed opportunity. Let this clumsy erection be compared with the graceful Alexander III. bridge thrown over the Seine a few years ago, or the new bridge over the Danube at Budapest, which were true works of art. And it looked as if they were again going to lose a golden opportunity by not adding something to Mr. Usher's gift and so secure a city hall worthy of the Scottish capital. In this, as well as other important public work, an architect either by selection or competition should be chosen rather than city officials, who had their own well-defined lines of work.

Thanks to private enterprise, however, there had been many fine buildings erected in Edinburgh within recent years. The most important of all was unquestionably the west side of North Bridge Street, built by the proprietors of the "Scotsman."

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Correspondents are particularly requested to be as brief as possible.

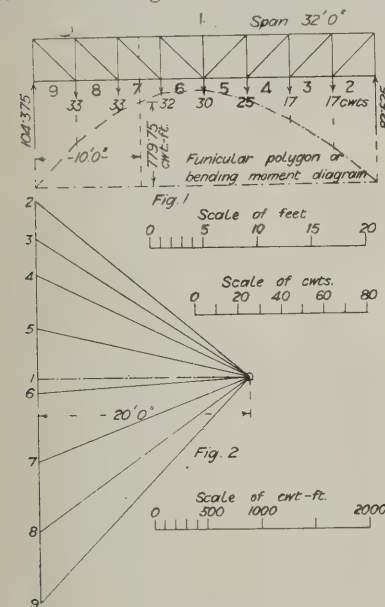
The querist's name and address must always be given, not necessarily for publication.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

Bending Moment on Lattice Girder.

DEVONPORT.—READER writes: "Required the bending moment, graphically and mathematically, from one end for girder as shown by sketch; span 32ft."

Draw the frame diagram of the girder as in Fig. 1, with the given loads hanging from the bottom flange. Number the external



spaces. Draw the line of loads, Fig. 2. Select a pole and draw vectors. Then construct funicular polygon (Fig. 1) by lines across the spaces parallel to, and numbered similarly to, the vectors. The closing line enables the parallel vector 0-1 to be drawn, giving the value of the reactions and enabling the subsequent stress diagram to be constructed. The bending moment at a point 10ft. from the left-hand abutment being required, this may be scaled off the funicular polygon as shown. By calculation alone, the bending moment at this point will be—

$$10 \left(\frac{7 \times 33 + 6 \times 33 + 5 \times 32 + 4 \times 30 + 3 \times 25 + 2 \times 17 + 17}{8} \right)$$

$$= (6 \times 33 + 2 \times 33) = 10 \left(\frac{835}{8} \right) = 264 = 779 \frac{7}{8} \text{ cwt.-ft.}$$

If the stress diagram be drawn out and the stresses scaled off, it will be found that this bending moment is resisted by the tension and compression of the flanges, the moment about the centre point of the brace being $2\text{ft.} \times 214 \frac{1}{2} \text{ cwt.} + 2\text{ft.} \times 176 \text{ cwt.} = 781 \text{ cwt.-ft.}$, which practically agrees with the above, the difference being due to slight errors in scaling.

HENRY ADAMS.

Buildings to Measure in South Wales and near Rushden.

ABERDARE.—D. H. M. writes: "Please name some buildings in South Wales suitable to measure for the R.I.B.A. Intermediate examination."

The following list gives a number of buildings in South Wales suitable for measuring for the R.I.B.A. Intermediate testimonies of study:—Thirteenth century. — Abbey Cwm Hir, Abbey Dore Church, Caerwent Church, Caldicot Church, Coy-

church, Crickhowell (restored), Llandaff Cathedral, Llanidloes Church, Llandysil Church, Malvern Church, chapel of St. Mary in the church of St. Woolos, Newport, Oystermouth Castle, St. David's Cathedral, Staunton Church, Strata Florida Abbey, Tenby Church, Tiddenham Church, Welsh Brecknor. Fourteenth century. — Brecon, church of St. Mary's, Coyty Church, Horgeston Church, Kidwelly Church (restored), Llandaff Cathedral, Llandyddid Church, Llantillio Crosseny Church, Monkton Priory Church, Marshfield, church of St. Mellons, Neath Abbey, Oystermouth Castle, Ross Church, St. David's Cathedral, Staunton Church, Tiddenham Church, Tintern Abbey. Fifteenth century. — Abergavenny Priory, Brecon, tower of St. Mary's Church, Cardigan Church, Coychurch tower, Llandaff Cathedral, Magor Church tower, Newport Castle, Ross Church, St. David's Cathedral, Tenby Church, At Chepstow the castle and church of St. Mary contain some good work of all periods.

H. Y. M.

NORTHANTS.—BILLY writes: "Please mention buildings to measure for R.I.B.A. within twelve-miles radius of Rushden, Northants."

Northamptonshire generally is one of the richest counties in England for churches, and the district you have chosen contains some of the most beautiful examples of ecclesiastical architecture to be found in this country; for within a few miles of Rushden, which itself contains a magnificent church, are the churches of Raunds and Higham Ferrers. The west window of Raunds Church, the west porch of Higham Ferrers Church or the roof of Rushden Church are features of exquisite beauty and eminently suitable for measuring as testimonies of study for the R.I.B.A. examinations. Other fine churches within the twelve-miles limit are to be found at Kettering, Addington, Braughton, Castle Ashby, Wilby and Aldwinkle.

H. Y. M.

Wren's House in Botolph Lane.

LONDON.—TECHNICAL writes: "Can you inform me where I can find a technical description—not a reporter's puff—of the house in Eastcheap standing between Botolph Lane and Love Lane, reputed to be the home of Sir Christopher Wren during the building of St. Paul's?"

An authoritative article dealing with this house, illustrated by a series of fine photographs, is in hand for THE ARCHITECTURAL REVIEW and will appear shortly.

Condensation in a Bathroom.

LONDON.—H. W. E. writes: "What is the cause of the hot- and cold-water pipes in my bathroom condensing water so much as to make the floor quite wet, and what is the best remedy? I thought perhaps an air-brick let into the wall against the ceiling would remedy the trouble."

As water comes in so much as to flood the floor one would think that leaks were the real cause. See whether the hot-water pipe does not leak where it joins the bath, as it may leak when much hot water has run through and expanded it, and close again when cold. If the joints be all good, and there be no very slight split in the hot-water pipe that opens when much very hot water expands the pipe, then search for wet coming in through the walls, as this really seems to be more likely than the condensation of the steam from a bath of hot water. If no drip or soak be found the condensation must be the cause, and ventilation, with warmed air if possible, is the cure. Placing the hot-water reservoir in the bathroom will give the most warmth, and two air-bricks, one near the ceiling and one at the floor near the hot-water reservoir if possible, will remove the vapour. If the bathroom be very small, the window had better be opened also at top and bottom when weather permits.

O. WHEELER.

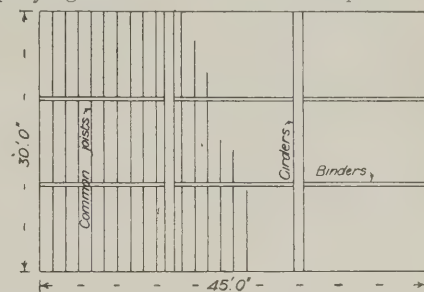
Scantlings for Framed Floor.

STOKE NEWINGTON.—Q. writes: "Please show how to work out the scantlings for a timber floor with wood girders and wood binders. Assuming 2 cwt. per ft. super. on the floor, how much is taken on the two girders and how much on the binders? I quite understand the different formulae, but am in great doubt as how to apply them."

The writer's simple formula for the strength of fir beams may be applied to this case,

namely, $w = \frac{bd^2}{L}$, where w = safe load in

cwts. distributed (allowing a factor of safety of 7), b = breadth in inches, d = depth in inches, L = clear span in feet. You give no dimensions, but a floor as shown by accompanying sketch will serve to explain the



method. Commence first with the common or bridging joists. Assume them to be at 15 ins. centres and 10ft. span over binders. Then

$w = \frac{bd^2}{L}$, whence $bd^2 = wL$; but $w = 2 \text{ cwts.}$

$\times 10\text{ft.} \times 1'25\text{ft.}$; therefore $bd^2 = 2 \times 10 \times 1'25 \times 10 = 250$, say $b = 3$, $d = 9$, then $bd^2 = 3 \times 9^2 = 243$, which is sufficiently near the mark. Then the binders will have to carry 2 cwts. $\times 10\text{ft.} \times 15\text{ft.} = 300 \text{ cwts.}$,

whence $300 = \frac{bd^2}{15}$, or $bd^2 = 15 \times 300 = 4,500$,

and as $\sqrt[3]{4500} = \text{say } 16 \frac{1}{2}$, this would be the size of a square beam to take the load, which is impracticable, and a rolled steel joist must be substituted. A rolled joist to carry 15 tons over a span of 15ft. would require to be Dorman, Long & Co.'s *G 8, 12ins. by 5ins. by 39 lbs. The girders would have to carry two loads of 15 tons, each roft. from support, on a span of 30ft. This will give a maximum bending moment of $15 \times 10 = 150 \text{ ton-feet}$. The tabular value required to be found in catalogue will then be $8 \times 150 = 1,200$, say Dorman, Long & Co.'s G 6 C 6, 16ins. by 14ins. by 212 lbs. compound girders.

HENRY ADAMS.

The Clock Tower, Westminster.

CHISWICK.—A. H. A. writes: "I wish to make a model of the clock tower at Westminster (Big Ben) about 16ft. high. Where can I find a copy of the design, with measurements?"

There do not appear to be any published drawings of the clock tower at Westminster giving sufficient detail to enable you to construct an accurate model. Even in the library of the R.I.B.A. no record is to be found of the architectural features of this important work.

H. Y. M.

Safe Height of Pier.

DEVONPORT.—READER writes: "If 5 cwts. per sq. in. is taken as the safe load on a course of brickwork, and 112 lbs. as the weight of a cubic foot of brickwork, neglecting wind-pressure, to what height may a brickwork pier 4ft. by 4ft. be safely built? It appears to me that whatever the size of the pier, the height would be the same."

Permissible load 5 cwts. per sq. in., 144 sq. ins. in 1 sq. ft., 144 by 5 = 72 cwts. per sq. ft. required load. At 1 cwt. per cub. ft. the height to produce a load of 72 cwts. will therefore be 72ft., and will be independent of the horizontal sectional area of the pier.

This is, however, not a practical question or answer. High piers should be calculated by the Gordon formula, and, if exposed to the wind, allowance should be made for the bending moment it would produce.

HENRY ADAMS.

NEW VENTILATION TESTS.

LECTURING recently on "Heating and Ventilation" before the Edinburgh Sanitary Society, Mr. A. Mackenzie (of Mackenzie & Moncur, Ltd.) observed that the word "ventilation" was said to have been coined 200 years ago by a Dr. Desaguliers, who invented a fanning wheel, and the man who turned the wheel was called the "ventilator."

Explaining the extraction and propulsion or plenum system, Mr. Mackenzie said that in two typical schools in Edinburgh—one with the extraction system and the other with the plenum system—he had made experiments with a view to ascertaining the relative cost of each. In the school with the extraction system the air was changed five times per hour, giving an air-supply of 803 cub. ft. per pupil per hour at a working cost of .38d. per pupil per week, while on analysis the amount of carbon dioxide in the classrooms averaged 7.3 volumes per 10,000 volumes. In the school with the plenum system the air was changed 9.25 times per hour, giving an air-supply of 1,646 cub. ft. per pupil per hour at a working cost of 1.75d. per pupil per week, while the amount of carbon dioxide averaged 6.7 volumes per 10,000 volumes. The result, therefore, was that the plenum system gave .6 of a volume less carbon dioxide per 10,000 volumes than the extraction system, but this was only attained by supplying about double the quantity of air at $4\frac{1}{2}$ times the cost. Another objection to the plenum system was that the windows required to be kept closed, and this was bound to have an unconscious influence on the children as regards the general policy of having open windows in their homes. There was, however, no doubt, that the plenum system gave better results in a school situated in a district where the atmosphere was foul and polluted, although an arrangement of the extraction system might be adopted which would give similar results at less cost.

Trade and Craft.

Faience and Glazed Ware.

If we ever arrive at the day when that solitary New Zealander shall survey the ruins of London, there is no doubt that he will be much impressed by the building materials of our time. To his mind these will be in striking contrast to those of the earlier periods of the world's architectural history, which his archæology will have discovered. As regards stone, little or no change has taken place. In bricks, however, there have been great alterations in manufacture, the most important being that in connection with glazed bricks; also in glazed terra-cotta and modern sanitary goods in glazed ware. To those who can remember the controversy about the introduction of terra-cotta into towns, the advance in this comparatively short period will appear very great. The early terra-cotta work was not very satisfactory, but that obtainable to-day is a very different material. It is now largely made with a vitreous surface, and is also highly glazed in colours. Considerable advance, too, has been made with glazed bricks, the bricks of to-day being immeasurably superior to those at first produced. Whereas the dirty-white brick or the brown salt-glazed were the sum total of the earlier brickmakers' efforts, we now have an infinite variety of colours and tints of remarkable

uniformity and excellence. An equally great advance, if not greater, has taken place in the direction of glazed ware to meet the requirements of modern sanitation. The patterns in sinks, urinals, baths, lavatories, stable fittings, &c., &c., now produced in all the tints of the rainbow, are legion. In no branch of modern industry has there been a greater call upon the ingenuity of the workers. The amount of capital invested in this branch of the building trade is immense, and we feel that the architectural profession fail to realize their indebtedness to the industry and energy of the firms engaged.

Foremost in the development alluded to have been Messrs. Cliff, Burmantofts, Ingham, Wortley & Co. and Oates & Green—firms now united in the Leeds Fireclay Co., Ltd., an organization pursuing a vigorous progressive policy, which has led recently to the opening of extensive and elaborately appointed showrooms at 2 and 3, Norfolk Street, Strand, W.C.

On a previous occasion we dealt with these showrooms and the facilities they afford to architects for the inspection of sanitary goods fitted up with all accessories, as well as a very wide range of samples in the more ordinary materials such as bricks, tiles and glazed terra-cotta.

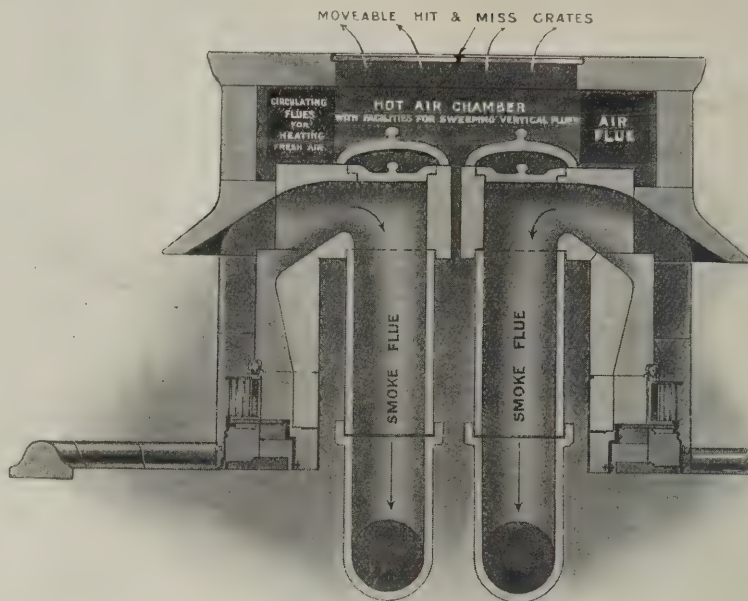
The firm has just issued a truly remarkable catalogue. This consists of nearly 600 pages and is produced in the very best manner. There are illustrations of all the most important varieties of goods manufactured by the various branches of the company, and full information is given respecting sizes, and constructional details as to how the parts are fitted up, with elevations, plans and sections, so that architects will find this catalogue of the greatest service in the preparation of working drawings and the solution of the many difficulties that occur in everyday practice. The catalogue, moreover, is a liberal education in modern sanitation

and the decoration and construction of buildings. Thousands of pounds have been spent on it.

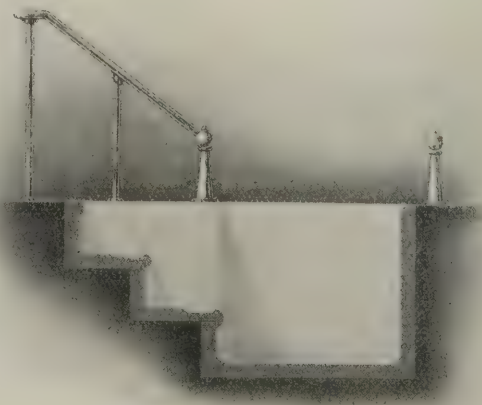
The accompanying three illustrations which we take from its pages show some of the latest innovations of most current interest. The "Senex" bath is an interesting design, which bears some relation to our remarks made recently with reference to the provision of baths in the floors of rooms. This is almost a necessity in public institutions which have the care of feeble or invalid persons. The handrails and steps render it easy for such to get in and out without risk. This is only one of the many designs for baths which are not ordinarily found illustrated in catalogues, so that these specialities of the Leeds Fireclay Co. deserve careful study by every architect.

There are many kinds of urinals and w.c.'s illustrated and described in the catalogue. We give a section of one of the former, namely, a circular back urinal, consisting of a highly-glazed fireclay back with sole and pier in one piece. These urinals have a minimum of joint, and where joints must necessarily occur they are far removed from risk of incrustation.

As illustrating another division of the catalogue we show a longitudinal section through a very neat infirmity stove, with descending smoke flues, made in glazed faience. This pattern, known as the "Hull,"



THE "HULL" DOUBLE STOVE FOR HOSPITAL WARDS.



"SENEX" SUNKEN BATH.

has, among other places, been used at Haley Green Hospital, Stourbridge; the Royal Infirmary, Hull; the Royal Infirmary, Nuneaton; the Menstone Hospital, and the Hunslet Workhouse, Leeds. A novelty in this stove is the provision of a fresh-air inlet flue from under the floor, by which the air is warmed before entering the ward.

Other sections of the catalogue deal with lavatory basins and fittings, sinks, washtubs, hospital and laboratory fittings, stable and farm fittings, and drainage specialities such as pipes, junctions, bends, traps, &c. Last but not least, the company's productions in glazed bricks are particularly well illustrated, such as the many designs of angles, mitres, returns, arches and moulds and also special patented bricks like "the double stretcher," consisting of a brick with a keyed joint at the back which interlocks so as to give adequate bond while enabling an even face to be obtained on both sides of a wall; Cliff's patent bond, in which glazed bricks of small size are used with a filling brick, so cheapening the cost of glazed brick walls; and the well-known Hessel-Tiltman and Shephard

quality, and does not need a fancy cement to fix it, is another point in its favour. It is, as we have said, unaffected by frost and heat, and it is impervious to bacteria, fungi, &c., and is not injured by gases or moisture. "Durolite" is thus particularly adapted for hospital wards and corridors, operating rooms, Turkish and other bath-rooms, lavatories, underground subways, engine-houses, bakehouses, cold stores, &c. An extremely interesting novelty has recently been introduced in this tiling, namely, the reproduction of the graining of marbles, granite, carved wood, &c., so exactly true to the originals that it is difficult, without a very close inspection, to detect that the representations are not the actual materials. The reproductions are quite permanent, and the application of the company's process has been extended to the production of landscapes and portraits in permanent and natural colours on glass, wood, iron, &c. Messrs. Durolite, Ltd., also specialize in leaded lights and stained glass for domestic, ecclesiastical and other purposes to which ornamental glass is applicable. Their latest and most successful production is painted figured rolled glass, for which there is already a large demand. This is produced in one, two or three colours, and the effect is novel and pleasing. The possibilities of the process are indeed great, and enable coloured-glass windows, &c., to be obtained at remarkably low prices. The address of the company is 33 to 36, Camomile Street Chambers, E.C.

NEW LONDON BUILDINGS.

AT yesterday's meeting of the London County Council the Building Act Committee reported the following applications under the London Building Act, 1894, their recommendations as to consent or refusal being appended in *italics* :—

Retention of an addition in front of No. 198, Essex Road, Islington, on the application of W. H. Winder, on behalf of T. Singlehurst. (*Consent.*)

Projecting balconies at Nos. 93 and 94, Long Acre, Strand, abutting upon Wilson Street, on the application of F. Chambers & Son, on behalf of Odhams, Ltd. (*Consent.*)

Deviation from the plan approved on 20th October, 1903, for the erection of blocks of buildings on a site on the north-west side of Coldharbour Lane, Brixton, abutting also upon Lilford Road and Kenbury Street, so far as relates to an increase in the height of the buildings next Coldharbour Lane, on the application of E. E. Bird. (*Consent.*)

Buildings on the north-east side of Maida Vale, St. Marylebone, to abut upon Maida Vale and St. John's Wood Road, on the further application of V. S. Galsworthy, on behalf of the Governors of Harrow School. (*Refusal.*)

One-storey shops in front of Nos. 431 and 433, Edgware Road, Paddington, on the further application of Gardiner & Theobald, on behalf of Matthews & Sons, Ltd. (*Refusal.*)

One-storey shops in front of Nos. 435 and 437, Edgware Road, Paddington, on the further application of Gardiner & Theobald, on behalf of Meux's Brewery Co., Ltd. (*Refusal.*)

One-storey shops in front of Nos. 439 to 451 (odd numbers only), Edgware Road, Paddington, to abut also upon Maida Hill West, on the further application of Boehmer & Gibbs, on behalf of W. Hirsch. (*Refusal.*)

Retention of buildings between Nos. 7 and 9, Coldbath Street, Greenwich, with a forecourt fence at less than the prescribed distance from the centre of the roadway of such street, on the application of Cooper & Goulding. (*Consent.*)

Buildings on the north-east side of Wharf Road, Bethnal Green, with external walls at less than the prescribed distance from the centre of the roadway of such street, on the application of M. W. King & Son. (*Consent.*)

Deviations from the plans approved on 26th April 1904, under sections 13 and 42 of the London Building Act, 1894, for the erection of dwelling-houses to be inhabited by persons of the working-class, on a site abutting upon Leather Lane, Portpool Lane, Verulam Street and Baldwin's Place, Holborn, on the application made by R. Robertson, on behalf of the Housing of the Working Classes Committee of the Council. (*Consent.*)

New streets for carriage traffic on the Mortimer estate, Streatham High Road, Streatham, on the application of E. B. T'Anson, on behalf of Mrs. Mortimer. (*Consent.*)

New street for carriage traffic to lead from Trinity Road to Norwood Road, Lambeth, on the application of C. Death. (*Consent.*)

New street for carriage traffic in continuation northward of Oaksford Avenue, Wells Road, Sydenham on the application of W. Wilkinson, on behalf of T. Covell. (*Consent.*)

New streets for foot traffic only to lead from Uxbridge Road to Bulwer Street, Shepherd's Bush, and the erection of a building in connection therewith, on the application of H. Macintosh & R. J. W. Newman. (*Refusal.*)

The Theatres and Music Halls Committee also reported the following :—

Plans submitted by W. Cave, showing a proposal to form a gallery at the north end of the Æolian Hall, Nos. 135-137, New Bond Street. (*Consent.*)

Plans with regard to bazaars, exhibitions, &c., to be held at Chelsea Town Hall, on March 26th, 27th, 28th and 29th, and at the Royal Horticultural Hall, Vincent Square, from May 20th to June 3rd. (*Consent.*)

Plan submitted by Romaine-Walker and Besant, showing a proposal to provide additional exits from the orchestra and from the supers' dressing-room under the pit at His Majesty's Theatre, Haymarket. (*Consent.*)

Plan submitted by F. Matcham & Co., showing a proposal to erect gates across the open passageway from the Holborn Empire, Holborn, into Weststone Park. (*Consent.*)

Plan submitted by E. Stephens, showing certain alterations proposed to be carried out in connection with the exits from the Royal Victor Hotel (late Royal Victor Music Hall), Old Ford Road, Bethnal Green. (*Consent.*)

Notes and News.

The Baldachino at Westminster Cathedral, which Bentley is said to have considered the best thing about the building, is now being erected.

The Architectural Association of Ireland held its annual dinner last Wednesday at Dublin, Mr. H. Albergy, president, occupying the chair.

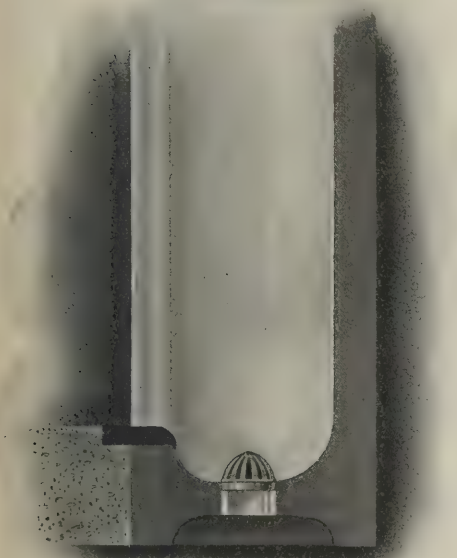
The new Episcopal Throne at Southwark Cathedral was dedicated on Friday last. It is of fumed oak, from the design of Mr. G. F. Bodley, R.A.

Llandaff Diocesan Architect.—The Bishop of Llandaff presided over a meeting of the Llandaff Diocesan Society at Cardiff on Friday, when Mr. F. R. Kempson, of Cardiff, was appointed architect in succession to the late Mr. John P. Seddon.

Sir William Richmond's Gladstone Memorial.—The recumbent effigies of the late Mr. and Mrs. Gladstone, upon which Sir William Richmond has been at work for some years, are now completed. The figures, in white marble, are life-size and lie side by side, a large crucifix between them. The top of the monument is of a shell-shape design, the flutings of which mingle with the feathered wings of the Angel of Watchfulness who, with outspread arms, supports a cushion upon which rest the heads of the recumbent figures.

Payment of District Surveyors by Salaries.—The Building Act Committee of the London County Council state, in connection with their proposal to pay district surveyors by salaries instead of by fees, that there are now eight districts vacant, two where the district surveyors are not acting owing to ill-health, and six where the surveyors are more than seventy years of age; "so that the present time is an exceptionally favourable one for a new system of payment." They recommend that the new scheme shall come into operation from April 1st next.

A Great Scheme of Rebuilding at Chelsea is to be carried out. Two big building enterprises have already been successfully undertaken there, by companies known as the Cadogan and Hans Place Estate Co., Ltd., and numbered 1 and 2 respectively. Now comes company No. 3, to carry out a huge clearance scheme involving some seven acres of much-built-upon land between the Fulham Road and the King's Road. It is said that 750 houses will be demolished, with churches, stables, &c., and that the majority of the existing streets will disappear. Two broad avenues, which will be planted with trees and will be called Sloane Avenue and Cadogan Avenue, will cross the estate in opposite directions. They will be each 60ft. in width. There will also be another 46ft. wide, to be called Draycott Avenue, running from the Fulham Road to King's Road.



CIRCULAR BACK URINAL.

patent partition bricks, Shoppee's patent dovetail bricks for vaulting and concrete floors, walls, &c., and Hall's patent hanging tiles.

We may mention, finally, that the glazes used by the company are all leadless, and are put on by only the most approved processes. The company also manufacture bathroom, w.c., and other metal fittings used in connection with their glazed goods. This is a good feature because only by such means can satisfactory results be guaranteed.

There are many coloured plates in the catalogue, but an adequate knowledge of the variety and excellence of the company's manufactures can only be gained by a visit to their showrooms.

"Durolite."

The grip or key with which "Durolite" opal tiling is fixed is non-rigid and thus allows for the difference in expansion and contraction of the tile and cement upon which and with which it is fixed. For this reason, when properly fixed, "Durolite" does not crack or craze. Moreover, as the key is not secured to the tile by a material affected by heat (such as pitch) it will not become detached from the walls to which it has been fixed. The fact that the backing "grips" immovably in any cement or plaster of good

Six new Secondary Schools for Cheshire are to be built at a cost of £62,000.

St. Mark's Campanile, Venice, will cost altogether £72,000 to rebuild. About half that sum has already been expended.

North Ormesby Hospital is to be enlarged at a cost of £6,875. Mr. J. W. Bottomley is the architect.

A new Vestry House to St. Mary's Episcopal Church, Aberdeen, has been built from designs by Mr. Arthur Clyne, F.R.I.B.A., of Aberdeen.

Woman Clerk of Works.—During the reconstruction of the Princes Theatre at Blackburn, just reopened, Mrs. Clarkson, daughter of the proprietor, Mr. Page, acted as clerk of works, exercising, we are told, "general supervision over the workmen and paying their wages."

The Kensington Borough Engineer, Mr. A. R. Finch (who has been in the service of the local authority for eighteen years), has been appointed engineer to the Kensington Borough Council, at a salary of £600 a year, rising to £1,000, in succession to Mr. W. Weaver, F.S.I., who resigns on a superannuation allowance of £500 a year.

A new Catholic Church at Bournemouth is being erected from designs by Mr. G. Gilbert Scott, of London. The nave will be 25ft. across, and the sanctuary narrowing to 18ft. The walls will be of brick, with Bath stone dressings. Messrs. G. McWilliam & Son, of Bournemouth, are the contractors.

A Bridge over the Surrey Canal, connecting St. George's Road and Neate Street, Camberwell, S.E., has been erected from designs by Mr. W. Oxtoby, borough engineer. The work was carried out by Messrs. Woodham & Sons, of Catford, at a cost of £3,969. The bridge is a steel lattice girder one of three spans, the total length, including approaches, being 410ft.

Asphalt Works for Ireland.—At Magheramorne, near the port of Larne, new asphalt works have been established by the Limmer Asphalt Co., Ltd. (Irish representative Mr. F. A. Porter, 13, Queen's Square, Belfast), for the manufacture of Limmer mineral rock asphalt and patent Lithofalt mineral paving. Magheramorne is a very favourable district, as it furnishes excellent limestone, free from flint and gritty substances—an important constituent in Lithofalt paving.

The Garden Suburb of Hampstead.—Of the 240 acres of the garden suburb proposed to be laid out at Hampstead, 55 acres would be for roads, 70 for industrial class cottages, 30 for the villas of clerks and persons able to pay about £60 a year, 20 for shops or houses from £60 to £100 per annum, 30 for houses of a value above £1,000 per annum, and 15 acres for still larger houses. Of £120,000 required to carry out the scheme, £65,000 had already been subscribed.

The Usher Hall: Latest Proposals.—In accordance with instructions from the Edinburgh Town Council, Mr. Thomas Hunter, town clerk, has prepared a report for the Lord Provost's Committee on the whole question of the new city hall for Edinburgh in connection with the late Mr. Andrew Usher's gift of £100,000 for the provision of a suitable building where good music might be heard by the people. There have been years of bother about this gift. Mr. Hunter suggests, as ways out of the difficulty, that the existing Synod Hall might be turned into an Usher Hall without extension and with only internal reconstruction; or the abandoned rebuilding and extension scheme might be taken up once more; or the present Synod Hall retained as an adjunct to a new Usher Hall fronting Lothian Road. None of these suggestions, however (says the "Scotsman"), can by any stretch of language be described as satisfactory.

The Brick Trade in the Black Country has been in a very depressed state for some time, but matters have now reached such a stage that in Oldbury (which is one of the largest brick-producing centres) there is every prospect of a number of works being closed.

New Council Schools at Blaenavon have been built at a cost of about £7,000, comprising a mixed school for 250 children and an infants' school for 150 children. Mr. J. B. Francis, of Abergavenny, was the architect, and Mr. Charles Cooke, of Hereford, the builder.

Duncan Street Corner, Leeds, has been transformed by the rebuilding of the north side of the busy thoroughfare running between Briggate and the Corn Exchange. Here two large shops and office blocks, with a small block between, have been erected in grey terra-cotta, the architect being Mr. Percy Robinson, of Albion Street, Leeds.

A Detailed Survey of the Site of Ancient Sparta is to be made the principal object of this season's operations of the British School at Athens—now that work in Crete is suspended. Serious attention will be given also to the remains of the Byzantine and Frankish periods, in which the province of Laconia is so rich. For this work the committee have secured the services of an able architect, Mr. Ramsay Traquair, of Edinburgh.

Sheffield Master-Builders' Association.—Mr. T. Roper has been elected president of this Association for the current year, Mr. G. E. Powell senior vice-president, and Mr. T. Eshelby junior vice-president. Committee: Messrs. J. Longden, J. Biggin, A. J. Forsdike, J. D. Cook, A. Mastin, F. Fidler, H. H. Hodkin, F. Turner, Walter Shaw, J. C. Warring, W. May, G. H. Bown, J. Vasey, W. Kirkham, J. S. Teanby, J. Dawson, junr., Charles Roberts and W. W. Mears.

Two Artesian Wells have recently been sunk at the Prince of Wales's Road Baths, Kentish Town, for the St. Pancras Borough Council, which give a supply of 30,000 gallons per hour. On account of the first of these wells having been reported as yielding no supply, it was on the eve of being abandoned when Messrs. C. Isler & Co. were consulted and proved a supply of over 15,000 gallons per hour by means of their system of pumping by compressed air. These satisfactory results induced the council to put down an additional well, which is carried to a depth of 480ft., and to permanently instal Messrs. Isler & Co.'s air-lift pumping machinery.

Calcutta and Bombay: A Comparison.—Calcutta has long been called the City of Palaces, but, said Mr. Charles Edward Buckland in a paper which he read before a recent meeting of the Society of Arts, the city is not generally considered to deserve the appellation, which has also been bestowed on Oxford, Bath and Genoa. Lord Lytton, with more truth, called Calcutta the City of Statues, of which there are a goodly number, chiefly of governor-generals and military heroes. If the appearance of Calcutta is compared with that of other cities of India it must be remembered that the grey stone which has made Bombay so beautiful is not available in or near Calcutta, and that the latter has to depend on burnt bricks and plaster as the material for its larger buildings. But Dalhousie Square would be a conspicuous feature in any town, with its fine public edifices and sheet of water. When Calcutta won the legend of "The City of Palaces," said Sir George Birdwood in the discussion following Mr. Buckland's paper, Bombay was an agglomeration of villages of tiled shanties and *kadjan* huts, and it was by the fervent genius of Sir Bartle Frere and the administrative ability and energetic devotion of Arthur Crawford that it was within five years transformed into "Bombay the Beautiful."

"The Sanitary Journal" (the organ of the Sanitary Inspectors' Association) now has its offices at 13, Victoria Street, S.W.

A Cottage Hospital is being completed at Moffat, on Selkirk Road, at a cost of about £1,000. Mr. Edward C. H. Maidman, of Edinburgh, is the architect.

An immense Ancient City of Mayos has, it is reported, been discovered in the Peten district of Guatemala by a French archæologist, Count Maurice de Péréguy.

"A Chat about Architects and Architecture."—Owing to the success of the first edition of this booklet, a second and enlarged edition of 5,000 copies has been published by the author, Mr. W. I. Chambers, architect, 11, The Green, Richmond, Surrey.

Messrs. Hukins & Mayell, architects and surveyors, of 76A, Westbourne Grove, W., have taken over the practice of the late Mr. W. H. Chaney, architect and surveyor, of 37 and 39, Essex Street, Strand, W.C. (and formerly of 30, Essex Street), and will continue the practice at these offices.

A Building in Memory of James Watt is to be erected at Greenock on the site of the house in which Watt was born, at the corner of William Street and Dalrymple Street. It will be Scottish Baronial in style and is estimated to cost £6,500. Messrs. H. & D. Barclay, of Glasgow, are the architects.

Dissolutions of Partnership.—The partnership between Mr. W. Clifford Parnell and Mr. J. Fred Fogerty, A.R.I.B.A., of Belfast House, Gervis Place, Bournemouth, has been dissolved, Mr. and Fogerty has taken into partnership Mr. George Brumell, A.R.I.B.A., with whom he will practice at the above address under the style of Fogerty & Brumell.—The partnership between Messrs. Davy & Salter, architects and surveyors, of Oxford and Maidenhead, has been dissolved; also that between Mr. R. A. Dean and Mr. P. Quinn, carrying on business as builders at Croydon.

An Excellent Advertisement has just been issued to the architectural profession by Messrs. Engert & Rolfe, Ltd., felt and asphalt manufacturers, of Barchester Street, Poplar, London, E., in the shape of an ingenious pair of pocket-dividers contained in a protective case upon which the firm's name is engraved. Such a memento is very serviceable and sure to be kept. Messrs. Engert & Rolfe's "Hair Bitumen" is now largely used for a variety of purposes, such as an underlining for every form of roof covering, as a sound-deadener in partition work, and in place of pugging under flooring. It is supplied in rolls 25 yds. long by 32ins. wide: thus each roll contains 200 sq. ft., or 2 squares. The list price is 9d. per yard by 32ins. i.e., 8 sq. ft. For sound-deadening purposes it is made of stouter substance than for underlining roofs.

The Stations on the Waterloo and Baker Street "Tube" will be all distinct by the employment of tiles of different colours. They have been designed by Mr. Leslie W. Green, A.R.I.B.A. The plans vary in shape and size according to the site available, but the elevations of those above ground are all alike, being carried out in glazed dark-red terra-cotta on a steel framework. The tile and glazed terra-cotta work is being executed by the Leeds Fireclay Co., Ltd. The Trafalgar Square and Regent's Park stations have no elevation. The former is under the south-east corner of the square, and has subways leading to the corner of the Strand (outside the post-office) on the one hand and to Cockspur Street on the other: while the Regent's Park station is under the flower beds in Park Crescent Gardens, and is approached, like that at Trafalgar Square, by a short staircase.

Complete List of Contracts Open.

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
BUILDING:			
Feb. 22	London, N.—Portland Cement, &c.	Town Council	E. J. Lovegrove, Borough Engineer, Municipal Offices, Highgate, N.
" 22	Dublin—Cement	Commissioners	Irish Lights Office, Dublin.
" 22	Cheltenham—School	Education Committee	Chatters & Smithson, Architects, 17 Regent Street, Cheltenham.
" 22	Liverpool—Public Baths	Corporation	W. R. Court, Municipal Offices, Liverpool.
" 22	Salford—Tenement Dwellings	Corporation	Borough Engineer's Office, Town Hall, Salford.
" 23	Bradford—Chapel, &c.	Corporation	City Architect, Whitaker Buildings, Brewery Street, Bradford.
" 23	Ely—Church	Corporation	Austin & Paley, Architects, Lancaster.
" 23	Aberafon—Schools	Education Committee	J. Llewellyn Smith, Architect, Central Chambers, High Street, Merthyr Tydfil.
" 23	Kelvedon Hatch—Cottages		R. H. Browne, Architect, Brentwood.
" 23	Tottenham—Sorting Office	H.M. Office of Works	H.M. Office of Works, Storey's Gate, London, S.W.
" 24	Stony Stratford—Schools	Education Committee	Harrington, Ley & Kerkham, Archts., 65 Bishopsgate St. Withoat, E.C.
" 24	Cardiff—Superstructure	University College of South Wales	J. Austin Jenkins, Registrar, University College, Cardiff.
" 24	Dorchester—Repairs	Town Council	G. J. Hunt, Borough Surveyor, Guildhall Chambers, Dorchester.
" 24	Workington—Stores	Co-operative Society	W. G. Scott & Co., Architects, Victoria Buildings, Workington.
" 24	Trealaw—Residence	W. P. Nicholas	A. C. Evans, Williams & Evans, Architects, Pontypridd.
" 24	Stafford—Cement, Lime, Bricks, &c.	Corporation	W. Blackshaw, Borough Engineer, Town Hall, Stafford.
" 26	Boote—Convenience	Corporation	B. J. Wolfenden, Borough Engineer, Boote.
" 26	Prestwich—Portland Cement, Lime, &c.	Urban District Council	Surveyor, Council Offices, Chester Bank, Prestwich.
" 26	West Hartlepool—Alteration of Steps	Corporation	Nelson F. Dennis, Borough Engineer, West Hartlepool.
" 26	Workington—Houses	W. Grave	W. G. Scott & Co., Architects, Victoria Buildings, Workington.
" 26	Bradford—Pump-room, &c.	Guardians	F. Holland, Architect, 11 Parkinson's Chambers, Hustlergate, Bradford.
" 26	Walker-on-Tyne—Assembly Hall, &c.	Trustees	Davidson & Phillipson, Architects, Pearl Buildings, Newcastle-on-Tyne.
" 27	Whitworth—Bakery	Co-operative Society	T. F. Wood, Secretary, Co-operative Society, Whitworth.
" 27	London—Extension of British Museum	H.M. Office of Works	Sir Henry Tanner, H.M. Office of Works, Storey's Gate, S.W.
" 27	Derby—Cement and Lime	Town Council	J. Ward, Borough Surveyor, Babington Lane, Derby.
" 27	London, W.—Chimney-shaft	Town Council	C. Jones, Borough Engineer, Town Hall, Ealing, W.
" 27	Corsham—Business Premises	Co-operative Society	W. H. Bromley, Surveyor, 3 Pickwick Road, Corsham.
" 28	Plymouth—Bridge	Education Committee	H. J. Snell, Architect, 11 The Crescent, Plymouth.
" 28	Ballyrobin—Residence		H. A. Craig, Ballyrobin, N.S., Ireland.
" 28	Leeds—Police-station, &c.	Watch Committee	W. H. Thorp, Architect, Phoenix Chambers, South Parade, Leeds.
" 28	Wick—Hospital		J. Young, County Clerk, Thurso.
" 28	Dublin—Lime, &c.	Irish Constabulary	Commandant's Office, R.I.C. Depot, Phoenix Park, Dublin.
Mar. 1	Shrewsbury—County Buildings	County Council	A. T. Davis, County Surveyor, Shirehall, Shrewsbury.
" 1	Accrington—Library	Corporation	W. J. Newton, Borough Engineer, Town Hall, Accrington.
" 1	Llanelli—Remodelling	Education Committee	W. Griffiths, Architect, Llanelli.
" 1	London, S.E.—Convenience	Borough Council	Borough Surveyor, Town Hall, Greenwich.
" 1	Exeter—Lime, Portland Cement, &c.	Town Council	T. Moulding, City Surveyor, Municipal Offices, Exeter.
" 2	Devizes—Twelve Cottages, &c.	Urban District Council	Borough Surveyor's Office, Devizes.
" 2	Sheffield—Cement, Lime, Bricks, &c.	Corporation	C. F. Wike, City Surveyor, Town Hall, Sheffield.
" 2	Navan—Bank	Belfast Banking Co.	A. Scott & Son, Architects, 34 Lower Sackville Street, Dublin.
" 3	Northampton—Bricks, Lime, &c.	Corporation	A. Fidler, Borough Engineer, Guildhall, Northampton.
" 3	Dalraddy—Workmen's Houses	Highland Railway Co.	W. Roberts, Engineer-in-Chief, Highland Railway Co., Inverness.
" 3	Carmarthen—Rebuilding Chapel		G. Morgan & Sons, Architects, Carmarthen.
" 3	Londonderry—Portland Cement	Corporation	Town Clerk, Guildhall, Londonderry.
" 5	Dalkey—Working-class Dwellings	Urban District Council	J. P. Gahan, Clerk, Town Hall, Dalkey.
" 6	Bromley-by-Bow—Alterations	Managers	J. & W. Clarkson, Architects, 136 High Street, Poplar, E.
" 6	Clitheroe—Slaughter-houses	Town Council	A. R. Bleazard, Borough Surveyor, Clitheroe.
" 6	Blackpool—Additions and Extensions to Hospital	Board of Management	R. B. Mather, Architect, 34 Birley Street, Blackpool.
" 6	Alfreton—Lodge	Urban District Council	E. Houghton, Surveyor, King Street, Alfreton.
" 7	Stamford—Buildings	Town Council	F. R. Ryman, Borough Engineer, Stamford.
" 7	Rushey—Chapel Alterations	Rev. P. McGeown	G. P. McGrath, Architect, Commercial Bldgs., Foyle St., Londonderry.
" 7	Wolverhampton—School Alterations		T. H. Fleming, Architect, 10 Queen Square, Wolverhampton.
" 7	Clavering—Farmhouse		Messrs. Crawter, Cheshunt.
" 7	Keighley—Church Enlargement		E. Simpson, Architect, 12 Cunliffe Terrace, Manningham, Bradford.
ENGINEERING:			
Feb. 22	Shanghai—Electrical Plant	Municipality	Preece & Cardew, 8 Queen Anne's Gate, Westminster, S.W.
" 22	Romford—Bridge Works	Urban District Council	H. S. Ridge, Council Offices, Market Place, Romford.
" 22	Potterhanworth—Tank Works		J. Clare, C.E., Sleaford.
" 23	Exmouth—Fire Appliances	Urban District Council	S. Hutton, Surveyor, Exmouth.
" 23	Rotherham—Boiler, &c.	Baths Committee	J. Platts, Architect, High Street, Rotherham.
" 24	Cavan—Traction Engine	County Council	County Surveyor, Athara, Cavan.
" 24	Weston-super-Mare—Heating Apparatus	Education Committee	Hans Price & W. Jane, Architects, Weston-super-Mare.
" 26	West Hartlepool—Engine and Dynamo	Corporation	H. F. Fredericks, Electricity Works, West Hartlepool.
" 27	Halifax—Motor Tower Wagon	Tramways Committee	W. M. Rogers, Borough Electrical Engineer, Halifax.
" 28	Lancaster—Heating Apparatus	Guardians	Newcombe & Newcombe, Architects, 89 Pilgrim Street, Newcastle.
" 28	Harwich—Sludge-pressing Machinery	Urban District Council	A. Giddins, Clerk, Chatteris, Cambs.
Mar. 1	Chatteris—Water-supply Works	Urban District Council	A. Giddins, Clerk, Chatteris, Cambs.
" 1	Croydon—Heating and Hot-water Apparatus	Borough Council	G. F. Carter, Borough Engineer, Town Hall, Croydon.
" 2	Sunderland—Extension Electricity Station	Corporation	J. F. C. Snell, Borough Electrical Engineer, Town Hall, Sunderland.
" 2	Sunderland—Feed-pump, Cooling-tower, &c.	Corporation	J. F. C. Snell, Borough Electrical Engineer, Town Hall, Sunderland.
" 2	Antwerp—Heating Apparatus	Town Council	Secretary, Town Hall, Antwerp.
" 5	Dundalk—Repairs to Boilers	Harbour Commissioners	N. Callan, Harbour Engineer's Office, Quay Street, Dundalk.
" 6	Carshalton-on-the-Hill—Kitchen Fittings, &c.	Asylums Board	Metropolitan Asylums Board Offices, Embankment, E.C.
" 7	Brussels—Turn-bridges		M. de Rudder, rue de Lorraine 11, Brussels.
" 15	Antwerp—Sluice		M. Pierrot, Directeur des Ponts et Chaussées, Marché au Blé de Zélande, Antwerp.
" 15	Pretoria—Refuse-destructor	Municipality	Mosenthal, Sons & Co., 72 Basinghall Street, London, E.C.
April 15	Valparaiso—Port Improvements		Minister of Finance, Santiago.
May 1	Talcahuano, Chili—Dock		Dirección de Material, Valparaiso.
" 7	Sydney—Electrical Plant	Municipality	T. Rooke, c/o Messrs. Preece & Cardew, 8 Queen Anne's Gate, S.W.
No date	Southend-on-Sea—Borehole	Electric Light Committee	E. J. Elford, Borough Engineer and Surveyor, Clarence Street, Southend-on-Sea.
IRON AND STEEL:			
Feb. 22	London, N.—Iron Castings, Pipes, Tools, &c.	Borough Council	Town Clerk, Town Hall, Upper Street, N.
" 22	Dublin—Iron Castings, Ironmongery, &c.	Commissioners	Irish Lights Office, Dublin.
" 22	Gothenburg—Pipes	Waterworks	Waterworks Offices, Lund.
" 22	London, E.C.—Tie Bars, Mild Steel, &c.	G.I.P. Railway Co.	J. I. Berry, Secretary, 48 Copthall Avenue, E.C.
" 22	Lund—Cast-iron Pipes	Waterworks	Town Waterworks Offices, Lund, Sweden.
" 23	London, E.—Iron Castings	Works Committee	Harley Heckford, Surveyor, Council Offices, High Street, Poplar.
" 23	London, W.C.—Iron Castings, Tools, &c.	City Council	Westminster City Hall, Charing Cross Road, W.C.
" 23	Chepping Wycombe—Cast-iron Pipes, &c.	Corporation	T. J. Rushbrooke, Borough Surveyor, 77 Easton Street, High Wycombe.
" 24	London, W.—Ironmongery, &c.	Guardians	J. Lamb, Clerk, 205 Goldhawk Road, Shepherd's Bush, W.
" 24	Warrington—Pipes, Castings, Valves, &c.	Water Committee	Water Engineer, Municipal Offices, Sankey Street, Warrington.
" 26	Ilford—Castings, Tools, &c.	Urban District Council	Public Health Department, Town Hall, Ilford.
" 27	London, S.E.—Ironmongery, &c.	Borough Council	V. Orchard, Town Clerk, Town Hall, New Cross, S.E.
" 27	Kingston-on-Thames—Ironmongery	Guardians	J. Edgell, Union Offices, Coombe Road, Kingston-on-Thames.
" 28	The Hague—Iron and Steel, &c.	Netherlands Colonial Office	Commercial Intelligence Branch, Board of Trade, 73 Basinghall St., E.C.
Mar. 1	Exeter—Iron Castings, Ironmongery, &c.	Town Council	T. Moulding, City Surveyor, Municipal Offices, Exeter.
" 1	Sheffield—Castings	Corporation	C. F. Wike, City Surveyor, Town Hall, Sheffield.
" 3	Northampton—Wrought-iron, Steel, &c.	Corporation	A. Fidler, Borough Engineer, Guildhall, Northampton.
" 3	Londonderry—Ironwork	Corporation	Town Clerk, Guildhall, Londonderry.
" 3	South Shields—Cast Ironwork, &c.	Corporation	S. E. Burgess, Borough Surveyor, Chapter Row, South Shields.
" 5	King's Heath—Iron and Steel Castings, Tools, &c.	Urban District Council	Surveyor, Council Offices, 23 Valentine Road, King's Heath.
" 15	Southall—Tools	Urban District Council	R. Brown, Surveyor, Public Offices, Southall.
PAINTING AND PLUMBING:			
Feb. 22	Dublin—Paints, White Lead, Plumbing Work	Commissioners	Irish Lights Office, Dublin.
" 22	Dublin—Painting and Glazing	Board of Public Works	A. Williams, Office of Public Works, Dublin.
" 23	Colchester—Painting	Hospital	G. Buck, Secretary, Hospital, Colchester.
" 23	London, W.C.—Materials, Painting, &c.	City Council	Westminster City Hall, Charing Cross Road, W.C.

Complete List of Contracts Open.—continued

DATE OF DELIVERY.	WORK TO BE EXECUTED.	FOR WHOM.	FROM WHOM FORMS OF TENDERS MAY BE OBTAINED.
PAINTING AND PLUMBING—cont.			
Feb. 24	London, W.—Painters' Tools, Brushes, &c. ...	Guardians ...	J. Lamb, Clerk, 206 Goldhawk Road, Shepherd's Bush, W.
" 24	Wakefield—Painting ...	Guardians ...	H. Beaumont, Clerk, Union Offices, Wakefield.
" 24	Manchester—Painting, &c. ...	Rivers Committee ...	Secretary, Rivers Department, Town Hall, Manchester.
" 24	Ammanford—Plumbing Works ...	Urban District Council ...	T. M. Evans, Clerk to Council, Ammanford.
" 26	Darlington—Painting ...	North Eastern Railway Co. ...	J. C. Valentine, Northgate Offices, Darlington.
Mar. 1	Exeter—Plumbers' Material, Painting, &c. ...	Town Council ...	T. Moulding, City Surveyor, Municipal Offices, Exeter.
" 3	Auckland—Paint ...	Rural District Council ...	J. Heslop, Surveyor, Cockton House, Bishop Auckland.
" 3	South Shields—Paints, &c. ...	Corporation ...	S. E. Burgess, Borough Engineer, Chapter Row, South Shields.
" 3	Northampton—Colours, &c. ...	Corporation ...	A. Fidler, Borough Engineer, Guildhall, Northampton.
" 3	London—Plumbing ...	Corporation ...	Town Clerk, Guildhall, Londonderry.
" 3	King's Heath—Paints ...	Urban District Council ...	Surveyor, Council Offices, 23 Valentine Road, King's Heath.
" 6	Belfast—Plumbers' Materials, Paints, &c. ...	Guardians ...	Master, Workhouse, Belfast.
" 6	Croydon—Lead, Glass and Painter's Materials ...	Visiting Committee ...	Clerk of Asylum, Croydon Mental Hospital, Warringham, Surrey.
ROADS AND CARTAGE:			
Feb. 22	Lanchester—Materials ...	Rural District Council ...	W. Cumming, Surveyor's Office, Lanchester.
" 22	London, N.—Granite, Flints, Cartages, &c. ...	Borough Council ...	Town Clerk, Town Hall, Upper Street, N.
" 22	Spilsby—Road Materials ...	Rural District Council ...	T. A. Busbridge, Highway Surveyor, Spilsby.
" 22	Thame—Granite, Carting, &c. ...	Rural District Council ...	J. Goodenough, District Surveyor, Thame.
" 22	Brixworth—Granite ...	Rural District Council ...	W. C. Woodford, Clerk, 18 Market Square, Northampton.
" 23	Tadcaster—Stone, Macadam and Carting ...	Rural District Council ...	T. Scott, Surveyor, Aberford, Leeds.
" 23	London, W.C.—Repairs, Granite, Cartage, &c. ...	City Council ...	Westminster City Hall, Charing Cross Road, W.C.
" 23	Flaxton—Materials ...	Rural District Council ...	J. Peters, Clerk, 4 New Street, York.
" 24	Durham—Road Materials, &c. ...	Rural District Council ...	G. Gregson, Surveyor, Durham.
" 24	Felling—Paving, &c. ...	Urban District Council ...	Surveyor, Council Buildings, Felling, Durham.
" 24	Epping—Carting ...	Rural District Council ...	Forrester, Surveyor, Thornwood, near Epping.
" 24	Manchester—Carting, &c. ...	Rivers Committee ...	Secretary, Rivers Department, Town Hall, Manchester.
" 24	Spalding—Granite, Slag, &c. ...	Rural District Council ...	H. Stanley Maples, Clerk to Council, Spalding.
" 24	Walton-le-Dale—Road Materials ...	Urban District Council ...	W. S. Woodcock, Clerk, Council Offices, Bamber Bridge.
" 26	Old Hill—Materials ...	Urban District Council ...	Council Offices, Lawrence Lane, Old Hill.
" 26	Deal—Materials ...	Town Council ...	Town Clerk, Town Hall, Deal.
" 26	Ilford—Granite, Flints, Kerbs, &c. ...	Urban District Council ...	Public Health Department, Town Hall, Ilford.
" 27	Bootle—Improvement Works ...	Corporation ...	Borough Engineer, Town Hall, Bootle.
" 27	Diss—Granite ...	Urban District Council ...	A. Cooper, Surveyor, The Terrace, Diss.
" 27	Doncaster—Dross and Granite ...	Rural District Council ...	W. R. Crabtree, Union Offices, High Street, Doncaster.
" 27	London, E.C.—Granite Spalls ...	Guardians ...	J. A. Battersby, Clerk, 53 Clerkenwell Road, E.C.
" 27	Woodbridge—Materials ...	Rural District Council ...	G. Cook, District Surveyor, Grundisburgh, near Woodbridge.
" 27	Lewes—Materials ...	County Council ...	F. J. Wood, County Surveyor, County Hall, Lewes.
" 27	Southall—Making-up ...	Urban District Council ...	R. Brown, Engineer, Council Offices, Southall.
" 27	Huntingdon—Cartage ...	County Council ...	H. Leete, County Surveyor, High Street, Huntingdon.
" 28	Croydon—Horse Hire ...	Borough Council ...	Road Surveyor or Borough Engineer, Town Hall, Croydon.
" 28	Cannock—Street Works ...	Rural District Council ...	H. M. Whitehead, Surveyor, Penkridge, Stafford.
Mar. 1	Exeter—Flags, Granite, &c. ...	Town Council ...	T. Moulding, City Surveyor, Municipal Offices, Exeter.
" 1	Ponteland—Highway Works, &c. ...	Rural District Council ...	D. Hope, Surveyor, Ponteland, Northumberland.
" 2	Sheffield—Asphalting, Flags, Granite, &c. ...	Corporation ...	C. F. Wike, City Surveyor, Town Hall, Sheffield.
" 2	Auckland—Road Metal ...	Rural District Council ...	J. Heslop, Surveyor, Cockton House, Bishop Auckland.
" 3	South Shields—Stone, Flags, Slag, &c. ...	Corporation ...	S. E. Burgess, Borough Engineer, Chapter Row, South Shields.
No date	Culham—Stone ...	Rural District Council ...	Bromley Challenger, Clerk, 59 Stut Street, Abingdon.
SANITARY:			
Feb. 22	Chelmsford—Scavenging ...	Rural District Council ...	W. Edser, Sanitary Inspector, Avenue Chambers, Chelmsford.
" 22	London, N.—Earthenware Pipes ...	Borough Council ...	Town Clerk, Town Hall, Upper Street, N.
" 22	Gillingham—Requisites for Precipitation Works, &c. ...	Town Council ...	J. L. Redfern, Borough Engineer, Corporation Offices, Gillingham.
" 22	Rishton—Sanitary Pipes, &c. ...	Urban District Council ...	Council Offices, 4 Church Street, Rishton.
" 23	Heaton Norris—Earthenware and Stoneware Pipes ...	Urban District Council ...	F. W. Brook, Clerk, Council Offices, Heaton Moor.
" 24	Litherland—Removal of Refuse ...	Urban District Council ...	A. H. Carter, Public Offices, Litherland.
" 24	Llandaff—Earthenware Pipes ...	Rural District Council ...	J. Holden, Surveyor, 20 Parks Place, Cardiff.
" 24	Westthroughton—Stoneware Sanitary Pipes ...	Urban District Council ...	T. Partington, Clerk, Town Hall, Westthroughton.
" 24	Stafford—Sanitary Pipes ...	Corporation ...	W. Blackshaw, Borough Engineer, Town Hall, Stafford.
" 26	Hampton Wick—Scavenging ...	Urban District Council ...	H. Fawcett, Council Offices, High Street, Hampton Wick.
" 26	Hinckley—Sewerage Works ...	Rural District Council ...	S. Preston, Clerk, Church Street, Hinckley.
" 26	Prestwick—Earthenware Pipes, &c. ...	Urban District Council ...	Surveyor, Council Offices, Chester Bank, Prestwick.
" 26	Halifax—Stoneware Pipes, &c. ...	Corporation ...	J. Lord, Borough Engineer, Town Hall, Halifax.
" 27	Derby—Disinfectants, &c. ...	Town Council ...	J. Ward, Borough Surveyor, Babington Lane, Derby.
" 28	Llandaff—Scavenging ...	Rural District Council ...	M. Warren, Clerk, Park House, 20 Park Place, Cardiff.
" 28	Pwllheli—Sewer, &c. ...	Corporation ...	E. R. Davies, Town Clerk, Town Hall, Pwllheli.
" 28	Stoke-upon-Trent—Disinfectants ...	Corporation ...	A. Burton, Borough Surveyor, Town Hall, Stoke-upon-Trent.
" 28	Stoke-upon-Trent—Sanitary Pipes, &c. ...	Corporation ...	A. Burton, Borough Surveyor, Town Hall, Stoke-upon-Trent.
" 28	Horwich—Sewage-purification Works ...	Urban District Council ...	H. L. Hinnell, Engineer, 41 Corporation Street, Manchester.
Mar. 1	Tillingdon and Castlechurch—Drainage Works ...	Rural District Council ...	R. E. W. Berrington & Son, Engineers, Bank Bldgs., Wolverhampton.
" 1	Guildford—Drainage Works ...	Town Council ...	C. G. Mason, Borough Engineer, Guildford.
" 2	Auckland—Stoneware Pipes ...	Rural District Council ...	J. Heslop, Surveyor, Cockton House, Bishop Auckland.
" 3	South Shields—Sanitary Pipes, Disinfectants, &c. ...	Corporation ...	S. E. Burgess, Surveyor, Chapter Row, South Shields.
" 5	King's Heath—Stoneware Pipes ...	Urban District Council ...	Surveyor, Council Offices, 23 Valentine Road, King's Heath.
" 7	Tyburn—Stoneware Pipes, &c. ...	Drainage Board ...	J. D. Watson, Engineer, Drainage Board Offices, Tyburn, near Birmingham.
" 13	London, S.E.—Sewers ...	County Council ...	Maurice Fitzmaurice, Chief Engineer, County Hall, Spring Gardens.
" 13	London, E.C.—Drain Pipes, &c. ...	Borough Council ...	Town Clerk, Shoreditch Town Hall, Old Street, E.C.
TIMBER:			
Feb. 22	London, N.—Timber ...	Borough Council ...	Town Clerk, Town Hall, Upper Street, N.
" 22	Dublin—Timber ...	Commissioners ...	Irish Lights Office, Dublin.
" 22	Gillingham—Timber ...	Town Council ...	J. L. Redfern, Borough Engineer, Corporation Offices, Gillingham.
" 22	Rome—Teak Wood ...	Ministry of Public Works ...	Ministry of Public Works, Rome, Italy.
" 23	London, W.C.—Timber ...	City Council ...	Westminster City Hall, Charing Cross Road, W.C.
" 24	Stafford—Timber ...	Corporation ...	W. Blackshaw, Borough Engineer, Town Hall, Stafford.
" 26	Ilford—Wheelwrights' Timber ...	Urban District Council ...	Public Health Department, Town Hall, Ilford.
" 26	Leeds—English and Foreign Timber ...	Gas Committee ...	R. H. Townsley, Manager, Gas Department, East Parade, Leeds.
" 26	Halifax—Timber ...	Corporation ...	J. Lord, Borough Engineer Town Hall, Halifax.
" 27	London, S.E.—Timber ...	Borough Council ...	Town Clerk, Town Hall, New Cross, S.E.
" 27	Derby—Timber ...	Town Council ...	J. Ward, Borough Surveyor, Babington Lane, Derby.
Mar. 1	Exeter—English and Foreign Timber ...	Town Council ...	T. Moulding, City Surveyor, Municipal Offices, Exeter.
" 1	Rochefort—Swedish, Norwegian and Russian Timber ...	Marine Offices ...	Marine Offices, Rochefort, France.
" 2	Auckland—Timber ...	Rural District Council ...	J. Heslop, Surveyor, Cockton House, Bishop Auckland.

List of Competitions Open.

DATE OF DELIVERY.	DESIGNS REQUIRED.	AMOUNT OF PREMIUM.	DEPOSIT REQUIRED FOR CONDITIONS, &c.	FROM WHOM PARTICULARS MAY BE OBTAINED.
Mar. 1	Bangor—New College Buildings (Names only) ...	—	—	J. E. Lloyd, Secretary, University College of North Wales, Bangor.
" 1	Greenock—School ...	—	—	A. F. Niven, Municipal Buildings, Greenock.
" 20	Bangor—Free Library ...	£25 and £15	—	W. H. Worrall, Municipal Offices, Bangor, North Wales.
" 24	Swadlincote—Free Library ...	£25, £15, £10	—	W. A. Mussion, Clerk, Council Offices, Swadlincote.
" 31	Birmingham—Council House Extension (Sketch Plans).	—	£1 ts.	Town Clerk, Council House, Birmingham.
April 2	Southwark—Public Library (£7,000) ...	£50, £30, £20	£1 ts.	J. A. Johnson, Town Clerk, Town Hall, Walworth Road, S.E.
No date	Stone—Isolation Hospital (Local Architects only)	—	—	J. J. Chapman, Clerk, Joint Hospital Board, Stone.

Current Market Prices

FORAGE.

	£	s.	d.	£	s.	d.
Beans ... per qr.	1	12	0	1	17	0
Clover, best ... per load	3	12	0	4	2	6
Hay, good ... per ton	3	5	0	3	12	6
Sainfoin mixture ... do.	3	5	0	3	15	0
Straw ... do.	1	8	0	1	14	0

OILS AND PAINTS.

Castor Oil, French ... per cwt.	1	1	10	1	2	0
Colza Oil, English ... do.	1	5	0	—	—	—
Copperas ... per ton	2	0	0	—	—	—
Lard Oil ... per cwt.	2	15	0	2	17	0
Lead, white, ground, carbamate ... per ton	16	0	0	—	—	—
Do. red ... do.	15	0	0	0	19	0
Linseed Oil, barrels ... per cwt.	1	0	3	—	—	—
Petroleum, American ... per gal.	0	0	6	0	0	6½
Do. Russian ... do.	0	0	5	0	0	5½
Pitch ... per barrel	0	8	0	—	—	—
Shellac, orange ... per cwt.	9	18	0	—	—	—
Soda, crystals ... per ton	3	2	6	3	5	0
Tallow, Town ... per cwt.	1	7	0	1	7	6
Tar, Stockholm ... per barrel	1	5	0	—	—	—
Turpentine ... per cwt.	2	8	1½	—	—	—

METALS.

Copper, sheet, strong ... per ton	93	0	0	—	—	—
Iron, Staffs., bar ... do.	7	5	0	9	0	0
Do. Galvanized Corrugated sheet ... do.	12	7	6	12	12	0
Lead, pig, Soft Foreign ... do.	16	7	6	—	—	—
Do. do. English common brands ... do.	16	15	0	—	—	—
Do. sheet English, 3lb. per sq. ft. and upwards ... do.	18	10	0	—	—	—
Do. pipe ... do.	18	10	0	—	—	—
Nails, cut clasp, 3in. to 6in. ... do.	9	5	0	—	—	—
Do. floor brads ... do.	9	0	0	—	—	—
Steel, Staffs., Girders and Angles ... do.	7	0	0	7	5	0
Do. do. Mild bars ... do.	7	10	0	7	15	0
Tin, Foreign ... do.	164	10	0	165	0	0
Do. English ingots ... do.	166	0	0	168	0	0
Zinc, sheets, Silesian ... do.	29	10	0	—	—	—
Do. do. Vielle Montaigne ... do.	30	0	0	—	—	—
Do. Spelter ... do.	25	17	6	26	7	6

TIMBER.

SOFT WOODS.

Fir, Dantzic and Memel ... per load	2	15	0	5	0	0
Pine, Quebec, Yellow ... do.	4	2	6	7	10	0
Do. Pitch, American ... do.	2	19	0	5	0	0
Laths, log, Dantzic ... per cu. fath.	4	0	0	6	0	0
Deals, Manchill, Yellow, 5th, 4x11 ... per std.	11	0	0	—	—	—
Do. do. do. 5th, 4x9 ... do.	10	10	0	10	15	0
Do. do. do. 5th, 3x11 ... do.	9	15	0	—	—	—
Do. Montreal, Red Pine, 1st, 4x9 ... do.	15	15	0	—	—	—
Do. do. do. 1st, 3x9 ... do.	12	10	0	13	0	0
Do. do. do. 2nd, 4x9 ... do.	11	5	0	11	10	0
Do. do. do. 2nd, 3x9 ... do.	10	10	0	—	—	—
Do. Tornea, Yellow, 1st & 2nd, 4x8 ... do.	10	10	0	—	—	—
Do. do. do. 1st & 2nd, 4x6 ... do.	10	5	0	—	—	—
Do. Archangel, Yellow, 3rd, 3x11 ... do.	10	15	0	—	—	—
Do. do. do. Dry, 4th, 3x9 ... do.	9	15	0	—	—	—
Do. Petschora, Yellow, Dry, 3rd, 3x11 ... do.	9	15	0	—	—	—
Do. do. do. do. 3rd, 3x9 ... do.	10	10	0	—	—	—
Do. Norrkoping, White, Unsorted, 3x11 ... do.	9	15	0	—	—	—
Do. Nederkalix, Yellow, 1st, 3x9 ... do.	13	0	0	—	—	—
Do. do. do. 1st, 3x7 ... do.	12	5	0	—	—	—
Do. do. do. 1st, 3x7 ... do.	10	10	0	—	—	—
Do. do. do. 1st, 2½x8 ... do.	10	5	0	—	—	—
Do. Räfsö, Yellow, 2nd, 3x8 ... do.	10	5	0	—	—	—
Do. do. do. 2nd, 2½x7 ... do.	10	10	0	—	—	—

Deals, St. John, Spruce, 1st, 2nd and 3rd, 3x8 ... do.	£	s.	d.	£	s.	d.
Do. Gambley, White, Unsorted, 3x8 ... do.	7	15	0	—	—	—
Do. Ljusne, Yellow, Dry, 3rd, 3x7 ... do.	11	10	0	11	15	0
Do. Ingramport, White, Unsorted, 3x4 ... do.	7	0	0	—	—	—
Do. Abo, Yellow, Unsorted, 3x4 ... do.	8	10	0	—	—	—
Battens, all kinds ... do.	6	10	0	9	10	0
Flooring Boards rin. prepared, 1st ... persquare	0	11	0	0	12	0
Do. 2nd ... do.	0	8	6	0	9	6
Do. 3rd, &c. ... do.	0	8	9	0	9	0

HARD WOODS.

Ash, Quebec ... per load	4	0	0	7	15	0
Birch, New Brunswick ... do.	2	7	6	4	10	0
Do. Quebec do. ... do.	2	12	6	5	0	0
Box, Turkey ... per ton	7	0	0	20	0	0
Cedar, Cuba ... per ft. sup.	0	0	3	0	0	4
Do. Honduras ... do.	0	0	7½	—	—	—
Do. Tobasco ... do.	0	0	5½	—	—	—
Do. Brazilian ... do.	0	0	4½	—	—	—
Elm, Quebec ... per load	4	5	0	8	10	0
Jarrah, plank ... per ft. cu.	0	2	6	0	3	0
Mahogany, Average Price for Cargo, Houduras ... per ft. sup.	0	0	4½	0	0	5½
Do. Tobasco ... do.	0	0	5½	—	—	—
Do. Cuba ... do.	0	0	11½	—	—	—
Do. African ... do.	0	0	3½	—	—	—

Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

DURING THE WEEK ending February 16th twenty-six failures in the building and timber trades in England and Wales were gazetted.

F. N. BOYD, bricklayer, Darlington. R.O. Feb. 8th.	
J. H. BOYD, joiner, Darlington. R.O. Feb. 8th.	
P. A. MILES, builder, Westgate-on-Sea. Adj. Feb. 3rd.	
G. RAYWORTH, plumber, Nottingham. Adj. Feb. 8th.	
A. JARVIS, bricklayer, Waldron. R.O. Feb. 8th.	
BUILDERS' BANK, LTD. Liabilities £7,000; assets nil.	
H. CLAYSON, builder, Claygate. R.O. Feb. 9th.	
SOUTHEAST AND DISTRICT BUILDING AND HOUSE DECORATING CO. R.O. Feb. 3rd.	
H. G. HIGGINS, architect and surveyor, Leigh-on-Sea. P.E., Chelmsford Shirehall, March 7th, at 10.	
J. H. POWELL, builder, New Milton. P.E., Southampton C.C., Feb. 28th, at 12.	
F. W. CHATBURN, builder, Forest Hill (late Leeds). P.E., Greenwich C.C., March 6th, at 1.	
NORTH OF ENGLAND ASPHALTE CO., Manchester. P.E., Manchester C.C., Feb. 26th, at 10.	
W. E. MUMFORD, contractor, Wood Green. Adj. Feb. 8th.	
A. PARKER, builder, Willesden Green. P.E., London Bankruptcy Court, March 16th, at 11.30.	
G. BLACKMORE & CO., brick manufacturers, Pelsall. R.O. Feb. 5th.	
C. R. CORK, plumber and painter, Longport. P.E., Hanley Town Hall, Feb. 28th, at 11.	
G. S. BUTCHER, builder, Kessingland. P.E., Great Yarmouth Town Hall, March 20th, at 11.	
F. W. GILL, builder, Thornton Heath. P.E., Croydon C.C., March 7th, at 11.	
J. M. JOWETT, builder and contractor, Leeds. P.E., Leeds C.C., March 5th, at 11.	
G. H. KILVINGTON, late builder, York. P.E., York Courts of Justice, March 2nd, at 11.	
R. W. BRAYLEY, builder, Mumbles. Adj. Feb. 9th. Gross liabilities £5,120.	
H. MARTER, builder, New Malden. Liabilities £599; assets £44.	
T. B. LAMB, builder and contractor, Preston. Gross liabilities £11,671; to rank £1,735; assets £1,242.	
J. W. LUCAS, builder and contractor, Bournemouth. Gross liabilities £56,357; estimated surplus £9,635.	

Coming Events.

Wednesday, February 21.

SURVEYORS' INSTITUTION.—Annual Dinner, Hotel Metropole, at 7 p.m.
INSTITUTE OF SANITARY ENGINEERS.—Mr. N. W. Hoskins on "Materials in Sanitary Work," at 7 p.m. (Students' Lecture.)
BUILDERS' FOREMEN AND CLERKS OF WORKS' INSTITUTION.—Ordinary Meeting at 8 p.m.

Thursday, February 22.

ROYAL ACADEMY.—Mr. W. R. Colton, A.R.A., on "The Rough-hewed and the Imitation of Life."
WORSHPFUL COMPANY OF CARPENTERS.—Mr. A. Evan Bernays on "Greek Temples and Ruins," at 8 p.m.
TIMBER TRADES' BENEVOLENT SOCIETY (Birmingham District).—Concert, Grand Hotel, Birmingham, at 8 p.m.

Friday, February 23.

ARCHITECTURAL ASSOCIATION.—Mr. F. T. Baggallay on "Porches and Approaches," at 7.30 p.m.
INSTITUTE OF CIVIL ENGINEERS.—Mr. C. H. Summer on "The Graphical Determination of the Deflection of Beams," at 8 p.m. (Students' Meeting.)
ROYAL INSTITUTION.—Prof. J. Oliver Arnold on "The Internal Architecture of Metals," at 9 p.m.
GLASGOW TECHNICAL COLLEGE ARCHITECTURAL CRAFTSMEN'S SOCIETY.—Prof. Charles Gourlay, B.Sc., A.R.I.B.A., I.A., on "Architecture in Saloon," at 8 p.m.

Saturday, February 24.

ARCHITECTURAL ASSOCIATION.—Third Spring Visit to the Ritz Hotel, Piccadilly. Members to meet at the building at 2 p.m.
BUILDERS' FOREMEN AND CLERKS OF WORKS' INSTITUTION.—Annual Dinner, Holborn Restaurant, at 5.30 p.m.

Monday, February 26.

ROYAL ACADEMY.—Mr. W. Goscombe John, A.R.A., on "Modern Sculpture."
SURVEYORS' INSTITUTION.—Ordinary General Meeting at 8 p.m.

Tuesday, February 27.

MANCHESTER SOCIETY OF ARCHITECTS.—Debate. Mr. Blumh to move "That Recent Restorations are destroying the Architectural Beauty of our Old Buildings," at 6.30 p.m.
BUILDERS' CLERKS' BENEVOLENT INSTITUTION.—Thirty-ninth Annual General Meeting, 21, New Bridge Street, E.C., at 7.30 p.m.

Wednesday, February 28.

NORTHERN ARCHITECTURAL ASSOCIATION.—Mr. G. A. T. Middleton on "Continental, Romanesque and Gothic Detail," at 7.30 p.m.
INSTITUTE OF SANITARY ENGINEERS.—Mr. N. W. Hoskins on "Materials in Sanitary Work," at 7 p.m. (Students' Lecture.)

Thursday, March 1.

ROYAL ACADEMY.—Sir William Richmond, R.A., on "The Evolution of Sculpture—Egypt and Greece."

Monday, March 5.

ROYAL ACADEMY.—Sir William Richmond, R.A., on "The Evolution of Sculpture—Egypt and Greece."

Thursday, March 8.

ROYAL ACADEMY.—Sir William Richmond, R.A., on "The Evolution of Sculpture—Egypt and Greece."

Wednesday, March 14.

QUANTITY SURVEYORS' ASSOCIATION.—Annual Dinner, Criterion Restaurant.

New Companies.

SOUTHERN BUILDING CO., LTD., Clapham Road, S.W. Capital: £2,000.

ORWALL JOINERY CO., LTD., to acquire the freehold premises known as the Great Eastern Joinery Works, Cullingham Road, Ipswich, to adopt an agreement with J. W. Aldons, and to carry on the business of builders and general merchants, &c. Capital: £3,000.

Guaranteed
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Guaranteed
Gearing and
Fittings.

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Panic Bolts.

Weather Bars.

Reversible
Window

Fittings, &c.

Appointments Wanted.

The charge for Advertisements under this heading is 1s. 6d. per insertion not exceeding four lines, and 6d. per line afterwards, prepaid. Three insertions may be had for the price of two. Advertisements must reach the Office not later than 5 o'clock on Monday.

A JUNIOR ASSISTANT (21) requires ENGAGEMENT; just completed art class; neat draughtsman and tracer; good constructionist.—R., 73, Wool Exchange, Coleman Street, City. 1634

A DRAUGHTSMAN and CLERK OF WORKS, 25 (Ferro - concrete), desires RE-ENGAGEMENT. Sound practical experience; measuring, checking, plotting and construction, tracer and colourist; excellent references; salary moderate.—Box 1658, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

ARCHITECT & SURVEYOR'S ASSISTANT DISENGAGED. Sixteen years' varied experience in town and country. Eight years last appointment.—H., The Cottage, Northstoke, near Bath. 1621

ARCHITECT'S JUNIOR ASSISTANT (20), good draughtsman and colourist, five years' London experience. Salary 30s.—S. A. T., 43, Chestnut Avenue, Forest Gate, E. 1623

ARCHITECTURAL ASSISTANT seeks immediate ENGAGEMENT.—Three years' London with previous Colonial experience. Two guineas. Good references.—Box 1625, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

ARCHITECT and SURVEYOR'S ASSISTANT (good) desires engagement. Design, working and detail drawings. Surveying and levelling.—A. B., 3, Huntsmoor Road, East Hill, Wandsworth, S.W. 1616

ARCHITECT'S ASSISTANT. Three years' London office experience. Hard worker, good designer, details, working drawings, and specification writing. Highest references. Could take charge of small office, town or country. Very moderate salary if good opportunity for advancement.—H. J. W. E., 2, Stone Villas, Camberwell Grove, S.E. 1639

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ARCHITECT and SURVEYOR'S ASSISTANT DISENGAGED shortly; 10 years' all-round experience; design, general and detail drawings, specifications, surveying, levelling, &c. Honours, South Kensington; ex. testimonials.—Box 1646, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

ARCHITECT'S JUNIOR ASSISTANT (23), 5 years' experience, good draughtsman, design, working drawings, detail, and general routine. London or country.—B. A. E., Glebeside, Preston Park, Brighton. 1649

ARCHITECT and SURVEYOR'S JUNIOR ASSISTANT (23) open to engagement, 6½ years' experience, abstainer, excellent references, 25s. per week. Box 4, "Herald" Office, Carnarvon. 1652

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THE ARCHITECTURAL ASSOCIATION

FEBRUARY 23rd.—Special General Meeting, at No. 18, Tufton Street, Westminster, S.W., at 7 p.m., to consider the Council's proposal to add the words "Editor of the Architectural Association Journal" after the word Librarian in Bye-laws 21 and 30, and substitute NINE ordinary members in Bye-law 21 in place of TEN.

FEBRUARY 23rd.—Ordinary General Meeting at No. 18, Tufton Street, Westminster, S.W., at 7.30 p.m., Paper by Mr. F. T. Baggallay, on "Porches and Approaches."

FEBRUARY 24th.—Third Spring Visit, to the Ritz Hotel, Piccadilly, Messrs. Mewes & Davis, Architects. Members to meet at the building at 2 p.m.

HENRY TANNER, JUN., } Hon. Secs.
A. MARYON WATSON, }

THE SOCIETY OF ARCHITECTS.

An EXAMINATION to qualify for MEMBERSHIP will be held on APRIL 10th, 11th, and 12th, 1906.

SYLLABUS on application to the SECRETARY, at Staple Inn Buildings, Holborn, W.C.

Telegrams: "Crypt, London." Telephone: 1852, Holborn.

Competitions.

BEDFORDSHIRE COUNTY COUNCIL.
LUTON SECONDARY SCHOOL AND TECHNICAL INSTITUTION.

The designs sent in by the Architects selected to compete in respect of the erection of the above School will be publicly exhibited at the Luton Town Hall, between the hours of 10 and 4 o'clock on Monday and Tuesday, the 26th and 27th February instant.

W. W. MARKS,
Clerk of the County Council.

UNIVERSITY COLLEGE OF NORTH WALES, BANGOR.

The Council will shortly invite a limited number of Architects to submit COMPETITIVE DESIGNS for the Permanent Buildings of the College. Architects who desire their names to be considered by the Council in selecting their list may send particulars of work already designed or executed by them to the undersigned (from whom further particulars may be obtained) before MARCH 1st next.

JOHN EDWARD LLOYD, M.A.,
Bangor, Secretary and Registrar.
January 24th, 1906.

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TO BUILDERS AND CONTRACTORS, &c.
The Urban District Council of the Borough of Devizes invite TENDERS for the ERECTION of TWELVE COTTAGES and OFFICES, &c., in Gain's Lane, Devizes.

The plans and specification may be seen and a copy of the bill of quantities obtained, at the BOROUGH SURVEYOR'S Office, Devizes, on and after MONDAY, 26th inst., on payment of a deposit of £1 1s., which will be returned upon the receipt of a bona-fide Tender.

Sealed Tenders, endorsed "Tenders for Cottages," on the special forms to be obtained from the Surveyor, to be delivered on or before TWELVE NOON, MARCH 2, 1906, at the Surveyor's Office.

The Council do not bind themselves to accept the lowest or any Tender.

F. G. BILLINGHAM,
Town Hall, Devizes. Borough Surveyor.

CHELTEMHAM EDUCATION COMMITTEE.

TO BUILDERS.

Tenders are invited for the ERECTION of new SCHOOL BUILDINGS, to accommodate 1,100 children, for the Naunton Park District of Cheltenham, in accordance with Plans, Specifications, and Conditions of Contract, to be seen at the Offices of Messrs. CHATTERS and SMITHSON, Architects, 17, Regent St., Cheltenham.

Early application is requested for bills of quantities, which will be supplied by the Architects upon receipt of a deposit of £2 2s., to be returned upon receiving a bona-fide Tender.

Tenders, sealed and endorsed, must be delivered to the undersigned by TWELVE o'clock, on THURSDAY, the 22nd FEBRUARY next.

No pledge is given by the Committee to accept the lowest or any tender.

WILLIAM PRESTON,
Education Officer, Secretary.
Rodney Road, Cheltenham.

THE TITLE PAGE

AND

INDEX FOR VOL. XXII.

(July to December, 1905)

OF

THE BUILDERS' JOURNAL

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See p. xx for the Employment Register.

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A Form of "Agreement and Schedule of Conditions for Building Contracts," lately issued by the Royal Institute of British Architects (by special permission of the Institute);

The Working Rules for the Building Trades of London, as agreed between the London Builders' Association and the Representatives of the Workmen;

A Catalogue of the Distinguishing Brands on Deals, Batens, and Flooring Boards.

List of District Surveyors and their districts; London County Council; Aldermen and Councillors and Officers of the Metropolitan Borough Councils;

Notes of Cases and Decisions in the Superior Courts.

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Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Bury St. Edmunds.—For improving the shirehall, for the Standing Joint Committee of the West Suffolk County Council:—

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F. C. Thurman, Walton	11,498
Bell & Sons, Cambridge	11,313
Parkington & Son, Ipswich	11,000
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Coulson & Lofts, Cambridge	10,500
Kerridge & Shaw, Cambridge	10,496
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* Accepted.

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T. J. Williams, Gloucester	£4,562
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Frampton Cotterell.—Accepted for the execution of alterations and additions to Frampton Cotterell Council School, for the Gloucestershire Education Committee. Mr. R. S. Phillips, surveyor, Gloucester:—

E. Preece, Filton, near Bristol	£1,851 to 3
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[Sixteen tenders received.]

Guildenburgh.—For additions and alterations to a house, for Mr. C. Brown. Messrs. Brown & Mayor, architects and surveyors, 80, Abington Street, Northampton. Quantities by architects:—

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A. Martin	1,329 0 0
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Harpford.—For the erection of a house at Bencham's, Harpford, near Newton Poppleford. Mr. J. Archibald Lucas, architect, Guildhall Chambers, Exeter:—

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Northcott	3,056
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E. S. Setter	2,325
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Continued on p. xviii.

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TENDERS - cont. from p xvi.

London, E.—For the reconstruction of the swing-bridge carrying Old Gravel Lane over the entrance to the East London Dock :—

J. Westwood & Co., Ltd., London	£19,946	12	3
A. Findlay & Co., Ltd., Motherwell	18,801	6	10
J. Cochrane & Sons, London	17,538	18	0
J. Butler & Co.'s Trustees, Leeds	16,992	2	0
Muirhead, Greig & Matthews, London	16,889	7	7
A. Handyside & Co., Ltd., Derby	16,794	9	0
Cleveland Bridge and Engineering Co., Ltd., Darlington	16,790	11	11
Grays Steel Constructional Co., Ltd., Grays	16,786	0	0
A. Faisey & Son, Leytonstone	16,284	8	0
Heenan & Froude, Ltd., Manchester	15,228	12	1
A. Thorne, London	14,573	0	0

[Estimated cost £15,522 17s. 3d.]
* Recommended for acceptance.

Rotherhithe.—For the erection of a permanent school for 324 children (junior mixed and infants) to take the place of the existing school on the Magdalen Street site, for the London County Council :—

J. Marsland & Sons, Walworth	£5,636	0	0
W. Downs, Walworth	5,540	0	0
W. Harris, North Woolwich	5,431	10	0
G. Munday & Sons, E.C.	5,398	0	0
Martin, Wells & Co., Ltd., S.E.	5,295	0	0
Patman & Fotheringham, Limited, London, N.	5,291	0	0
Rice & Son, London	5,278	0	0
Treasure & Son, Upper Holloway	5,245	13	8
E. Triggs, Clapham	5,227	0	0
W. Johnson & Co., Ltd., Wandsworth Common	5,198	0	0
J. & M. Patrick, Wandsworth	5,161	0	0
T. D. Leng, Deptford	5,127	0	0
Kirk & Randall, Woolwich	5,095	0	0
C. Wall, Ltd., London, S.E.	5,060	16	1
J. Garrett & Son, Balham Hill	5,007	0	0
J. Appleby & Sons, Lambeth	4,990	0	0
H. L. Holloway, Deptford	4,982	0	0
T. C. Sharpington, Nunhead	4,979	0	0
F. & H. F. Higgs, Herne Hill	4,960	0	0
W. Lawrence & Son, Tottenham	4,948	0	0
E. Lawrence & Sons, London	4,931	0	0
Galbraith Brothers, London	4,660	0	0

[The architect's estimate was £5,621.]
* Recommended for acceptance.

Swansea.—For pier extension, for the Swansea Harbour Trustees :—

Jones & Son, Neath	£24,000
W. H. Hunter, Cardiff	23,990
Topham, Jones & Railton*	22,422
L. P. Nott	22,244
Muirhead, Greig & Matthews	23,031

* Accepted.

Watford.—For the erection of a new grammar school at Watford. Mr. C. P. Ayres, architect, Watford :—

McCormick & Sons, Islington	£11,429
Newby Brothers, Southgate	11,106
Norman & Burt, Burgess Hill	11,094
A. J. Chowne, Northampton	10,990
W. H. Hyde, Norwood	10,987
J. Cracknell, Peterborough	10,972
J. Darvil	10,802
Murray & Son	10,787
Miskin & Sons, St. Albans	10,672
G. & J. Waterman	10,567
Coulson & Lofts, Cambridge	10,500
Kerridge & Shaw, Cambridge	10,496
Page & Sons, Croydon	10,490
Webster & Cannon, Aylesbury	10,397
Clark Brothers	10,340
J. Barker, Ltd., Kensington	10,328
G. Wiggs	10,325
Clifford & Gough	10,299
Oak Building Co., Cambridge	10,298
F. & G. Foster, Norwood	10,289
H. Martin, Northampton	10,200
Rowland Brothers, Horsham	10,192
C. Brightman*	9,985

[Architect's estimate, £10,370.]

[Rest of Watford.]

* Accepted subject to the approval of the Local Government Board.

New Clock and Chimes for Ripon Cathedral.—A new clock and chimes are to be erected in the cathedral tower at Ripon from designs and plans by the late Lord Grimthorpe. Another dial will be erected on the south side of the tower, facing Boroughbridge Road. Messrs. Potts & Sons, Leeds, have the new clock in hand. It will be made generally on the lines of the Lincoln, Newcastle and Carlisle Cathedral clocks.

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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

February 28, 1906. Vol. 23, No. 577.

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Ruffling the Associates. ASSOCIATES of the Royal Institute of British Architects up and down the country—more especially at Leeds—have been getting very uneasy about what they deem to be wholesale elections to the Fellowship. We have published letters in other issues. Now comes a further protest from Leeds. The Associates there say that, if they could have the actual position and purpose of the Fellowship definitely explained, they would all know better where they stood. "Surely it may be assumed that the original idea was to make the Fellowship a sign of eminence, more or less; otherwise, why have a second class at all? And is not this confirmed by the fact of the subscription being higher? And does not the much-discussed resolution of the Institute—to shortly elect this class only from the ranks of the Associates—prove the same? If the contention that every competent architect has a right to election as Fellow is correct, it seems not only a hardship but an inconsistency to force him after this year to go through an examination. We cannot see what purpose of a worthy kind the Fellowship fulfils, unless it be to recognize a select or eminent class of men." In reply to this the Institute Council say they are convinced it is to the interests of the Institute that thoroughly qualified architects' whose age and busy practice preclude them from entering for examinations should become Fellows before the door is for ever closed against them: but they hasten to add that no further elections of that nature will be possible after December 3rd, in accordance with the resolution of the General Body passed a year ago. However, the Leeds Associates proceed thus: "Our views—which we have reason to know are very widely shared—seem to be much misunderstood in London. We are working solely for fair play and for the dignity of the Institute. So far are we from holding that the Associate's examination is the main essential, that we would willingly see entrance to our class widened, and a man's practical work accepted in substitution for some (or even all) of the examination work; so long as it was definitely ascertained that the conception and details were entirely his own. But, knowing the educational value of preparation for the examination, and remembering the constant emphasis hitherto placed upon it by the leaders of the Institute and the local societies, we are bound to insist that it is (1) unfair to the examined men, (2) derogatory to the dignity and consistency of the Institute, and (3) unworthy of the candidates as architects and gentlemen, to bring about this unseemly scramble for easy entrance to the Institute. . . . We must protest, and have already effectively protested, against the official recognition of men who hope by the Fellowship to obtain that entrance to the Institute which they have

been unable or unwilling to obtain as Associates. We also demur to men whose practice is chiefly connected with estate agency or kindred work. One other remark in conclusion. Of the present members of the Institute Council—excluding, of course, the representatives of the allied societies—we find that more than 75 per cent. have at some time qualified as Associates. The members of the Council have themselves justified our contention by starting to reach their exalted position by the Associate's gate." This is, of course, largely a personal matter, as well as one of wide bearing on the general attitude which should be adopted in regard to the Fellowship, and we do not intend to touch the personal aspect. With regard to the other side of the question, however, we certainly feel that the Associates are quite right in much of their contention. There can be—and possibly has been—too much of the "open door," and though a body of eminent men has recently gone in through that portal—men who for many reasons have hitherto desired to remain outside—we have a feeling that the influx has swept in some who do not really merit the honour. Still, whatever is the upshot of it all, we think the protest from Leeds will at least have the merit of calling to mind in future what Fellowship of the Institute really should be.

Registration Sub-Committee: Statement. THE Registration Sub-Committee of the R.I.B.A., consisting of the president, Sir Aston Webb, R.A., Mr. Edwin T. Hall, Mr. T. E. Collcutt, Mr. John Slater, Mr. J. S. Gibson, Mr. A. W. S. Cross, Mr. W. H. Seth-Smith and Mr. George Hubbard, appointed "to take evidence for and against the principle of registration and to suggest the course of procedure to be adopted at the general meeting when the present scheme of registration comes up for discussion," desire to state that they have held twelve meetings and taken the *viva voce* evidence of twenty-one architects practising in London and the provinces, a verbatim report of which has been preserved, and they hope soon to be in a position to report to the Registration Committee. This is a very interesting announcement. We shall await the report with much interest. The Sub-Committee is quite representative of both sides, and their views on this much-debated question should be valuable.

ROYAL ACADEMY EXHIBITION, 1906.

THE sending-in day for architectural works is Friday, March 30th, from 7 a.m. to 10 p.m. as hitherto. Will architects let us have their drawings as early as possible. We shall be glad to deliver them free of charge after making reproductions of such as we desire.

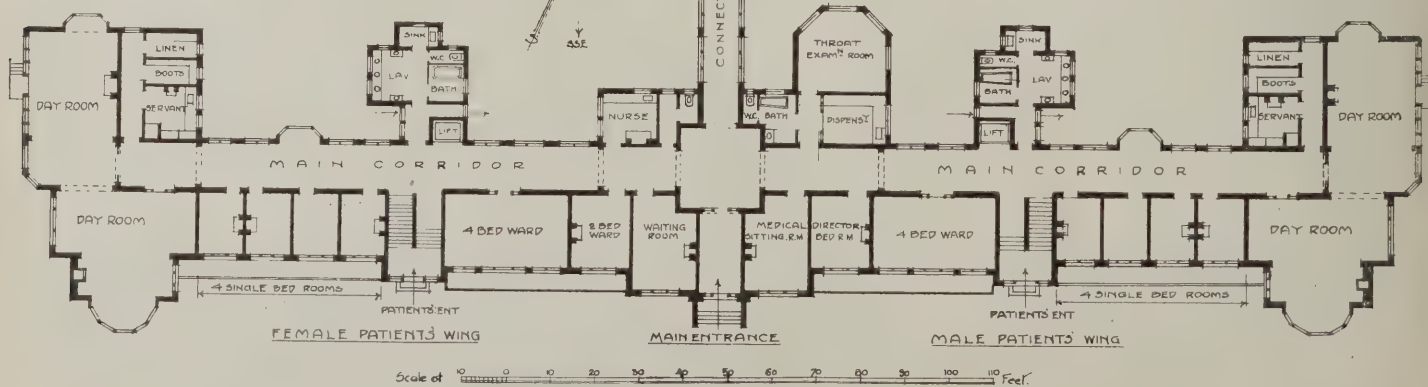
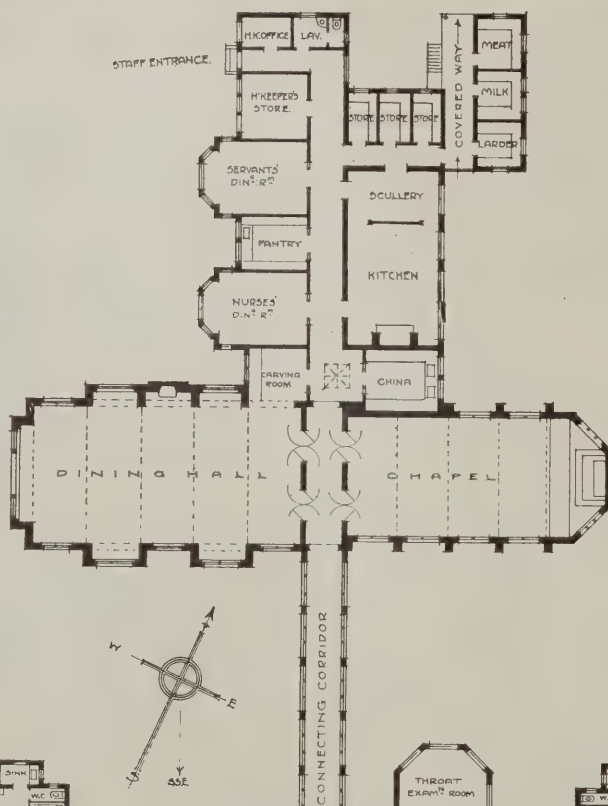


NURSES' HOME, CROSSLEY SANATORIUM.

CROSSLEY SANATORIUM.

THIS sanatorium, illustrated by the accompanying plans and photograph, and the general view given as a centre plate in this issue, is the gift of Mr. W. J. Crossley to the Manchester Hospital for Consumption. It has been built in Delamere Forest, Cheshire, occupying an elevated site, of about 66 acres in extent, two miles due north of Mouldsworth station. The sanatorium was opened last year. The terrace in front of the main building is 480ft. above sea-level, and to the south-east and west are magnificent views of the great Cheshire plain. As will be seen from the accompanying plans, the sanatorium comprises the following buildings:—The main building, where the patients are housed, the nurses' home, a pair of cottages for engineer and gardener, laundry-block and engine-house, bacteriological laboratory, and stables. At some distance from the main building (to the east) is the pumping station, where a perfect system of engines and pumps has been put down for the supply of water from the well, 504ft. deep. The main

building provides accommodation for ninety patients, medical director and two assistants; the patients being arranged in four wards of six beds each, ten wards with four beds, one with two beds, and twenty-four single-bedded rooms—all on the southerly side of the building. The windows of all these rooms are sufficiently wide to enable the beds to be placed lengthways at the same when open, or lifted on to the balcony outside. The building is basemented throughout, providing ample accommodation for douche-rooms, patients' cloak-rooms and dressing-rooms, X-ray room and storage spaces. The plan is self-explanatory; but it will be seen that a spacious dining-hall (60ft. by 32ft.) and chapel are provided in addition to the usual kitchen and stores, and separate dining-rooms for nurses and servants. The nurses' home is somewhat larger than present requirements demand, in the event of any extension of the sanatorium in the future. The other subsidiary buildings need little or no description. Suffice it to say that all the appliances in the engine-house and laundry are of the most modern



Ground-floor Plan of Main Building.
THE CROSSLEY SANATORIUM, DELAMERE FOREST, CHESHIRE. W. CECIL HARDISTY, ARCHITECT.

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Supplement to
THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD,
Wednesday, February 28th, 1906.



THE CROSSLEY SANATORIUM DELAMERE FOREST O



E. W. CECIL HARDISTY ARCHITECT.

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description. In the bacteriological laboratory no expense has been spared to equip it in the most thorough manner with the best-known scientific appliances. The whole of the "sputum" from the patients is taken here to undergo careful examination, and it is hoped that by the special attention given to this branch of the work of the sanatorium much increased knowledge will result. With regard to the architectural treatment of the buildings externally, an effort has been made to secure a bright and cheering effect by means of the colour of the materials employed rather than by elaboration of detail. The walls are faced in red Ruabon bricks to the first-floor level, the upper portions of the elevations being rough-casted in white spar with red brick quoins and strings. All the woodwork is painted cream-white, and the roofs are covered with red Ruabon tiles. The whole of the work has been carried out from designs prepared by and under the superintendence of Mr. W. Cecil Hardisty, architect, of Manchester. The general contractors were Messrs. I. Hamilton & Son, of Altrincham, and the clerk of works was Mr. John Broadbent. The cost of the buildings and furniture has amounted to more than £70,000.

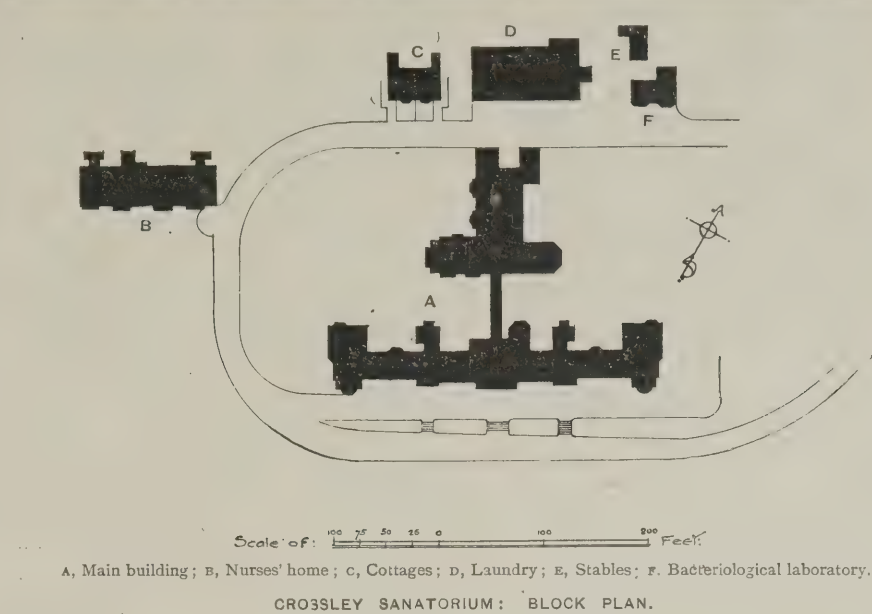
LABOURERS' COTTAGES.

An Irish Architect's Opinions.

IN a paper which he read recently before the Architectural Association of Ireland Mr. R. M. Butler gave interesting practical details of labourers' cottages. He said that to build a cottage—decent, roomy and commodious, and of so permanent and substantial a character as to need little or no repairs for several years—was simply impossible for less than £130 to £140. But, on the other hand, it was equally the fact that with £140 to £160 per house they could do this without having recourse to the bad expedient of temporary or semi-temporary materials. A good brick or masonry cottage could, and was being built, all over Ireland, for £150 or less, and that notwithstanding that building was at least as dear as in England. How did the difference arise? Merely that the Irish planned more simply. Of course,

The Average Irish Plan

was capable of much improvement. Generally, it consisted of a structure about 16ft. by 24ft. inside dimensions, divided into a kitchen, 12ft. by 16ft., and two bedrooms, each 12ft. by 8ft. Other plans provided a kitchen 16ft. by 12ft., and a single large bedroom on the ground floor of the same size, with one or two attic bedrooms, each about 12ft. by 6ft. In Mr. Butler's opinion the two-storey cottage was the best and cheapest type. Many Irish authorities, however, thought otherwise, but he held, as a *sine qua non*, that no cottage should contain more than three bedrooms, one of which should be of good size, and two at least should have fireplaces, more for the sake of ventilation than for heating.



Coming to details. Wherever masonry was cheap it was the best material to use, but 14in. brick or 10in. good concrete were also excellent. The use of 9in. brick walls or thinner concrete was bad. His ideal was a 20in. masonry wall, pebble dashed. In his opinion,

The most Economical Plan

of cottage was two rooms over two, or two over three, never three over two. The plan should not be frittered up in pantries and offices, but kept straightforward and simple, all within four rectangular walls. No return buildings or excrescences; these meant money. If a scullery and pantry were needed, and means permitted, he thought the best arrangement was a little lean-to. The practice adopted in England of frittering away the ground floor area in sculleries, and so forth, was bad in a two-storey, and ruinous in a one-storey, cottage. They had to build for in or about £150 in really substantial materials. Labourers neither required nor understood the use of pantries, larders, sculleries, parlours, baths or even privies. It would be well to educate them, but the time was not ripe, and the first essential was decent healthy housing. All the space within the walls should be devoted to kitchen and bedrooms.

Position of the Staircase.

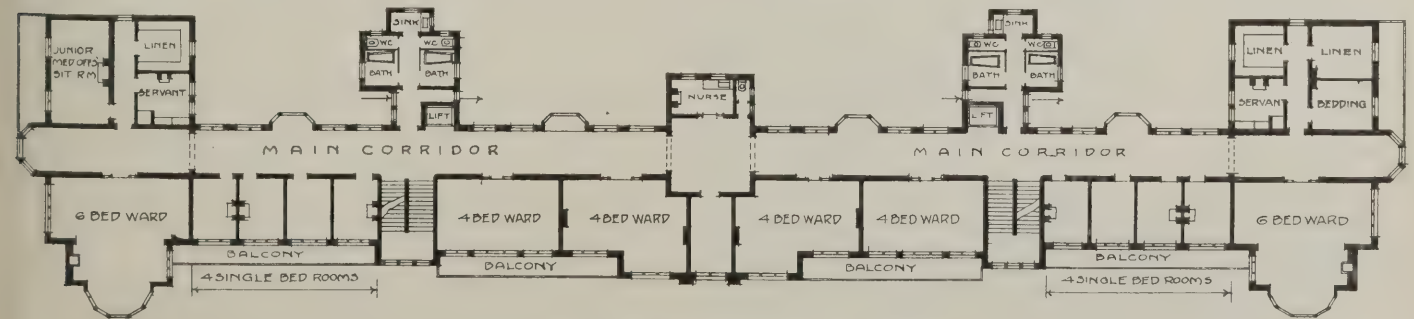
The best place for the staircase (if there were an upstairs) was in the kitchen, and it should not be too steep, on account of children. The heights of the rooms was an important point. He thought 8ft. clear from floor to ceiling on the ground floor was abundant, and he saw no objection to omitting the plaster ceiling where there was an upper storey, and whitewashing the joists. In single-storey cottages it was a great mistake to make the roof open to the ridge, or the ceiling too high; it made

the house intolerably cold. Any money they could save was best spent in enlarging the area. The upper floor rooms should be about 4ft. to the wall-plate, with a good sized dormer, and even in the dormer he would use up-and-down sashes; casements caused great trouble. There should be three bedrooms in all cases, and in no instance ought one to open out of the other. In England some labourers' wives took great pride in having a little "parlour," but it was a non-essential, and in Ireland would be out of place. If there was no pantry, one or two cupboards and a few feet of shelving were most useful to poor labourers.

Everything should be strong and cheap. Hearths should be of firebrick on edge, set in cement. A stone set in the floor should be provided for chopping sticks. Cottages should be built near a supply of good drinking water, and all roof water should be collected in a big well-painted barrel, which was better than a galvanized tank. Plastering was best of two coats, twice lime-whitened. He did not favour concrete floors; he thought Chester tiles were much better, and nearly as cheap.

The Exterior.

As to the exterior, cement dashing was the only thing that would keep wet from getting through the walls in exposed situations. Projecting porches, unnecessary gables and ornament added to the cost; good ornament was very dear, and bad or commonplace ornament only an eyesore. In two-storey cottages a little string-course at the ceiling level improved the proportions by making the cottage look lower—and it cost little. He would like to see all cottages whitewashed with lime mixed with tallow, for it gave a nice clean appearance, and protected the walls from the driving rain.



THE CROSSLEY SANATORIUM FOR CONSUMPTIVES, DELAMERE FOREST, CHESHIRE. W. CECIL HARDISTY, ARCHITECT.

CONCRETE MIXERS.*

By J. S. OWENS, M.D., B.A., A.M.I.C.E.,
F.R.G.S.

(Concluded from p. 100, No. 576.)

PASSING on to the actual mixing of the ingredients after they are duly proportioned, we find that the processes employed fall under four separate heads:—

- (1) Hand-mixing.
- (2) Mechanical mixers of the continuous type.
- (3) Mechanical mixers of the batch type.
- (4) Gravity mixers.

"Dry" and "Wet" Mixing.

There are two methods of mixing, known as the "dry" and the "wet." In the former all the ingredients are mixed together before water is added, and again after the addition of the water. This is the method adopted in England.

The "wet" process consists in making the cement or lime and sand into a mortar with water, and then adding this mortar to the broken stone or shingle. This is not used in England, but is common in France.

The usual way in which hand-mixing is carried out here is well known and needs no description. The mixing is carried out on a smooth platform or "banker," and the "turning" is done with shovels.

There are certain drawbacks which are inherent in hand-mixing. The turning of materials with a shovel does not necessarily result in a thorough mixture, as much depends upon the way in which the shovel is handled. It should be given a certain twist, which it is difficult to describe and which results in a scattering of the materials. Again, it is necessary to exercise constant supervision over the mixing gang, or the work will be scamped. It is a process which may result in very well mixed concrete, or concrete which is neither mixed nor wetted properly.

The Two Types of Mechanical Mixers.

Turning now to mechanical mixers. There are, as pointed out, two types—"continuous," giving a continuous delivery and requiring a constant and steady feed; and "batch" mixers, which take a single charge of materials into a receptacle, where it is mixed. On being discharged the vessel receives another supply, and so on.

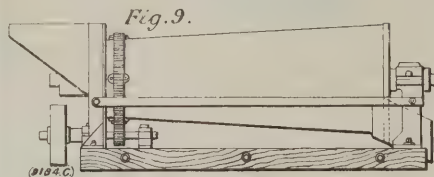
Some engineers object to the continuous methods of mixing on the ground that the concrete does not always contain uniform proportions of the various ingredients. Mr. S. B. Newbery stated, in a paper read before the Association of American Cement Manufacturers, that "for the preparation of cement for blocks, in which thorough mixing and use of an exact and uniform proportion of water are necessary, continuous mixing machines are unsuitable, and batch mixers, in which a measured batch of the material is mixed the required time and then discharged, are the only type which will be found effective." This statement must be taken as an individual opinion, and it appears to point rather to inefficiency of the feeding apparatus than to bad mixing. In the author's opinion excellent results can be obtained from continuous mixers provided they are efficiently and continuously fed. If the feeding is done by hand it is necessary to give the materials a preliminary rough turning before shovelling them into the machine.

The most Common Type of Continuous Mixer

is one in which the materials are fed into one end of a long revolving cylinder with internal projections, and the discharge takes place from the other end. At first cylinders without projections were used, but not with much success. One of the first machines employing this means of mixing, but with projections on

the internal surface of the cylinders, was Le Mesurier's, designed for the Birkenhead Docks. It was said to mix about 150 yds. per day, at 4d. per yd.

A modification of this principle is seen in Mason's mixer (Fig. 9). In previous machines in order to cause the materials to travel along the cylinder to the discharge end it was



MASON'S MIXER.

necessary to incline the axis. In Mason's mixer the axis is horizontal and the place of the cylinder is taken by the frustum of a cone, the wider being the discharging end; thus there is always a tendency for the concrete to travel from the narrow or feeding end to the wide or discharging end.

There are a great number of machines in which the mixing apparatus consists of a long revolving box open at each end and inclined towards the delivery end. The shape of this box in cross-section varies. In some it is circular, with shelves as described; in others square, as in one made by the Cockburn Barrow and Machine Co., N.Y. In Weller's machine it has a section somewhat like a cross. The principle is the same in all; and all alike claim that the particular shape adopted has some very special advantages.

There is a type of continuous mixer in which a long cylinder or trough has a spindle revolving inside, carrying arms or paddles arranged round it in the form of a screw. The cylinder or trough is fixed in this case and the material is propelled towards one end by the screw arrangement of the blades, aided sometimes by an inclination of the whole towards the outlet.

The following is a description of

The Huge Cary-Latham Continuous Machine,

designed specially for use on the Newhaven Harbour works and capable of delivering 100 tons of concrete in twenty minutes*: "It consists of two measuring turntables, one for shingle and the other for sand, divided into boxes of the proportionate sizes required. The bottoms of the boxes are hinged so as to drop at a given point in the revolution of the turntable, the hinge-joint being specially contrived to prevent clogging. The cement is also driven, in the required proportion, through a screw-creeper fed from a hopper. All three ingredients are then discharged into a circular pan, from the centre of which radial arms, carrying scrapers, work and level the materials, thus mixing the concrete to a certain extent dry. They also push the mass forward to the delivery chute, where water is added; and the resulting concrete passes to a cylinder, which revolves on outside rollers on a cradle inclined at an angle of 8 degs. to the horizontal. Longitudinal dash-boards are fixed inside the cylinder, and in its revolution the concrete is turned over by them as if by shovels, finally discharging into the vessel moored below it." This machine was driven by a 20-h.p. engine, and was used for making the 100-ton "sack-blocks" used in the harbour works. The cost of a 100-ton block mixed by hand, piece-work, was £5 5s. for labour, but with the above machine the cost of mixing was only £1 15s.

Another excellent machine of the revolving cylinder type for continuous work is the "Ridley." The cylinder revolves upon rollers, and is open at both ends. It is provided with straight or spiral mixing plates

or blades fixed to the internal surface, and is driven from a spur ring encircling the cylinder.

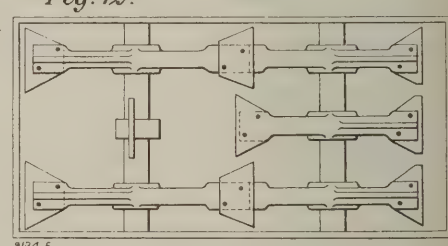
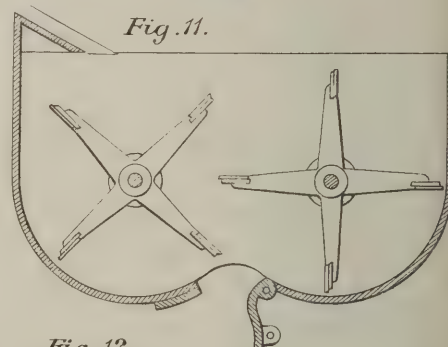
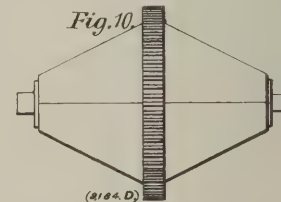
A Point worth noting

about these revolving cylinder machines is that the nature of the aggregate has an influence upon the amount of inclination of the cylinder towards the outlet which is necessary to give a free discharge. A small aggregate requires greater inclination than a coarse, and one containing a large proportion of sand requires a greater inclination of cylinder than one containing little sand.

Sometimes the projections on the inner surface of the cylinder are placed in a sort of spiral to assist the discharge. In the first cylinder machines they were placed in a straight line parallel to the axis of the cylinder. The spiral arrangement is also adopted in Ransome's mixer, to give a better mixing movement to the material.

"Batch" Mixers

usually consists of either (a) a revolving box which takes the charge and churns it about until mixed (Fig. 10); or (b) a fixed box, in



BATCH MIXERS.

which are placed one or more revolving spindles carrying arms or paddles (Fig. 11 and 12).

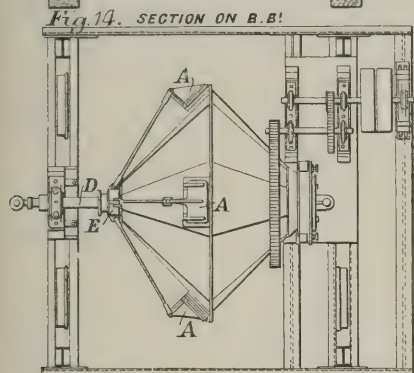
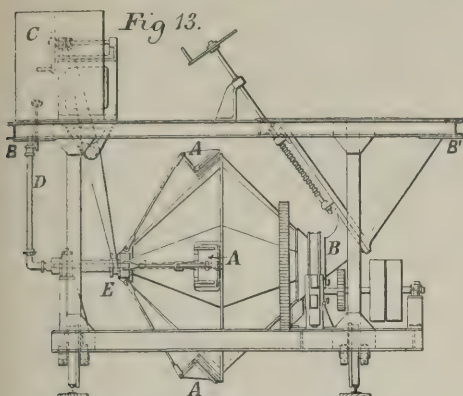
The revolving box type may take an infinite number of forms. The Lee mixer consists of a cylinder through which a spindle passes in a rather remarkable way. It enters through the side, near one end, and passes out through the opposite side, near the other end. The revolution of the cylinder, after it has received its charge through a door for the purpose, tosses the materials about inside, and so mixes them.

Other Types.

Another form of mixing vessel is the "cubical"; the spindle passes along one of the diagonals of the cube and causes the box to revolve, mixing as before. This machine is made in two forms by the United Concrete Machinery Co. In one the cube is filled from the top through a hopper in the staging supporting it, a door being provided to take the charge. In the other machine the vessel is fed at one of the corners through a large pipe and trunnion, the emptying taking place through a door provided for the purpose.

* A paper read before the Civil and Mechanical Engineers' Society on December 7th, 1905.

* Min. Proc. Inst. C.E., vol. lxxvii.



TAYLOR'S MIXER.

Another type has a cylindrical vessel revolving on its axis, and provided with steel projections from its inner surface, which carry up the material, like shelves, and discharge it before reaching the top of the cylinder. The Ransome Concrete Machinery Co. make a machine of this type.

Taylor's Mixer

is a batch machine of the revolving vessel type (see Figs. 13 and 14). The mixing chamber is shaped somewhat like two hollow cones placed base to base, with the axis of revolution passing through their apices. A spindle or trunnion projects from one apex and is supported by a bearing; through this trunnion water is admitted by a pipe. The other apex is cut off or truncated to form a circular opening, round which is fixed a roller path supported by and revolving upon rollers. The axis of revolution is horizontal. The materials are fed from a hopper through the above opening, and discharged when mixed through a series of doors round one of the cones near its base. These doors can be opened or closed while the machine is in motion by means of levers actuated from a collar sliding upon the trunnion.

Another form of the Taylor machine (Fig. 15) has a different arrangement for discharging. An opening is provided at the opposite apex from the feed. The vessel is supported and revolves in a frame, which latter is supported by a pair of horizontal trunnions at right angles to the axis of rotation. By this means the vessel can be tilted so as to discharge its contents. This is a great improvement upon the one previously described, as you can see into the vessel and gauge the water and time of mixing.

The following is the actual time of three operations of the machine. —

Secs.	Secs.	Secs.	
0	0	0	Hopper opens and empties into mixer.
60	60	60	All material in mixing cone.
105	90	90	Concrete properly mixed.
115	95	100	Cone turns over so as to empty.
140	120	140	Cone back in position, ready for filling.

The capacity is about 10 to 24 cub. yds. per hour, twenty to twenty-seven batches being mixed in that time.

The "Gauhe" is another of the closed vessel mixers, having a revolving drum for mixing and an arrangement of feed hopper and discharging doors. The capacity may be anything from 4 to 40 cub. yds. per hour, according to the size.

"Messent's Closed Mixer"

is a batch machine. The charge is fed into an irregular-shaped vessel revolving on an axle. The shape of the vessel is such as to thoroughly mix the material after a few revolutions. An interesting development of this mixer is a machine designed by Mr. A. H. Owles, M.I.C.E., and used on the Dover Harbour Works. It is thus described by Mr. Appleby in his "Handbook of Machinery." "The mixing vessel, the capacity of which is 1 cub. yd., is of the well-known 'Messent' type. It is mounted on a strong steel-frame carriage provided with two electric motors, one of which revolves the mixing vessel whilst the other gives a travelling motion to the carriage, so that the operations of mixing and travelling can be performed simultaneously. The proper charges of material are fed into the mixer from hoppers, and the charging door is closed; the machine is then travelled to and over the block mould, the mixing vessel being meanwhile rotated by the motor provided for that purpose. The number of revolutions are indicated by a dial . . . and when about fifteen revolutions are registered . . . the mixer motor is stopped . . . the mixed concrete discharged, and the machine returned for another charge."

A Curious Machine

is described in the "Engineering News" of September 6th, 1900, as follows: "Instead of using steam power to churn the concrete in a box, like the common mixer, the box or drum is placed on wheels and is so connected to them as to slowly revolve while a horse is drawing it from the place where the ingredients are piled to the place where the concrete is to be used . . . The capacity of the

drum is 21.6 cub. ft. or 0.8 cub. yds., and it is designed to hold sufficient ingredients to make half a cubic yard of rammed concrete in place. The ingredients shovelled in separately will nearly fill the drum, but they shrink rapidly as the cart moves off, and they become incorporated with each other.

"At the point where it is desired to dump, the driver raises a lever and releases an unlatching bar, which opens the latch holding the two halves of the drum together, and it at once dumps its contents and at the same time automatically goes out of gear." This machine is the invention of Mr. Isaac H. Fisher, and can be drawn by one horse. It has been christened the "Dromedary," owing to the open half of the drum resembling a hump.

Fawcett's and Oehler's Machines.

The type of batch mixer having a fixed vessel to contain the concrete, and revolving paddles to mix it, is well represented by Fawcett's machine and Oehler's (a Swiss make).

The former mixer has a drum of a peculiar shape which contains two parallel spindles (as in Figs. 11 and 12), each carrying three sets of arms or paddles. There are four arms in each set, and the spindles revolve in opposite directions, an arm on one spindle coming into the space between two arms on the other. This arrangement gives as thorough a mixing as it is possible to obtain; and when the delivery door is open the movement of these arms clears out the drum of all concrete, as the flukes on the ends are designed to scrape clean the whole surface from side to side as they revolve. The remarkable kneading and mixing which this machine gives the materials in the drum makes it one of the best for reinforced-concrete work, in which the quality of the concrete surrounding the steel must be specially good.

In the Oehler machine the mixing mechanism consists of a single spindle having arms and flukes much the same as the last. But the arrangement for emptying the drum is different. In this case the whole drum, which is open above, turns upside

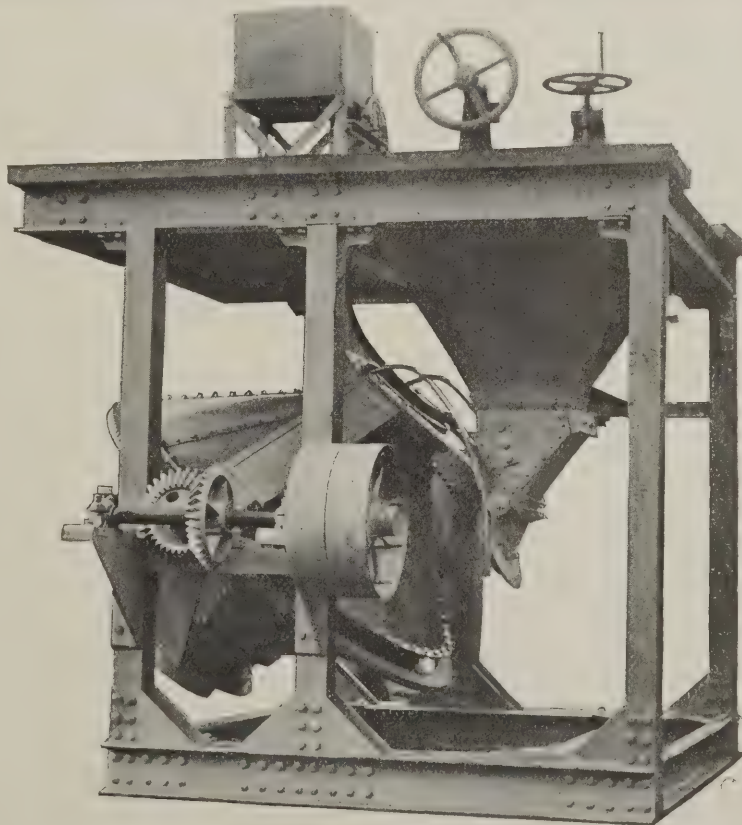
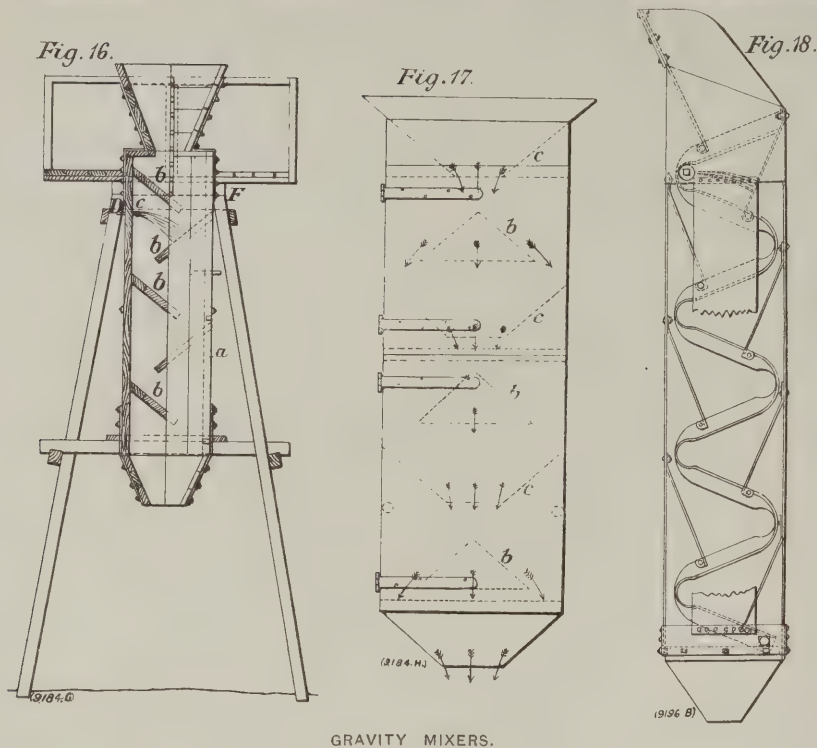


FIG. 15.—MIXER OF TAYLOR FORM.



GRAVITY MIXERS.

down, and, as before, the flukes of the revolving arms scrape it clean. The general design of the Oehler mixer is practically the same as Fawcett's, but with the two important differences just mentioned.

Arthur Koppel's Machine

(illustrated in connection with the first part of this article, Figs. 4 and 5) is another excellent type of batch mixer. In this the materials are fed into a revolving drum with a special arrangement of paddles and scraper. A very neat arrangement of single-bucket elevator gauges the ballast, and the water is measured in a tank by a ball tap.

Gravity Mixers.

There now remains only the class of machine known as "gravity" mixers. These are mixers pure and simple.

As the name implies, they work by the force of gravitation and consist of means whereby the materials in falling through a certain height have their ingredients thoroughly incorporated together.

The first of these machines was invented by Jackson and patented in 1882. It consists (Fig. 16) of a chute provided at the upper end with a hopper and at the lower with a contracted outlet. "The main trunk or chute has in its interior shelves which incline downwards and project alternately from opposite sides of the interior of the said trunk or chute, and are so situated relatively the one with the other that when the materials to be mixed are thrown into the hopper they fall down the first inclined shelf and therefrom on to the next inclined shelf, and so on from shelf to shelf until they pass from the open bottom."* Water may be admitted in a spray near the top of the chute.

The idea of this mixer is very simple, but there are certain drawbacks inseparable from the arrangement. By a series of experiments the author has found it to be impossible by shelves alone to obtain a practicable mixer suitable for all kinds of material. The mere action of directing a stream of materials from shelf to shelf does not necessarily mix if the complete stream is diverted as in this machine; and it has also been found that if the shelves are inclined at an angle sufficient to ensure throwing the stream from shelf to shelf, the adhesion of the ballast and cement prevents its slipping off, and so the apparatus clogs. On the other hand, if the inclination

is sufficient—and it must not be more than about 25 degs. to the vertical—the materials slip off the shelves but the apparatus does not mix. Further, the inclination necessary for one kind of aggregate is not the same as for another. The finer the particles and the more sand contained the greater is the tendency to clog.

Messrs. Mason Brothers, of Leicester, attempted to get over the latter difficulty by having the shelves hinged and the inclination capable of being altered. But the other dilemma remains.

In 1885 Stockman invented a gravity mixer (Fig 17) consisting of a series of superimposed cones and funnels in a chute, the funnels dropping the materials on to the points of the cones. The inclination difficulty remained the same in this as in the chutes with shelves, and, as a matter of fact, both Jackson's and Stockman's patents were allowed to become void.

There is an American mixer in which a series of round pins are arranged in a "staggered" pattern down the chute. The pins pass from front to back, and are arranged in horizontal rows one above the other, the pins of one row under the spaces of the row above. On throwing materials into the hopper provided at the top they are mixed by these pins in falling. Unlike the mixers previously mentioned, which hang vertically, this must be worked on a slope.

The great difficulty in such mixers is the efficient wetting of the concrete. They appear to mix dry materials fairly well, but there is a tendency for the water, which is admitted near the top, to run down the back of the chute in a stream separate from the ingredients of the concrete. A box, therefore, is provided in some near the bottom, into which the concrete falls and is allowed to soak for a short time with the water.

This mixing with the water has always been a serious difficulty in gravity mixers.

Dr. Owens' Machine.

In the author's machine certain new principles are introduced (see Fig. 18). The chute is the same as before, but all the bafflers or inclined surfaces are placed at a very steep slope to ensure the materials sliding off, and there is no complete diversion of the materials. Provision is also made to ensure a proper wetting of the concrete and prevent the water running down as a separate stream. This object is attained as follows:—

The water is forced to follow either a central path, in a spray, down the mixer, there mingling with the concrete, or to spread in a thin film over the working surfaces, upon which the particles of dry materials fall and become wetted.

The mixer consists of a chute, with large baffle plates on alternate sides, as in Jackson's, but fixed at about 25 degs. to the vertical. A series of sinuous bars or springs pass down the centre of the chute, spaced at equal intervals apart. They are bent in a zigzag way to perforate the free edges of each large baffle plate. These springs are formed of thin bars about 2ins. by $\frac{3}{8}$ or $2\frac{1}{2}$ ins. by $\frac{3}{16}$, and are so twisted—in addition to the bending above mentioned—as to deflect the material in opposite directions as it falls from each large plate. Water is admitted in a spray behind the top plate, and thence follows three separate paths—

- (1) down the sinuous bars in a film,
- (2) from one large plate to the next below it,
- (3) in a spray with the materials as they fall down the chute.

The chute hangs vertically, and the sinuous bars split the materials into columns. One of each pair of columns falls between these bars, in the spaces; and the other column strikes the inclined surface of the bars or springs, and is deflected into the one falling in the space. This is what is referred to as a partial deflection. The process is repeated where the narrow bars pierce the free edge of each large plate. It also takes place to some extent from the large plates themselves, which do not project far enough into the chute to cause a total deflection.

The action of this mixer is very satisfactory. As in all gravity mixers, it is best to give the materials a rough turning before feeding into the hopper. When feeding begins the water is turned on and a steady stream of materials shovelled into the chute. The amount of water is easily regulated.

For work below ground level, where it is not necessary to lift your materials up before letting them fall, this machine is especially useful. When fed properly it turns out from 80 to 120 yds. per day, and as no power is used it is very economical. Several machines are at present in successful use. They are being made by Messrs. Arthur Koppel.

To attempt a thorough description of all the concrete mixers in use would require too much space. The author can therefore only hope that the members of this Society will deal leniently with his attempt to give even this imperfect account of the processes involved in producing a good concrete. The subject is a large one and growing in dimensions day by day as the advantages of concrete either plain or reinforced are becoming more and more widely recognized.

The author begs to acknowledge his indebtedness to Mr. A. E. Carey, M.I.C.E., Messrs. J. H. Wilson & Co., Messrs. Arthur Koppel and Orenstein & Koppel, Mr. Henry Puplett, M.S.E., Mr. E. N. Trump, Syracuse, N.Y., Messrs. the Ransome Concrete Machinery Co., N.Y., the National Concrete Machinery, Chicago, and the Link-Belt Engineering Co., Philadelphia, for their kindness in supplying him with drawings, photographs and particulars relative to their respective machines for the purpose of preparing this paper.

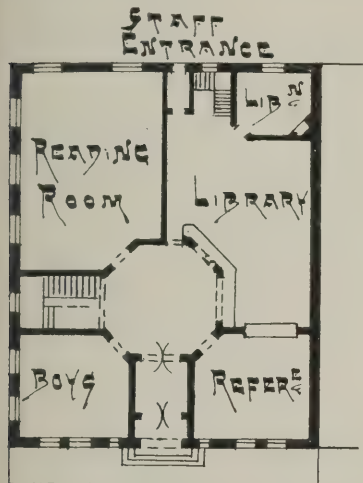
Liverpool Architectural Society.—Last week's meeting of this Society was given up to a further discussion of Mr. T. T. Rees's paper on "The Improvement of our Cities." Mr. T. Myddelton Shallcross opened the discussion, and was followed by Mr. Hastwell Grayson, Mr. Rathbone, Professor Riley, Mr. H. B. Bare, Mr. P. C. Thicknesse and others. Resolutions were passed that the city of Liverpool should be worthy of its commercial greatness and should express its dignity, which was only to be done by the combined efforts of worthy citizens. "It therefore suggests to the Council of this city the advisability of having a committee to deliberate as to the best means of attaining that end."

* Jackson's specification, 172, 1882.

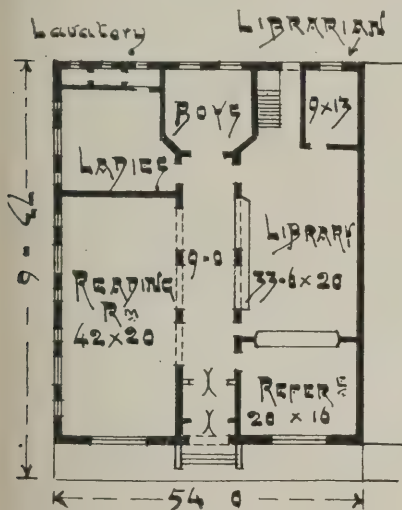
CROMPTON LIBRARY COMPETITION.

THE Crompton Urban District Council of Shaw (adjoining the borough of Oldham) having been offered £3,000 by Mr. Carnegie for a library, have just concluded the final stage of a very successful competition. Forty-six designs were submitted, the majority from Lancashire, several from London, and others from Belfast, Newcastle, Coventry, Gosport and other towns. Mr. G. H. Willoughby, F.R.I.B.A., a most experienced assessor, adjudicated on the designs. His award was announced in our columns two week ago. The total outlay on the library, to include everything except furniture, was limited to the £3,000.

Mr. Jesse Horsfall, F.R.I.B.A., of Manchester, gained the first premium of £30. He sent in two separate designs, rough plans of which are given below.

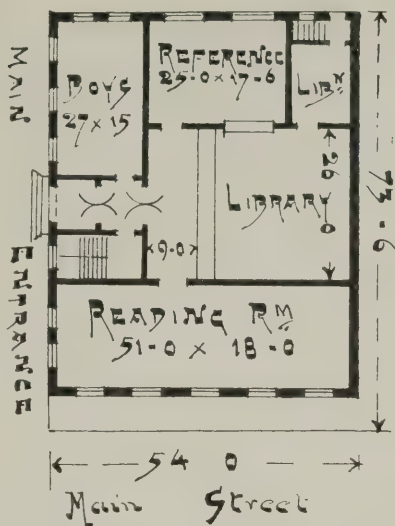


SELECTED PLAN, BY JESSE HORSFALL, F.R.I.B.A.



ALTERNATIVE PLAN BY JESSE HORSFALL, F.R.I.B.A.

The one with the octagon hall has been selected for erection, and it will, no doubt, be generally admitted by those who inspected the designs when on exhibition that it has well merited the place of honour. A vestibule about 9ft. wide, with an entrance in the centre of the main elevation, opens to an octagon hall with an octagon dome light. On the right-hand side, most conveniently planned, is the lending counter; on one side, facing the front, is the boys' reading-room, 21ft. by 18ft., with two tables and benches; and on the other side the reference library. Leading from the octagon hall is a staircase of two flights, one down to a men's lavatory in the basement, and the other up to a ladies' reading-room (20ft. by 16ft.) on the first floor, with a lavatory adjoining. The general newsroom adjoins the side street and is well



PLAN PLACED SECOND, BY A. E. DIXON, A.R.I.B.A., AND CHARLES H. POTTER.

lighted. It contains four reading tables accommodating thirty-two readers, and two stands for sixteen newspapers. The lending library facing it has a skylight over and contains two ranges of bookshelves placed at right angles to one another. The librarian's room, with a small fireplace, is lighted by windows from the back street, the staff entrance and stairs to basement being close by. In the basement are the heating chamber, staff lavatory and workroom. The elevation is Italian in feeling, designed to be erected without great expense. The central entrance is square-headed, with radiating key and arch stones. On either side is a small circular window, and above, under a gable, a three-light window into the ladies' reading-room. At each corner are stone quoins. The side elevation has a bold gable accentuating the staircase.

Mr. Horsfall's alternative design shows all the public rooms on the ground floor. The elevations are artistically designed in Gothic with mullioned windows. The front elevation has two gables and a side range of three-light windows. If this elevation could be applied to the other plan a most successful library building would be the result.

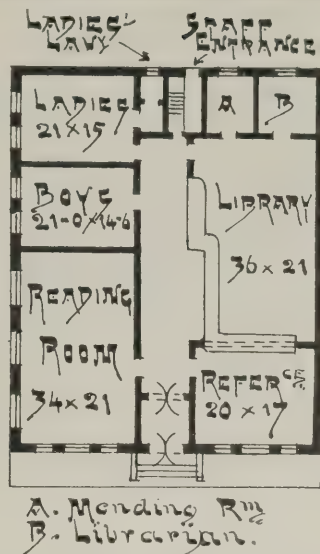
Mr. A. E. Dixon, A.R.I.B.A., and Mr. Charles H. Potter, both of Manchester, gained the second premium of £20. They selected the less important street for their main entrance, which opens into the lending library and public counter. The boys' reading-room is placed on one side and the public reading-room on the other. The reference library and librarian's room are well placed. The ladies' reading-room is above, approached by a staircase placed close to the entrance.

Another Manchester architect, Mr. Thomas J. Hill, was awarded the third premium of £15, while the fourth (£10) was gained by Messrs. J. Eaton, Sons & Cantrell, of Ashton, Lancs.

Three good designs were sent in by London architects—one by Mr. E. W. Poley with a central corridor and an octagon hall, very similar to the first-premiated plan, with all the public rooms placed on the ground floor; another by Messrs. Fair & Meyer, who, however, unfortunately forgot that in the North of England the librarian's room must overlook the library, having placed his room above, and so rendered their effort futile; and the third by Mr. J. A. Minty.

A very clever plan and design came from Belfast, by Mr. E. Sharp Hill, and another good plan was that by Mr. H. Lord, of Manchester (here shown).

Mr. T. B. Walters, of Coventry, was one of those who placed his entrance in the side street. He arranged the lending library on



PLAN BY H. LORD, F.R.I.B.A.

the ground floor and the reference library over it. In a large building with a numerous staff that may be desirable, but for a small Lancashire town it is a defective arrangement; otherwise the plan was an excellent one.

Messrs. Walker, Carter & Walker, of Windermere, sent a plan with a large first floor occupying the whole length on the main street. Their elevations were extremely successful. Two very well-studied designs came from Messrs. Hope & Son, of Bradford, and from Messrs. Crouch & Butler, of Birmingham, and others from Mr. E. Cratney, of Willington-on-Tyne, and Mr. S. M. Mould, of Newcastle, with an octagon hall.

One of the best plans in the room was that submitted by Mr. W. Norman Twist, of Birmingham, the entrance being arranged in the side street, with lavatories on each side and the library counter in front.

Altogether the designs submitted were very competent.

DRAWINGS OF ANCIENT ARCHITECTURE.

Proposed National Collection.

TWO or three weeks ago we published a note stating that the Spiers Testimonial Committee had handed over to Mr. R. Phené Spiers the sum of £79, being the balance in hand of the fund after paying the costs of the medallion, presentation of books, dinner to Mr. Spiers, and the publication of his volume of essays "Architecture, East and West." We now understand that Mr. Spiers proposes to hand over this sum to a small committee consisting of himself, Professor Lethaby and Mr. R. Weir Schultz, to deal with as the nucleus of a fund (to be added to by subscription or otherwise) for the purpose of forming a collection of drawings of ancient architecture in continuation of the work of the Spiers Testimonial Committee, such drawings to be deposited at the South Kensington Art Library or at the British Museum, and to be available for access by students of every kind. The committee now invite architects and others who possess such drawings to place them at their disposal for this purpose. They will also be glad to receive any information as to the existence of such drawings or of sketch-books or other material of a similar kind. Photographs of buildings which no longer exist, or which have been materially altered, will also be received for the collection. Communications in reference to the matter should be addressed to Mr. R. Phené Spiers, 21, Bernard Street, Russell Square, W.C.

NOTES ON COMPETITIONS.

The following is a list of competitions open:—

DATE OF DELIVERY.	COMPETITION.
March 1	NEW COLLEGE BUILDINGS AT BANGOR (Names only).—Particulars from Mr. J. E. Lloyd, Secretary, University College of North Wales, Bangor.
" 5	NEW COUNCIL OFFICES FOR HOLBORN.—Names only (from which a selection will be made by the Committee) to Mr. Lionel Walford, Town Clerk, 197, High Holborn, W.C.
" 5	HOSPITAL AT LEUCHARS.—Particulars from Mr. J. L. Macpherson, clerk to Hospital Committee, St. Andrew's, Fife.
" 12	SCHOOL AT GREENOCK.—Premiums of £42 and £31 10s. for designs placed second and third. Particulars from Mr. A. F. Niven, Municipal Buildings, Greenock.
" 17	LIBRARY AT PEEL (I.M.).—To cost £500. Single premium of £10. Limited to architects in the Isle of Man. Particulars from Mr. George Cannell, Town Clerk, Douglas.
" 20	FREE LIBRARY AT BANGOR.—Premiums of £25 and £15. £1 is deposit for conditions. Particulars from Mr. W. H. Worral, Municipal Offices, Bangor, North Wales.
" 24	FREE LIBRARY AT SWADLINCOTE.—Premiums of £25, £15 and £10. Particulars from Mr. W. A. Mussion, Clerk, Council Offices, Swadlincote.
" 31	BIRMINGHAM COUNCIL HOUSE EXTENSION (Sketch Plans).—£1 is deposit for conditions. Particulars from Birmingham Town Clerk, Council House.
April 2	PUBLIC LIBRARY AT SOUTHWARK (to cost £7,000).—Premiums of £50, £30 and £20. £1 is deposit for conditions. Particulars from Mr. J. A. Johnson, Town Clerk, Town Hall, Walworth Road, S.E.
May 31	NATIONAL CONGRESS HALL FOR BRAZIL.—Premiums of 15,000, 10,000 and 5,000 milreis (equivalent to about £1,685, £1,125 and £562 respectively). 5,000 milreis also for designs not premiated but desirable to be acquired. The conditions of the competition can be seen at the offices of the Commercial Intelligence Branch of the Board of Trade at 73, Basinghall Street, E.C.
No date	ISOLATION HOSPITAL AT STONE.—Limited to architects in the district. Particulars from Mr. J. J. Chapman, clerk to the Stone Joint Hospital Board, Stone, Staffs.

Central Public Library, St. Pancras.

There is consternation in St. Pancras over the proposed public library. On the one hand are the economists who are alarmed at what they regard as the too progressive tendencies of the borough council, an alarm which has been augmented apparently by a councillor's remark that theirs was to be the finest library in London. On the other hand are those persons who consider that architect ratepayers practising in the borough should have, at the least, a chance of competing for a building the cost of which they will be called upon to bear a share. This latter section is headed by Mr. Inglis, a local architect, who is conducting a very active campaign to secure an open competition. It will be remembered that at the request of the borough council Mr. Belcher, president R.I.B.A., nominated six architects whose names were accepted for a competition limited to that number, each competitor to receive an honorarium of £40. Mr. Inglis contends that this is great extravagance and that a considerable amount of ratepayers' money might be saved by an open competition with premiums of £100, £50 and £25, the first premium to merge in the commission payable to the successful competitor. Groaning is a relief to a sufferer, even when suffering is borne with the knowledge that it is but an inevitable means towards ultimate good. This simile may be applied to ratepayers and public libraries. Assuming that libraries are a benefit to the community, there yet remains the inconvenience of paying for them, and the person who does not groan when this stage of affairs is reached is a *rara avis* indeed, no matter how advanced

his principles may be. So there is excuse, if not reason, for the fears of the St. Pancras economists, but with the action of the architect who desires an open competition it is impossible to sympathize. The profession is divided in its views as to whether competitions are an advantage or otherwise, and much argument has been adduced on both sides. However divergent opinion has been upon the principle of the matter, there has been no question as to the superiority of the method of paying a limited number of competitors something for their trouble, over the other method so wasteful in labour where much is done for little. St. Pancras having decided to possess a library, it was the duty of the council to take steps to obtain for those it represents the best building possible in the circumstances. This it appears to have done, and it has moreover shown evidence of an intention to deal fairly with an overworked profession by offering some sort of remuneration for the valuable designs which will be at its disposal to select from. Mr. Inglis not only intends to prevent this if he can, but he desires in his cheese-paring open competition scheme to rob the successful competitor of a well-earned premium; and all to save a paltry sum of £165—paltry indeed when compared with the probable cost of the building, i.e., £20,000. It is evident the council was not aware that there were architects in St. Pancras capable of producing free libraries, for if it had been there is no doubt it might have acted differently. As it is, the Council has committed itself to a certain course of action, and in view of this fact it is a matter for deep regret that anyone calling himself an architect should be guilty of an endeavour to wrest honour and commission from six highly capable fellow-practitioners who have had the good or bad fortune to be selected to occupy a position the which has been attained without any previous solicitation on their own part. Such conduct can only be stigmatised as undignified, unprofessional and savouring of the dog in the manger.

Building for the National Congress of Brazil.

It is not likely that this competition will be much sought after in this country. It is curiously described in the Board of Trade Journal as "a competition for the presentation of plans for the construction of a building for the National Congress of Brazil." It is further stated that "projects destined to compete will be received in the secretarial department of the Federal Senate up to 4 p.m. on the 31st May next." Prizes of 15,000, 10,000 and 5,000 milreis are offered to the authors of the three best plans presented to the judges, and a further sum of 5,000 milreis is to be expended in acquiring the plans which the judging committee regards as the most deserving of being acquired for the National Congress. If anybody considers these particulars alluring, they may obtain further information at the offices of the Commercial Intelligence branch of the Board of Trade, 73, Basinghall Street, London, E.C.

Saxon Snell Essay Prize.

This prize, the outcome of a legacy by the late Mr. Henry Saxon Snell, F.R.I.B.A., is to be awarded by the council of the Royal Sanitary Institute at intervals of three years. The subject for 1906 is: "Suggestions for improvements in sanitary appliances for use in workmen's dwellings and labourers' cottages under the varying conditions of water-supply and drainage usually obtaining in towns and villages." The prize is of £50; together with a medal of the Royal Sanitary Institute. The essay is to be of not more than 5,000 words and must be delivered before 4 p.m. on September 30th next, addressed to the Secretary, Royal Sanitary Institute, 72, Margaret Street, W. Two com-

petitors of different professions or crafts may join in sending an essay and plans.

Secondary School for Girls at Liverpool.

At last Thursday's meeting of the Liverpool Education Committee considerable discussion took place in regard to a competition for the new secondary school for girls which is proposed to be built on a site in Aigburth Vale, to accommodate about 300 girls, with a junior department for about 100 scholars. The sites and building sub-committee recommended that the competition should be limited to architects in Lancashire and Cheshire, with premiums of £50, £30 and £20, and this recommendation was ultimately adopted.

Carnegie Library, Southwark.

The committee of the Competition Reform Society disapproves of the conditions in the above competition because the designs are to be assessed by a committee of councillors and the borough surveyor. Members are requested to abstain from competing unless the conditions are satisfactorily revised.

A Leeds Sunday School.

The trustees of Holdforth Street Chapel, New Wortley Leeds, having decided to build a new Sunday school adjoining the chapel, architects were invited to submit competitive designs. The assessor (Mr. C. H. Channon, of Malton) has placed first the design submitted by Messrs. T. A. Buttery and S. B. Birds, of Leeds and Morley, and the trustees have accepted his award and instructed the architects to proceed with the building.

Obituary.

Mr. William Barratt, builder, of Bowes Park, N., poisoned himself recently.

Mr. J. T. Gresty, builder, of Willaston, Nantwich, died last week in his sixtieth year.

Mr. Ernest Godman, architect, died last week at Banstead, Surrey. For many years he had been associated with Mr. C. R. Ashbee, at Chelsea, and with the Guild of Handicraft, now removed to Campden, Glos. He was also the secretary of the Committee for the Survey of the Memorials of Greater London. Quite recently we reviewed his book on "Mediæval Architecture in Essex," and we now have before us his later book on "Norman Architecture in Essex." Mr. Godman was only 30 years of age.

Mr. J. E. Tuit, a director of Sir William Arrol & Co., died last week, aged 46. He was discovered by Sir William Arrol on the Forth Bridge work, and was assistant to Sir John Fowler and Sir Benjamin Baker on that great undertaking. He was responsible for the design of the staging and other temporary works which enabled the workmen to carry out their difficult operations on the great high projecting members of the giant cantilevers; indeed, it is not too much to say that it was Mr. Tuit's mathematical ability in determining wind-pressures and stresses, and in devising the above, in association with the practical experience and judgment of Sir William Arrol and Mr. A. S. Biggart, that made the Forth Bridge an accomplished proof of the ingenuity and genius of Sir John Fowler and Sir Benjamin Baker. Mr. Tuit, on the completion of the Forth Bridge, came to London, and was in sole charge of the erection of the Tower Bridge for Sir William Arrol & Co. Later he was occupied on various work for his firm, and some of the finest roofs in Clyde shipbuilding and engineering works were designed by him. His latest great bridge work was the structure across the Nile at Cairo, now being erected. The design prepared by him for this bridge, nearly two miles long, was accepted in international competition.

Notes and News.

A new Bison House at the Zoo is being erected, adjoining the deer house. Work on the new otters' pond is well in hand.

Cost of erecting Elementary Schools.—A committee of the London County Council is to submit a full report on this subject.

"A Chat about Architects and Architecture."—In our issue for last week we stated that the new edition of the above booklet had already been published. The author (Mr. W. I. Chambers) informs us that this is not the case, the date fixed for publication being May 1st.

Messrs. Joseph Kaye & Sons, Ltd., of Leeds, have received an order from the Admiralty for 8,100 of their patent seamless serrated oil feeders, also a similar number of their patent seamless spouts, to be delivered to H.M. naval establishments as may be required. This order is part of a contract which is to extend over the next three years.

The late Mr. Saxon Snell's Bequest.—At next Monday's special general meeting of the Royal Institute of British Architects Mr. A. Saxon Snell will call attention to the terms of the bequest by his father, the late Mr. Henry Saxon Snell, and will ask what steps have been taken by the Council to formulate a scheme for the proposed scholarship or prize.

A Complimentary Dinner to Professor Henry Adams, M.I.C.E., M.I.M.E., F.S.I., F.R.S.I., was given last week at the Holborn Restaurant by students of the City of London College who had worked under his direction while he was there as professor of engineering, which position he held for thirty-five years. Professor Adams was presented with an illuminated album and a gold chain.

The 23rd Annual Congress of The Royal Sanitary Institute will be held at Bristol from July 9th to 14th next. Sir Edward Fry will preside, and the following will act as presidents of sections 1, 2 and 3 respectively:—Section 1, "Sanitary Science and Preventive Medicine," Sir William J. Collins, M.D.; section 2, "Engineering and Architecture," Mr. Edwin T. Hall, V.-P.R.I.B.A.; section 3, "Physics, Chemistry and Biology," Mr. W. N. Shaw, M.A., D.Sc., F.R.S.

The new Carlton Hotel at Johannesburg, just opened, has been entirely built and equipped by Messrs. Waring & Gillow, and when it is realized that everything except the stone employed in the construction had to be shipped from England, the magnitude of the work will be evident. The building is of six storeys and has a frontage of 620ft. There are more than 200 bedrooms. The accommodation includes a rotunda in the Charles II. style, a Louis XVI. palm court, a ballroom or restaurant with modelled ceiling and galleries at the ends, a public dining-room, billiard-room, Adam drawing-room, ladies' writing-room, grill-room and smoking-room. Turkish baths are also provided.

Craigmillar Asylum, Edinburgh, is to be reconstructed according to plans prepared by Messrs. Henry & Maclellan, architects, of Edinburgh. A new upper storey is to be erected in place of the present roof storey, and a new top storey added. On this top floor the kitchen offices (now in the basement) will be located, together with additional dormitories and servants' accommodation. The present dining hall is to be considerably lengthened, and the laundry and washhouse (at present in an outside building) placed in the basement under the dining hall. Various alterations will be made on the other floors, and the whole of the lavatory and bathroom accommodation will be remodelled and brought up to date. The cost of the work contemplated will be about £15,000.

For the Grand Hotel, Worthing, the design of Messrs. Mitchell & Raine, architects, of London, has been accepted.

An Office Tower Forty Storeys High, reaching to a height of 594ft., is to be built in New York at a cost of £300,000. Mr. Ernest Flagg is the architect. The highest skyscraper at present in New York is in Park Row, comprising twenty-nine storeys, 382ft. high.

The Annual Dinner of the Surveyors' Institution was held last Wednesday. The president, Mr. Charles Bidwell, said that the membership of the institution was rapidly approaching 4,000, and the entries for the examinations for this year were 700. Scholarships for students had been instituted at Cambridge, at the University of North Wales, and at the Armstrong College, respectively of the values of £80, £50 and £50 per annum, tenable for three years.

"Modern Buildings: their Planning, Construction and Equipment."—Vol. I. of this new work (edited by Mr. G. A. T. Middleton, A.R.I.B.A., assisted by numerous special contributors) has just been issued by the Caxton Publishing Co., 84-86, Chancery Lane, W.C., price 10s. 6d. nett. It deals with "Office Practice and Draughtsmanship," "Cottages and Country Houses" and "The Construction of a Building's Shell," and is very fully illustrated, some of the reproductions being in colour. We shall review the volume in our next issue.

The Mutilation of Sculpture is a vogue of to-day, said Mr. W. R. Colton, A.R.A., last week in his second and concluding lecture at the Royal Academy. Apparently, to lop off a leg or two legs, or an arm and a leg, greatly enhanced the artistic value of sculpture. Well, it certainly had one quality—it left more to the imagination. One genius had even gone farther and split off a piece of a face. This was not a joke; it appeared in a recent exhibition of high class, where a considerable proportion of the sculpture was more or less mutilated. "But seriously," said Mr. Colton, "is not this the hypocrisy of art—a juggle to deceive the observer? Sculpture should not lend itself to the absurd or grotesque; it should be the expression of an idea." Mr. Colton spoke of the fountain as perhaps the finest expression of decorative sculpture. He instanced a number of examples, among them being two at Versailles, several in Rome, and others at the Alhambra, Pompeii, Cambridge and Lyons. Dalou's Paris fountain, "The Triumph of the Republic," was also illustrated.

The Teaching of Mathematics to Building Workmen.—Mr. Harold Busbridge, A.R.I.B.A., chief lecturer in building subjects at the L.C.C. Technical Institute at Paddington, dealt with this subject in a paper which he read before the recent meeting of the Association of Teachers in Technical Institutes at the Regent Street Polytechnic. In considering the requirements of evening students, Mr. Busbridge held that the part which mathematics played in the training of builders' workmen was a very limited one. For this reason he thought that the Board of Education syllabus in practical mathematics, admirable as it might be for the engineer, was nevertheless quite unsuited to the needs of workmen. An average student who patiently plodded through the whole prescribed course would never be likely to make effective use of one-half of what he had learned—in fact, he would probably not retain more than one-tenth as a working modicum—and the time he had been spending in acquiring some degree of proficiency in the use of logarithms, trigonometrical formulæ, &c., would in nine cases out of ten have been far better spent on other subjects bearing more directly upon his work or upon some useful artistic training, in which most workmen were so lamentably deficient.

THE ARCHITECTURAL ASSOCIATION.

A SPECIAL general meeting of the Architectural Association was held at 18, Tufton Street, Westminster, on Friday night (Mr. E. Guy Dawber, F.R.I.B.A., president, in the chair) to consider a proposal of the Council to add the words "Editor of the A.A. Journal" after the word "librarian" in by-laws 21 and 30, and to substitute "nine ordinary members" in by-laws 21 in place of ten. The Council felt that the Editor should be ballotted for annually, as in the case of other officers, and that he should be an ex-officio member of the Council. This would still bring the total of the Council to seventeen members as before. The proposal was unanimously agreed to.

The ordinary meeting followed, when the following new members were elected:—Messrs. A. D. Leroy, J. A. Mettham, D. Kibbler, E. S. Coldwell, H. Cyril Chatfield Clarke, J. E. Lee, F. G. Geary, C. W. Ferrier and G. E. G. Leith.

The re-instatement of Mr. C. L. Fleming-Williams was announced; also the following further donations to the Building Fund:—

	£	s.	d.
E. B. l'Anson (2nd donation)	-	-	10 10 0
Ernest Newton do.	-	-	3 3 0
P. H. Adams	-	-	1 1 0
H. J. Rippon	-	-	0 10 6

Mr. Frank T. Baggallay, F.R.I.B.A., then read a paper on "Porches and Approaches." Our report of it is held over till next week, by reason of the great pressure on our space.

Law Cases.

Guards on Moulding Machines.—At the Loughston County Court last week an apprentice machinist named Wood claimed damages under the Employers' Liability Act, 1880, from Messrs. Young & Son, builders, of Longton, for the loss of his thumb on July 5th, 1905, while working a spindle moulding machine belonging to the defendants, which, it was alleged, was not provided with a proper and efficient guard. Wood said he had to rebate about 100 strips of oak, about ½ in. thick and 2½ ins. wide; he had to push the strips along the table of the machine in front of a spindle making 3,000 revolutions a minute. He was pushing one strip along when, in consequence of the curly or knotty nature of the wood, it kicked back, and his left hand slipped on to the knives, cutting off his thumb. On behalf of the plaintiff it was stated that the machine was regarded by the trade as "most dangerous," so much so that in 1902 the Operatives' Society sent out a circular asking for better fencing. In many places a better protective guard had been adopted, and it was contended that if such a contrivance had been in use on this machine Wood's accident could not have happened.—The judge asked why the case had not been brought under the Workmen's Compensation Act, remarking that he did not want two actions to arise out of the matter.—Mr. Brough, for the defendants, said that 7s. 10d. weekly had been allowed under the Workmen's Compensation Act until last November, when it was refused; the defendants were then told the matter was to be proceeded with under the Employers' Liability Act.—The judge said that Wood, having received half wages, was indemnified up to the present, and all his Honour had to consider was how the accident affected plaintiff's future. Undoubtedly he was a less competent workman, but after all not so much. He therefore should name £40 as compensation and £10 in addition for costs.—It was agreed that the action under the Employers' Liability Act should be withdrawn, and a memorandum filed under the Workmen's Compensation Act.

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Correspondents are particularly requested to be as brief as possible.

The querist's name and address must always be given, not necessarily for publication.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

Stability of Church Roof.

Roof writes: "I send drawing showing proposed framing of roof of nave for a new church 24ft. wide, with transept 19ft. wide. Are the sizes of timbers suitable for the span, and are the walls and buttresses sufficient to resist the thrust of the roof? I should also like to know the best method of constructing the roof of nave and transept where they intersect to form the valley shown on plan."

The scantlings of the roof trusses will probably be sufficient if the buttresses are made of the dimensions shown in elevation (Fig. 1) and plan (Fig. 2). The vertical dead load from one-half of the roof truss, amounting to 94.5 cwt., is assumed as acting on the wall-plate $4\frac{1}{2}$ ins. from the inner edge of the wall, and this is combined with the whole of the wind-pressure on the roof, amounting to 63 cwt., acting in a direction normal to the slope of the roof-surface and striking the opposite wall where shown on Fig. 1. The result is then combined with the weight of the wall and buttress acting at their mutual centre of gravity, the length of wall being taken as between assumed window openings, the positions and sizes of which are not stated. Having obtained the final resultant, the maximum stress per square foot

will be found by the formula $\frac{W}{A} \pm \frac{M}{Z}$, where

W = vertical component of resultant, A = sectional area of wall and buttress in square feet, M = bending moment, and Z = modulus of section. Then $\frac{404}{17'15} \pm \frac{404 \times 1'43}{9'4} = 23'55$

$\pm 61'5$ = say 85 cwt. = 4.25 tons per sq. ft. maximum compression on material of buttress. For the framing of roof timbers at the junction of the nave and transept roofs the arrangement will be as shown by dotted lines on plan (Fig. 3), section along ridge of nave (Fig. 4) and cross-section of nave (Fig. 5). The ridge of transepts may be continued right through, and short principal rafters from the ridge of the nave carried down and halved to it. The valley rafters, into which the ends of purlins are framed, should not be less than 11 ins. by 7 ins., and they should have their ends firmly secured to the junction of the transept ridge and short principal rafters.

HENRY ADAMS.

Damp Walls.

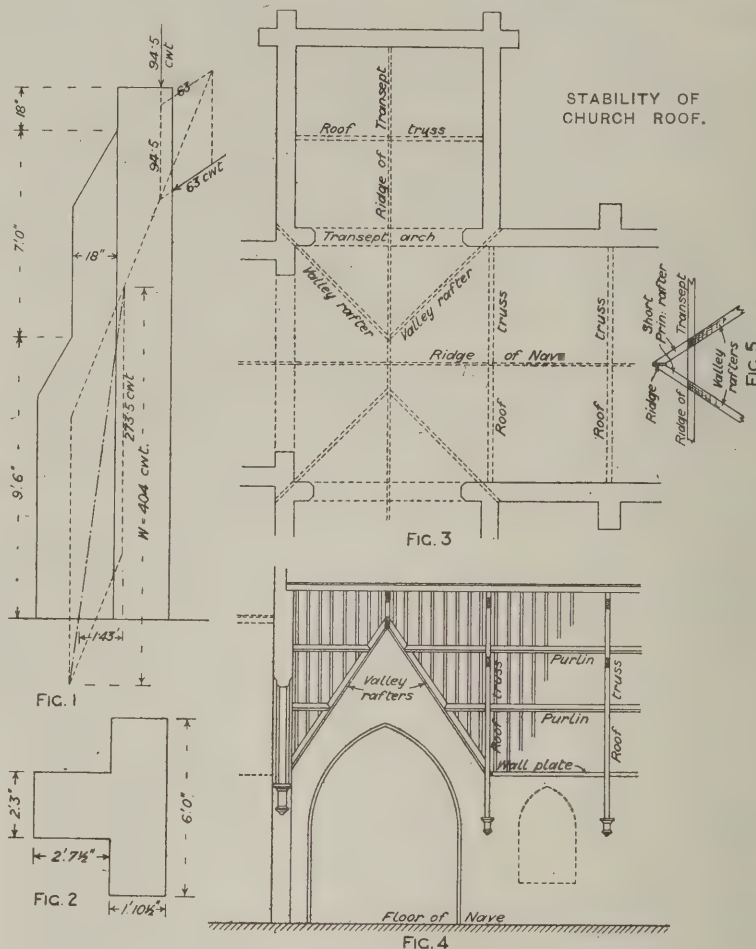
HARROW.—H. W. writes: "(1) Two years ago I had a house plastered inside with 'Sirapite' plaster, and a few months later, when it appeared to be fairly dry, some of the walls were coated with 'Duresco' distemper, and other walls papered. Soon afterwards the paper in many places showed signs of discoloration and the distemper in several places became covered with small tear drops of a gummy consistency. The distemper was of colours said to resist the action of caustic lime. The house has recently been repapered and the ceilings whitened with ordinary distemper, but although two and three coats have been applied to the ceilings they look very dirty, and appear to show the lines of the laths above. In one room, which has been papered with a red paper, the colour

has faded downwards for about 12 ins. from the picture-rail on the walls, which are built of brick, but not on one side which is a stud partition. The frieze above the picture-rail in this room also looks dirty and patchy on the three brick walls, but not on the partition. Papers in the other rooms are satisfactory. Can you explain the reason for this, and any method of preventing the ceilings looking dirty? (2) In one corner of the above house facing south-west there is a considerable amount of damp showing on the inside of the wall just above the skirting for several feet each side of the angle. The walls are 14 ins. thick, built solid to the first floor, with 9 in. rough-cast walls above. Can this be due to the walls becoming saturated by driving rain and the damp-course preventing its passing downwards, causing it to come out on the inside of the wall, or can you suggest any other reason and a cure for this?"

(1) There is little doubt that the discoloration in question is caused by damp and not by the caustic lime at all. The plaster on the ceilings must be very thin and inadequate if it allows the lime of the laths to show. I suggest that you paper the ceilings, or, if that be objected to, distemper them with "Hall's Distemper." I have found this better for ceilings than other preparations. (2) This damp undoubtedly rises from the subsoil, and the matter should be properly investigated. Is there any soil at that corner above the damp-course? Is there a leaky rainwater spout or downpipe there? Generally, I would advise investigation as to whether the rainwater does not run down the face of the rough-cast, especially on south and west aspects, and soak into the lower brickwork as soon as it gets to the lower edge of the rough-cast. If so, will it not be well to form a small tilting ledge along that line to discharge the water clear of the brickwork?

F. S. I.

STABILITY OF CHURCH ROOF.



Cowhouses.

LEEDS.—A.R.I.B.A. writes: "A client owns some old farm buildings. The cowhouse is considerably under the regulation size, and lacks light and ventilation. The local authority (in a country district) give notice for it to be pulled down and rebuilt, or they will close it. Have they power to do this, as it is a comparatively easy matter to enlarge the building so as to give the requisite cubic feet of air-space, light and air. My client is willing to do this but will not rebuild. What is his legal position in regard to the local authority? They have no by-laws relating to such buildings. What shall I take as the standard? In preliminary sketches I have allowed 700 to 800 cub. ft. per animal. The building has a lean-to roof 6 ft. at eaves and about 15 ft. at the highest point."

Section 34 of the Contagious Diseases (Animals) Act, 1878, empowered the Privy Council to make Orders for the lighting, ventilation, cleansing and water-supply of cowsheds and dairies, and for authorizing a local authority to make regulations for the purposes aforesaid. In 1885 the Privy Council made an Order under the Act (and that Order has the same effect as though it were an Act of Parliament). By section 8 of that Order it was provided that it should not be lawful for a cowkeeper to occupy any cowshed—whether old or new—"as long as the lighting and the ventilation, including air-space and the cleansing," were not such as were proper. By section 13 of the Order power was given to the local authority to make rules for regulating cowsheds, and it has been held (*Baker v. Williams*, November 1st, 1897) that this also includes power to make regulations as to "ventilation and air-space." Though the Privy Council have never issued a direction on the subject, it has become a very usual practice to insert in the local regulations a clause calling for 800 cub. ft. per cow as the minimum to be allowed, and such a figure (though variable

NEW LONDON BUILDINGS.

AT yesterday's meeting of the London County Council the Building Act Committee reported the following applications under the London Building Act, 1894, their recommendations as to consent or refusal being appended in *italics* :—

Parish hall on the northern side of Waynflete Street Earlsfield, and a house on the western side of Tramere Road, to abut upon Waynflete Street, on the application of F. E. Halford, on behalf of the Rev. D. Tudor Craig. (*Consent.*)

Projecting shops in front of Nos. 210, 212, 214 and 216, Mare Street, Hackney, on the application of Hodson & Whitehead, on behalf of H. & H. W. Rowlandson. (*Consent.*)

Iron and glass shelter in front of No. 17, Pembridge Square, Kensington, on the application of S. Dowsing & Sons, Ltd. (*Consent.*)

Retention of a wood, glass and zinc roof at the side of No. 144, Coldharbour Lane, Brixton, abutting upon Eastlake Road, on the application of J. Karno. (*Consent.*)

Buildings on the south side of Broughton Road, Fulham, on the application of Badenoch & Bruce, on behalf of the directors of Loud & Western, Ltd. (*Consent.*)

Extension of the period within which the erection of a Welsh Congregational Chapel on the northern side of Willenhall Road, Woolwich, was required to be commenced, on the application of J. M. Peate. (*Consent.*)

Buildings on the northern side of Mitcham Road, Tooting, to abut upon Ensham Street, on the application of H. J. Marten, on behalf of the Council of the Metropolitan Borough of Wandsworth. (*Consent.*)

Porch in front of the Baptist Chapel on the west side of the Bloemfontein Road, Hammersmith, on the application of R. N. Hewitt, on behalf of the building committee of the chapel. (*Consent.*)

Addition (jointing chamber) in front of the Barnsbury Telephone Exchange, Barnsbury Grove, Islington, on the application of C. Elliott, on behalf of the National Telephone Co., Ltd. (*Consent.*)

Re-erection of Nos. 95 to 103, Maida Vale, Paddington, with projecting porches and bay windows, on the application of Boehmer & Gibbs, on behalf of F. Britton. (*Consent.*)

Projecting clock in front of Nos. 127-130, Long Acre, Strand, on the application of E. R. Burch, on behalf of Morgan & Co., Ltd. (*Consent.*)

Projecting porch in front of No. 121, Victoria Street, Westminster, on the application of Farebrother, Ellis & Co., on behalf of V. S. & F. T. Galsworthy. (*Consent.*)

Porch in front of St. Paul's Church, Kingsdown Road, Islington, on the application of A. B. Cook. (*Refusal.*)

Iron and glass covered way in front of St. Mark's Vicarage, Kennington Oval, on the application of W. Fitch, on behalf of the Rev. J. Darlington. (*Refusal.*)

Iron illuminated sign at the Queen's Hotel, No. 104, Oxford Street, on the application of T. Holland. (*Refusal.*)

Retention of a wood and glass showcase in front of No. 8, Grafton Street, St. George, Hanover Square, on the application of F. Sage & Co., Ltd. (*Refusal.*)

Additions to No. 17, Sutton Place, Hackney, to abut upon Urswick Road, on the application of W. Gibbins, on behalf of A. Escott. (*Refusal.*)

Retention of a one-storey building at the rear of No. 54, Winsted Street, Battersea, abutting upon Surrey Lane, on the application of Greenfield & Cracknall, on behalf of F. C. Greenfield. (*Consent.*)

Four houses on the southern side of Tressillian Road, Brockley, on the application of H. J. Glanville. (*Consent.*)

New street for carriage traffic to lead from Eastmearn Road to Chatsworth Road, West Dulwich Lambeth, on the application of C. J. Bentley, on behalf of L. S. Rogers and A. & E. Rowberry. (*Consent.*)

Bay windows and porches to twenty-six houses on the south side of Oxford Gardens, Kensington, on the application of Trant, Brown & Humphreys, on behalf of Daley & Franklin. (*Consent.*)

Extension of the periods within which the erection of a projecting pent-roof to the fire-brigade station on a site on the north-east side of Eltham Road, Lee, and western side of Meadow Court Road, on the application of O. Fleming, on behalf of the Fire Brigade Committee of the Council. (*Consent.*)

Projecting sign in front of No. 45, New Bond Street, St. George, Hanover Square, on the application of G. & F. Kent, on behalf of E. Charvet. (*Consent.*)

Retention of an illuminated sign in front of No. 14, Hanover Court, Long Acre, on the application of J. P. Choate, on behalf of F. H. Berry. (*Consent.*)

Re-erection of No. 4, George Street, Woolwich, on the application of J. O. Cook, on behalf of J. Frankling & Son. (*Refusal.*)

New streets for carriage traffic upon the Hilly Fields Park estate, Vicar's Hill, Lewisham, on the application of W. H. Collier on behalf of the trustees of the Jerrard estate. (*Consent.*)

Deviation from the plan approved on December 18th, 1905, for the formation or laying-out of a new street for carriage traffic to lead from Fernhill Street to Auberon Street, North Woolwich, so far as relates to an alteration in the levels of the proposed street, on the application of Tapp Jones & Son. (*Consent.*)

New streets for carriage traffic out of Wavertree Road and Nuthurst Avenue, Brixton, on the application of Briant & Son, on behalf of A. A. Coffee and the Westminster Investment Society, Ltd. (*Consent.*)

Houses for persons of the working class on the north side of Beckett Street, the east side of Toulon Street and the east and west sides of Baily Street, Wyndham Road, Camberwell, on the application of — Oxtoby, on behalf of the Council of the Metropolitan Borough of Camberwell. (*Consent.*)

Deviation from the plan approved on January 23rd, 1906, under sections 13 and 22 of the London Building Act, 1894, for the erection of artisans' dwellings on the north-eastern side of Pond Place, Chelsea, so far as relates to an alteration in the position of the forecourt fence at the corner of Pond Place and the roadway leading to nslow Dwellings, on the application of Joseph & mithem, on behalf of the Council of the Metropolitan Borough of Chelsea. (*Refusal.*)

Open shed on the north side of Sumner Street, Southwark, on the application of F. Bailey, on behalf of the City of London Electric Lighting Co., Ltd. (*Consent.*)

Deviation from the plan approved on April 11th, 1905, for the formation or laying-out of a new street for carriage traffic, to lead from Fulham Palace Road to Colehill Lane, Fulham, and, in connection therewith, the erection of buildings, so far as relates to the substitution for the two blocks of residential flats of four shops, on the application of A. Blackford. (*Consent.*)

Building at the rear of No. 363, High Street, Lewisham, on the application of the Magneto Motor Cycle and Electrical Engineering Co. (*Consent.*)

Removal of a fence at the rear of No. 2, Kelso Place, Kensington, and also to the closing of openings in the rear wall of such building, on the application of G. E. Bucknill. (*Consent.*)

Uniting of No. 45, Piccadilly, with a building on the eastern side of Albany Courtyard on the application of G. D. Martin. (*Refusal.*)

The Theatres and Music Halls Committee also reported the following :—

Plan with regard to a sale of work to be held at the Portman Rooms on March 8th. The arrangements shown on the plan appear to be satisfactory. (*Consent.*)

Plan, submitted by the Thames Electrical Joinery Co., Ltd., showing a proposal to cover with asbestos millboarding the enclosure of the lift from the beer cellar to the first floor of the Café Vaudeville, Strand, with a view to complying with one of the Council's requirements with regard to the building. The Committee think the existing matched-board enclosure should be replaced by one of hard or non-inflammable wood. (*Refusal.*)

Plan, submitted by the Town Clerk of the Royal Borough of Kensington, showing a proposal to provide a gas-heated plate warmer on the landing of the gallery staircase of the Kensington Town Hall. By the proposed arrangement the landing would be reduced in width from 7ft. to about 5ft 6ins., and would be further obstructed by persons using the apparatus. The Committee do not consider that an exit staircase should be used for the purpose proposed. (*Refusal.*)

Snow Hill Station, Birmingham, built in 1871, is to be reconstructed. When finished the new station will be considerably more than twice the size of the present building, for it will stand upon land bounded by Colmore Row, Snow Hill, Livery Street and Water Street. The Great Western Hotel is to be materially altered and improved, and the existing buildings on the Snow Hill side are to be taken down and several blocks erected in their place, these including waiting-rooms, refreshment-rooms, a small booking-office, telegraph offices, stationmaster's apartments, cloakrooms, and a left-luggage department. On the lower side of Snow Hill, near Great Charles Street, a spacious parcels yard about 200ft. long is to be provided.

Sheffield Society of Architects and Surveyors.—Before this Society on Thursday last Mr. J. B. Mitchell-Withers delivered a lecture on "Early Eighteenth-century Architecture." He commenced by referring to Greenwich Hospital as the building where the work of Inigo Jones and Sir Christopher Wren could be seen to advantage; but portions of which were built by various architects in the eighteenth century, of whom Sir John Vanbrugh and Hawksmoor were the most celebrated. He then dealt with buildings in London, the chief of these being St. Mary Woolnoth, St. Mary's-in-the-Strand, and St. Martin's-in-the-Fields. He also referred to the buildings erected at Oxford and Cambridge, such as the Fellows' building at King's and the Senate House at Cambridge, and the Radcliffe library and buildings to the High Street at Oxford. Domestic and street architecture of this period was illustrated by a number of views of buildings at Bath and Stamford, concluding with views of Blenheim Palace and Castle Howard, both of which were built by Sir John Vanbrugh.

Correspondence.

The Architects' Enrolment Bill.

To the Editor of THE BUILDERS' JOURNAL.

SIR,—As some of your readers are doubtless aware, a sub-committee of the R.I.B.A. is sitting to collect evidence concerning the above measure. Before this I was recently summoned as a provincial architect, and attended with the approval of the president of the Bristol Society of Architects. There I upheld the cause of registration, pointing out that Western architects were practically unanimous in their desire for a measure that should protect both the profession and the public. But I hardly expected that so good an illustration of the efficiency of registration would appear so shortly in my own city as that afforded by the recent medical prosecution. I, therefore, venture to send you a report of the proceedings, taken from the "Western Daily Press." Stripped of all extraneous matter, it reads as follows :—

"Mr. Wansbrough, in opening the case, said . . . the Act of Parliament under which the proceedings were instituted was the Medical Act of 1858, which stated that it was expedient that persons requiring medical aid should be enabled to distinguish qualified from unqualified practitioners. Section 15 set out the conditions of registration. Under section 40 of the Medical Act it was provided that any person who should wilfully or falsely pretend to be, take, or use the title of doctor contrary to the provisions of the Act, should be liable to a fine not exceeding £20. Defendant was not registered, as would be conclusively proved. . . . What defendant had done was to use the prefix to his name of 'Dr.' He called himself 'doctor,' and he (Mr. Wansbrough) submitted that it was as clear as daylight that if a person practising in any way in the curing of people called himself 'doctor,' the suggestion was that he was a doctor of medicine; and if he was not registered he was undoubtedly liable to conviction. . . . According to advertisements, defendant practised as a medical electrician, and represented himself to be such. If in that connection he represented himself to be a doctor, then he (Mr. Wansbrough) submitted that, beyond question, he contravened the provisions of section 40 of the Medical Act, and that, not being registered, he was unquestionably liable to the fine provided for under that Act for each offence.

"Mr. Wethered, on behalf of the defendant . . . remarked that the use of the word 'doctor' did not necessarily imply that he was a registered practitioner under the Act. . . . To bring him within the Act, defendant must use some title which implied that he was a practitioner registered under the Medical Act. That he had not done. What was more, he never practised medicine, but practised treatment; nor did he hold himself out to be a medical practitioner in the ordinary sense. . . . The magistrates . . . were of opinion that—first, the defendant intended the public to believe that he practised as a doctor in healing disease; second, that he wrongly called himself doctor; and, third, that he did this for his own personal benefit, and thereby gained a livelihood."

Here, then, we have an instance of how the registering of a title or designation has again proved effective in protecting both the public and the fair name of an honoured calling. The Bench, moreover, appear to have been of opinion that the public had become habituated to associating those who use a certain title with those who discharge certain duties. Hence, if the Enrolment of Architects' Bill became law, the public would gradually come to understand that architects were only those who had received a certain training and pursued a certain calling. Thus the Bill would bring about a reform which, in the opinion of the vast majority of architects, is now become imperative.—Yours truly,

BRISTOL. HAROLD SMITH, A.R.I.B.A.

"Competition Design by Proxy."

To the Editor of THE BUILDERS' JOURNAL.

SIR,—In your recent leader under the above head you say that "if they (draughtsmen) have the ability to win competitions for their employers, they have it also for themselves." True, but if compelled by necessity to spend the best hours of the day "ghosting," only the most robust are able to compete on equal terms with those who can give all their time and attention to their own work. Competitive work, even when successful, means capital to start with. An architectural student does not become a draughtsman should he be able to provide for himself and his own without resorting to such speculative work as competitions.—Yours truly,

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Electrical Notes.

On Testing the Efficiency of Electric Lights.

Just as with heating apparatus it is difficult to determine the precise efficiency of any particular form, so in regard to the candle-power of artificial illuminants considerable difficulty is often experienced in ascertaining the exact figure. In this connection it is interesting to turn to the paper on "Some Recent Electrical Measuring Instruments" which Mr. Kenelm Edgcumbe, M.I.E.E., A.M.I.C.E., read before a recent meeting of the Junior Institution of Engineers. He made extended reference to photometers, which, though perhaps not strictly electrical instruments, are intimately connected with electric lighting. He observed that so long as lights of the same colour—or nearly the same colour—were to be compared, the difficulties were not great, and either a Lummer-Brodhun or a Trotter photometer would give perfectly consistent and accurate results. If, however, the lights differed in colour the problem became extremely involved. Some authorities had even gone so far as to say that it was incorrect to speak, for instance, of the "candle-power of an arc lamp" on account of the physiological effect of so white a light being different from the more yellow light of a candle. However that might be, it became absolutely essential to find some basis on which the illuminating power of various sources of light might be compared, even when as different in colour as the mercury vapour lamp and the flame arc. In all ordinary photometers the measurement consisted almost invariably in the comparison of two surfaces illuminated respectively by the two sources of light to be compared.

The brightness of one or both of these illuminated areas was then varied until, as nearly as could be judged by the eye, equality of illumination was attained. From a knowledge of the candle-power of the standard and the respective distances of the two lights from the screens the candle-power of the other light could be at once calculated: though in making this calculation it was to be remembered that the illumination decreased inversely as the square of the distance of the light from the screen. With any such photometer it was found, as might well be imagined, that to obtain a balance of illumination when the lights were of different colours was a matter of extreme difficulty.

To Overcome the Difficulty.

Mr. A. P. Trotter had suggested a method of getting over this difficulty, which consisted in employing two differently tinted screens to receive the two lights. For example, if an arc lamp was to be compared with a glow lamp standard, an orange-yellow screen might be employed for the arc and a bluish screen for the glow lamp. By choosing suitable tints the screens could be made to appear almost identical in colour when illuminated by their respective lights, and an accurate balance was easily obtained. The objection to this method was that a constant had to be found for each pair of screens, and this constant would depend upon the relative colours of the lights under test. Moreover, it could only be determined by comparing two known lights of the same colour by means of the screens, so that the difficulty of obtaining the constant, and the inaccuracy thereby introduced, was considerable.

The "Flicker."

Of late years the "Flicker" photometer had been coming into favour. The principle of this device, which was originally due to

the work of Hood, Whitman and others, was that the surfaces illuminated by the two lights to be compared were alternately presented to the observer's eye in rapid succession. If they differed to any extent in brightness a distinct flickering was noticeable, which diminished and eventually disappeared altogether as the two illuminations were made more and more nearly equal. It was, moreover, found that a perfectly definite point of balance could be obtained, in spite of all ordinary differences of colour.

All photometry was largely a matter of experience, and a practised observer could probably obtain more accurate results with a spot of candle grease on a sheet of note-paper than a novice could with the most perfect photometer extant, and one advantage possessed by the "Flicker," as compared with the ordinary photometer, was the great ease with which an ordinary observer could form an opinion as to whether or not any flickering was present in the field of view. In the hands of an experienced worker, however, so long as the two lights to be compared were of the same or nearly the same colour, the "Flicker" photometer was more sensitive than the ordinary Bunsen grease spot, though not so sensitive as either the Trotter or the Lummer-Brodhun; and, as regards lights dissimilar in colour, accurate results could be obtained by its means, as already pointed out, in cases where the ordinary photometer completely failed.

For street lights, too, photometers constructed on the "Flicker" principle were used. Associated with them was the vexed question of whether candle-power or illumination measurements should be made. All things considered, however, Mr. Edgcumbe thought that the best standard was a small 8 or 10-volt glow-lamp worked off a portable accumulator having a capacity of 15 or 20 ampere-hours.



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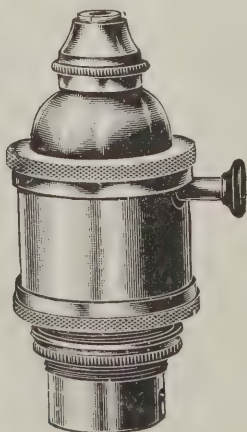
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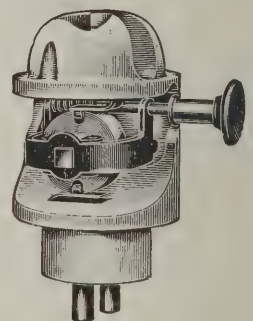
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Coming Events.

Wednesday, February 28.

NORTHERN ARCHITECTURAL ASSOCIATION.—Mr. J. B. Mitchell-Withers on "Early Eighteenth-Century Architecture," at 7.30 p.m.

INSTITUTE OF SANITARY ENGINEERS.—Mr. N. W. Hoskins on "Materials in Sanitary Work," at 7 p.m. (Students' Lecture.)

INSTITUTION OF CIVIL ENGINEERS.—Students' Visit to the Works of Messrs. Joseph Westwood & Co., Ltd., Napier Yard, Millwall. Train from Fenchurch Street at 2.12 p.m.

ARCHITECTURAL ASSOCIATION (Discussion Section).—Mr. E. C. M. Willmott on "Shop Fronts," at 7.30 p.m.

SOCIETY OF ARTS.—Capt. G. S. C. Swinton on "London Traffic," at 8 p.m.

Thursday, March 1.

ROYAL ACADEMY.—Sir William Richmond, R.A., on "The Evolution of Sculpture—Egypt and Greece."

CARPENTERS' COMPANY.—The Right Hon. James Bryce, M.P., F.R.S., on "The Relation of Architecture to History," Carpenters' Hall, London Wall, at 8 p.m.

BIRMINGHAM BUILDERS' EXCHANGE.—Mr. J. Millar Carr on "Architectural Ceramics," at 6 p.m.

CHEMICAL SOCIETY.—Ordinary Meeting at 8.30 p.m.

Friday, March 2.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—Prof. Beresford Pite on "Architectural Effect in Cities."

ROYAL INSTITUTION.—Dr. R. Caton on "Hippocrates and the newly-discovered Health Temple at Cos," at 9 p.m.

JUNIOR INSTITUTION OF ENGINEERS.—Meeting at 8 p.m.

Monday, March 5.

ROYAL ACADEMY.—Sir William Richmond, R.A., on "The Evolution of Sculpture—Egypt and Greece."

ROYAL INSTITUTE OF BRITISH ARCHITECTS.—Business Meeting, Election of Royal Gold Medallist, at 8 p.m.

SOCIETY OF ENGINEERS.—Mr. R. G. Allanson-Winn on "Submerged Chain Cable Groynes," at 7.30 p.m.

LIVERPOOL ARCHITECTURAL ASSOCIATION.—Mr. Charles Spooner on "Church Fittings," at 8 p.m.

Tuesday, March 6.

ARCHITECTURAL ASSOCIATION OF IRELAND.—Mr. W. J. Stewart on "Portable Buildings and Cheap Housing," at 8 p.m.

Wednesday, March 7.

NORTHERN ARCHITECTURAL ASSOCIATION.—Annual Meeting at 7.30 p.m.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Mr. R. S. Lorimer on "Scotch Gardens and Garden Architecture," at 8 p.m.

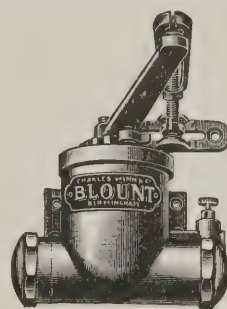
Thursday, March 8.

ROYAL ACADEMY.—Sir William Richmond, R.A., on "The Evolution of Sculpture—Egypt and Greece."

MANCHESTER SOCIETY OF ARCHITECTS.—Discussion on Students' Drawings at 6.45 p.m.

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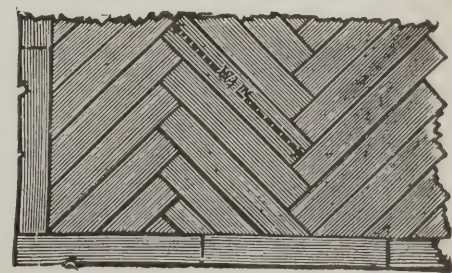
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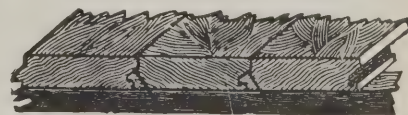
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WORKING FOREMAN PLUMBER, Gas and Hot Water Fitter, 35, well up in all trades. Thoroughly experienced in management and carrying out any kind of work. Draughtsman, and up to specification and contract. Town or country. Reliable and good character.—"EXPERIENCED," 124, Saltcott Road, Clapham Junction. 1684

Drawings, Tracings &c.

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PERSPECTIVES effectively executed. General architectural drawing.—C. H. SIMPSON, 12, Titchborne Street, Cambridge Square, W. 1650

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Appointments Vacant.

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WANTED, by an old-established firm of Manufacturers in London, a capable and energetic REPRESENTATIVE, acquainted with Builders, Contractors, and Engineers, to travel in part of London and Suburbs, and other places. Not more than 35 years of age. Unexceptional character and gentlemanly appearance. Remuneration, partly salary, partly commission. Good permanent post for suitable man.—Apply in first instance, with copies of testimonials, and stating remuneration required, to "MANUFACTURERS," Box 1678, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

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FOR SALE (by private treaty).—Plumbing, Decorating and Job Building Business, situate in the neighbourhood of Stroud; disposal solely through ill-health; excellent opportunity for carpenter and plumber; ingoing about £200.—For full particulars apply to NELMES, POOLE & ATKINS, Auctioneers, John Street, Stroud.

FOR SALE.—**BUILDER AND CONTRACTOR'S BUSINESS** in West of England Genuine concern, in same family nearly a century. £600 required or valuation.—Box 1673, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

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TO ARCHITECTS, BUILDERS, and ENGINEERS. MARTIN & SANDER, of 4, Manor Road, Stoke Newington, N., photograph this class of work, and can operate on short notice.

WOOD BLOCK FLOORING. Builders' own material laid; labour only or labour and composition; work done any time and any distance.—Address, A. KENT, 141, Church Road, Battersea, London S.W. 1637

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WANTED—Quotations, lowest cash price for one each of the following:—"Fletcher's History of Architecture"; "Rivington's B.C.," Part 3; "Moore's Sanitary Engineering"; "Pea's Estimating"; "Quantities," Davies; "Specifications," Leaning.—Address E. D. DENNIS, Sedburgh, Yorks.

YORK Stone Sills, Steps, Templates, and other worked stone cheap. Send for price list.—KELLY & Co., Stone Merchants, Mill Hill, N.W., and Kilburn, N.W.

SEE PAGES XXI AND XXII FOR EMPLOYMENT REGISTER.

5 O'CLOCK P.M. MONDAY IS THE LATEST TIME FOR RECEIVING "WANT" ADVERTISEMENTS.
OFFICE: 6, GREAT NEW STREET, FETTER LANE, E.C.

THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

February 28th, 1906.

CONTRACTORS' SUPPLEMENT (MONTHLY).

FOREWORD.

IT is our opinion that a trade paper such as THE BUILDERS' JOURNAL should provide information on every side of the architectural profession and the allied building trades, so as to be not only a means of intercommunication, but sufficiently comprehensive to save busy men—and who is not busy nowadays?—from having to seek in several journals the news connected with their business.

With this object in view we are continually extending our sphere. Lately we have directed particular attention to the structural side of architecture, and also have added a supplement devoted to fire-resisting construction and fire-prevention. We feel now, by adding the "Contractors' Supplement," that we reach the "headstone of the corner" of the journalistic edifice which we have been building these eleven years.

The special information that this "Contractors' Supplement" will deal with may be briefly summarized as follows:—

Lists of current prices of specialties and of commodities sold in the open market.

Reports on the various trades that make up the building industry and from the chief centres, contributed by special correspondents, such as:—

The Stone, Granite and Marble Trades.

The Slate and Tile Trades.

The Clayworking Industry.

The Cement Trade.

The Ironmongery Trade.

The Timber Trades.

The Paint Trade.

The Metal Trades.

The Glass Trade.

The Wallpaper Trade, &c.

Reports on openings for trade at home and abroad.

Notes on the labour market and current rates of wages.

Illustrated articles by eminent authorities on innovations in the erection of buildings, &c., the organization and office work of builders' businesses, contractors' plant, new materials, new appliances and new methods of manufacture, &c., &c.

Interesting personal news and notes.

Information on Contracts open for tendering, in extended form.

The ordinary issues of THE BUILDERS' JOURNAL will be enlarged when necessary to include news of momentary currency, such

as contracts open, tenders, market prices, bankruptcies, &c., upon the lines adopted in this supplement.

It is always impossible to perfect the organization of a new feature by the first issue, and we therefore ask the indulgence and assistance of our readers. There are many details which have not yet been worked out, and we feel that the information as regards prices and trade reports on the various industries are not complete. We shall be glad to receive information regarding business happenings, changes in prices, openings for trade, &c., and shall be pleased to consider articles and illustrations on subjects of interest to contractors and others engaged in the execution of building works, new methods of construction, &c.

No extra charge will be made for these monthly supplements. We feel they are needed, and that our efforts to make THE BUILDERS' JOURNAL strong in character, attractive in contents, and necessary in information will compel the attention of all architects and builders, thus making this publication one of the essentials of their business life.

We count on the support of our many friends to make these supplements valuable aids towards the advancement of the building trades.

BUILDERS AND BUILDING.

By Howell J. Williams, L.C.C.

I HAVE been asked to contribute to this "Contractors' Supplement" the first of a series of articles by builders and others connected with the building trades. The only difficulty I experience is as to the special side of building or builders' work which I should take as my subject, but perhaps I cannot do better than give a series of observations upon the changes that have occurred during my own business career of more than twenty years. That there have been great changes from the builder's standpoint during the past quarter of a century will be readily apparent to everyone.

Masters and Men.

The old order, when the builder was practically an autocrat and could "say things" to workmen and foremen, has now almost passed away, owing to the more or less successful combination of the men in their trade-unions—combinations of considerable strength which have resulted in much greater independence for the men. The great strikes of former years have taught both sides useful and necessary lessons. The builder has learnt that workmen are entitled to consideration as regards their hours of labour and wages, and also in the way they are treated. He has realized that it is for the best that a minimum wage should be established in order to prevent unscrupulous employers obtaining an advantage over their more honourable competitors by beating down individual workmen to get their labour below the fair minimum. The strikes have also caused employers to strengthen their



FIG. 1.—FOUNDATION WORK AT THE "DAILY MAIL" BUILDING.



FIG. 3.—STEELWORK AT THE "DAILY MAIL" BUILDING.

position, by uniting in an association for their mutual protection; and now that the organizations of both sides have gathered such strength, the risk of disputes being decided by the old barbarous methods of strikes has been considerably lessened, for both have come to agreements in respect to rules for conciliation and arbitration. All this shows that there has been a general growth of good feeling not only among the men but also among the employers.

It is a matter for discussion whether the near future should not see this method of conciliatory settlement of disputes extended still further by the promotion of compulsory arbitration.

The Old and the New Builder.

The growth of these organizations, together with other causes, has, however, had a tendency to so increase the capital required in a large builder's business that the old-fashioned builder—the man who had risen

to be a large contractor from a bricklayer, a stonemason, a carpenter or even a navvy—is now almost passing away. Perhaps we may have cause to regret the disappearance of the builder who has had individual training and has become a master of one or perhaps more of the trades that constitute the building industry. Many of the chiefs of our large building concerns at the present time are financiers and gentlemen with office training who delegate to various heads of departments and foremen the control of the work, so that nowadays the personal heads of many businesses are not always intimately acquainted with the work they are carrying out. Particularly must this be so in the furnishing and drapery firms who are pushing into heavy building work by their financing "wheels within wheels" methods. It is not every builder whose name may be associated with the erection of an

important building who would be able to personally superintend the work in any one of the trades that might be concerned. The tendency is for builders to become less and less men of sufficient experience to be able to direct operations. This, owing to the rapidly developing modern system of contracting, is by the latest indications likely to be extended by

The Americanizing of the Building Trades.

I do not say whether it would be for better or for worse to see in London such a firm as the George R. Fuller Building Construction Co., of New York and Philadelphia, established with a capital of £20,000,000 sterling, whose operations include the buying-up of



FIG. 2.—CLEARING THE SITE FOR KLEINWORT'S NEW BANK IN FENCHURCH STREET, LONDON.



FIG. 4.—THE PARTIAL FRAME CONSTRUCTION AT THE "DAILY MAIL" BUILDING.

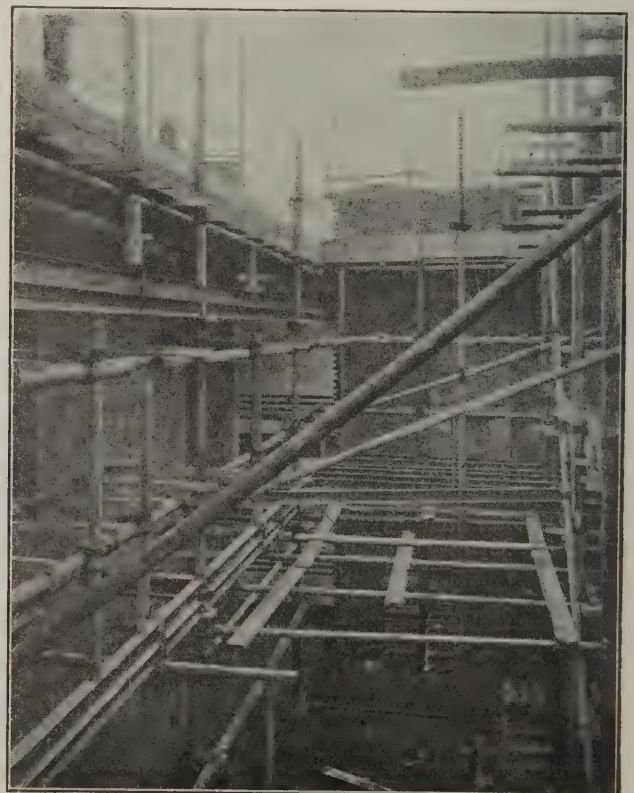


FIG. 5.—SHOWING PROGRESS MADE WITH MAIN WALLS WHILE WAITING FOR STEELWORK FOR FLOORS BETWEEN.

sites for the erection of buildings and the sale of the completed article to the customer, thus abolishing the present system of architect and builder; but if such companies really came into existence in this country they would certainly destroy the builder and very largely the architect too.

Increasing Difficulties for the Builder.

At the present day the builder has to encounter much greater difficulties than he had twenty years ago. There is the problem of rebuilding premises in increasingly congested centres. Then there are the greater difficulties created by amendments to the various building Acts, and the anomalies existing in the by-laws of central and local authorities, these being seldom administered with that common-sense and reasonableness which they should be, being too often interpreted in a cast-iron manner without any appreciation of the fact that circumstances alter cases. The responsibilities of the builder owing to the Workmen's Compensation and other Acts having a direct bearing on the trades are greater now than they were formerly, and they have given rise to the modern insurance system.

Again, far-reaching changes have been wrought by scientific progress in the direction of sanitation and ventilation and other matters that have resulted in the greater elaboration of modern buildings. Everything nowadays seems to be specialized, and the builder is only left to execute the carcass. All this tends more and more to make him

An Office Man

rather than a master of trades. I have an instance in mind of a job where the builder's actual priced work was a small sum of about £6,000, and the provisional sums were in excess, so that the total cost of the job was about £14,000. The builder is not only called upon to pay these provisional sums but has to pay the district surveyor's fees, and so act as the general financier.

Another of the great difficulties of the latter-day builder is the

Lack of Really Trained Men

with the ability and capacity, nerve and strength of will to take charge of works. This is undoubtedly due to the persistent decay in the apprenticeship system, although possibly it may also be due to the lack of prizes and rewards adequate to the enormous amount of detailed knowledge required. The salaries and wages of foremen are not such as to tempt men to devote the requisite time to technical instruction and training that is necessary in addition to the personal experience of a craft. We might do well to adopt some such system, to occupy the place of the apprenticeship system, as that of the Boule School in Paris, where in certain trades connected with the building industry boys are apprenticed to the municipality for four years, beginning at about the age of thirteen, and are thoroughly trained in both design and craftsmanship, their general education being continued for about one or two hours every day while they are learning their craft. We need some such set of highly-trained craftsmen to form a leavening in the building trades to-day in order to give the necessary stimulus to efficiency.

The almost insurmountable obstacles, however, to men with such qualifications being able ever to become master-builders on their own account under modern conditions is again a factor in preventing some of the best talent remaining in the building trades. The difficulties of obtaining an opportunity of securing sufficient capital and the necessary entrée into the "invited to tender" lists of the architectural profession are almost insurmountable, and the chances of young men establishing themselves as builders to-day are infinitely fewer than they were years ago. Many architects might be the making of young men in this direction, but

fail to give them the necessary opportunity, preferring to ignore the personal man with whom they might do business and to run after a name in connection with a firm the founders of which have passed away years ago, the management now being in the hands of the class referred to above.

The writer can never forget his indebtedness to two or three well-known architects in the City, particularly the late Mr. George Barnes-Williams, who gave him his first opportunity of a fair-sized job, which would now have been given to an established firm able to show photographs of fine buildings erected by them.

Competition.

The difference between competition in the architectural profession and in the building trades is that, whereas open competitions have given their chance to some of our most brilliant young architects with ability and genius, on the other hand the most brilliant of technically and manually trained artisans, even with all the qualifications necessary for master-men, never get a chance of showing their capacity as master-builders, for the competition has to be one of price, and the more reckless or the largest speculator—and sometimes the keenest candidate for the Bankruptcy Court—is the one who obtains the work.

Cheapness nowadays covers almost everything, and a good builder, master of his business and its detail, able to take personal responsibility and control, may be passed over, leaving him without a continuity of employment for his employees, the want of which is one of the greatest curses of the building trade of the present day.

On Behalf of the Workman.

One frequently hears the phrase, "A fair day's work for a fair day's pay," and talk of the difficulty the employer has to obtain it from his workmen, but it is to be wondered at that the workman's heart and soul is not in his work, particularly as regards expedition, when the probability is that directly he has completed his work the reward he will receive will be his discharge. It may be that some other method of remuneration than the hour wage is needed in the building trades in order to encourage and bring out the best in the British artisan. One may well doubt the all-sufficiency of technical institutes—even scholarships—to which he is expected to apply himself voluntarily after his day's work.

The question as to adequate reward and remuneration for the best services, either by masters or by men, apart from specialists, is

always worthy of consideration, provided there is a fair equivalent in value.

I now come to the second portion of my subject, namely,

The Methods of Building.

These have altered very considerably, together with the improvements and specializing in almost every branch of building work. This has led to contractors' work tending more to engineering than to building work.

Upon the more general aspect we may note a change in regard to the provisions of basements in buildings. Often, indeed, there are two basements. Owing to the electric light, however, they are no longer dark cellars but constitute valuable spaces.

The rebuilding of premises in restricted areas necessitates much greater care in demolition, and the existing regulations regarding the carriage of materials during certain hours, so as not to interfere with business in the City of London, and also with the object of avoiding nuisance from dust, give much more trouble to the builder. (See Fig. 2.)

Commercial interests have again required the builder to proceed with greater speed than formerly. He often has to work night as well as day.

Improvement of Plant.

There has been an improvement in plant for the erection of buildings. Firstly, we have the Scotchman (or derrick) on a gantry, and latterly electric lifts have been arranged to raise materials to their positions. There has also been a change in building construction.

When the writer first started in business, flitch-plates were introduced in a beam; when extra strength was required; then followed cast-iron stanchions and bressummers, these giving place to wrought-iron, and latterly steel and the numerous patent systems of concrete and fire-resisting construction.

Iron and Steelwork.

Iron and steel were first used to a very limited extent, and the building by-laws and regulations did not aid in the development, requiring brickwork to be supported by brick or stone to the foundations. In the "Daily Mail" offices (which the writer constructed in 1898) this system of using steelwork as an aid rather than a dominant partner in the construction is to be seen. Fig. 3 shows how the steel was encased in brickwork, the stanchions seldom extending beyond two floors, one of the longest being shown in Fig. 4. The girders generally took a bearing upon stone templates built into the brickwork. Such a system, it will be readily understood, is not



FIG. 6.—SHOWING UNDERPINNING OF GANTRY.

altogether satisfactory. It continually causes delays, because in some cases the contractor would be waiting for the steelwork, and as soon as he was started the steelwork contractor would have to wait for the general contractor. Fig. 5 shows how the writer found it desirable to proceed with the erection of the walls, leaving open a portion waiting for the steelwork. It is much more convenient, of course, to complete floor by floor, and thus such a partial frame system is undoubtedly not so advantageous as a complete steel frame such as was adopted recently at the Ritz Hotel. Here it will have been noticed that the steelwork was the most important part of the structure, this being erected complete and being self-supporting. The "Daily Mail" offices may be cited as one of the first examples where the steel grillage foundation was adopted (Fig. 1). It was almost an unheard-of thing at one time to extend the concrete in the foundation over the whole site as well as in the trenches, and of the same thickness, though the concrete raft has now become quite customary. In this instance, however, the foundation work was taken a step further by the steel grilles and frames being embedded in the concrete raft. This job was completed in the very short time of seventeen months, and is an instance of how the contractor is often interfered with by the client desiring to use a portion of the building before it is all completed. Fig. 6 shows the rolls of paper for the machines which were already working in the basements, although the construction had not proceeded above the first floor. This figure also has reference to the consideration of the steel frame in relation to the advantages afforded in

The Saving of Scaffolding.

In the American steel frame system the derricks are taken up with the steelwork, and the scaffolding consists of staging supported out from the steelwork. This view shows how at the "Daily Mail" offices the proprietors required to use the floors before the contract was completed, necessitating the underpinning of the Scotchman, the legs of which are to be seen supported on temporary steel girders.

These are a few only of the changes in methods of building, the limitation of space in these columns alone restricting reference to further examples, but they suffice to indicate the altered conditions of builders and building to-day, and the influence of the steel and other specialists dominating modern building.

New Companies.

WOLNA SCAR GREEN SLATE CO., LTD., Broughton-in-Furness. Capital: £1,128.

LONDON PAINT AND VARNISH CO., LTD., to acquire the business carried on at West Drayton, Middlesex, as the Resilta Co., and to adopt an agreement with Patents and Industries Ltd. Registered office: 3, London Wall Buildings, E.C. Capital: £10,000.

PEERLESS PATENTS CO., LTD., to acquire the business carried on by S. Booth at Bridge Mill, Warrington, as the Peerless Patents Co., and to carry on the business indicated by the title and that of builders' merchants, manufacturers of and dealers in stone, slate, clay, timber, &c. Capital: £7,500.

Portsmouth Master-Builders' Association.—Mr. G. R. Chamberlain has been elected president of this Association for the current year.

The Association of Master-Painters in Scotland held its annual meeting at Aberdeen recently, when Mr. Alexander Latto, of Aberdeen, was elected president. The next annual meeting will be held at Glasgow.

An "At Home" in connection with the Edinburgh and Leith building trades was held in the Royal Hotel, Edinburgh, on Thursday evening last. The function was under the auspices of the Master-Builders' Association and the Building Trades' Exchange.

THE LABOUR MARKET.

Board of Trade Returns for January.

THE Board of Trade returns show that employment in the building trades remained dull in January, and showed little change as compared with a month and a year ago. Returns from fifty-three London employers showed that in the last week of January they paid wages to 9,961 workpeople of all classes, compared with 9,745 in December and 11,127 in January, 1905. Employment generally in London was rather worse than a month ago, and much worse than a year ago. Returns from employers' associations in sixty-three districts outside London stated that in three-fourths of them employment was the same as a month ago, and in one-sixth, including Halifax, Birmingham, Swansea and Aberdeen, it was worse than a month ago. Compared with a year ago, employment was reported worse in twenty-six towns and about the same in thirty, while in seven it was better.

Bricklayers

have experienced bad employment generally, but it has been moderate at Stockton, South Shields, Oldham, Stockport and St. Helen's; fair at Bootle and Coventry; improving at Bath, Swindon and Croydon. At Glasgow and Greenock it was worse than a month ago. A report from Leeds states that some men were migrating from that town to Lancashire, where some large mills were in process of erection.

Stonemasons

found employment much the same as compared with a month ago, and in England as compared with a year ago, but it was worse than a year ago in Scotland. Employment improved at Bristol, but at Dundee it was worse than a month ago. The strike of 716 quarrymen at Nantlle which began on December 4th and lasted forty-five days has been settled by the men accepting the proposed reduction of wages of 10 per cent. 1,500 Weardale limestone quarrymen have secured a small advance.

Carpenters and Joiners

With carpenters and joiners employment on the whole was worse than a month ago, the decline being chiefly in London and the Midlands, while in the Eastern Counties there was an improvement. The percentage of trade-union members unemployed at the end of January was 10.1, as compared with 9.6 in December and 11.6 in January, 1905.

Slaters and Tilers

found employment very bad in England and Ireland. Much short time was reported. A strike began on January 15th of about 400 slaters in eleven towns in Northumberland, Durham, Cumberland and Cleveland, Yorks, against a proposed reduction in wages from 10d. to 9½d. per hour. No settlement is yet reported.

Plumbers

With plumbers employment was slightly better in the Northern Counties but worse in every other district, the greatest decline being in the Midlands and Ireland. Compared with a year ago there was considerable improvement in the Northern Counties and Ireland, and some improvement in Scotland, elsewhere there was a decline, which was most marked in London.

Plasterers and Painters

Employment with plasterers continued bad, and in Scotland was worse than a month ago, but with painters employment showed a general improvement as compared with a month ago. It was still generally bad, however, though fair at Bolton and Northampton, moderate at Birmingham, Dewsbury and Stalybridge, and fairly good at Stafford.

A joint conference was held last week at Newcastle between representatives of the Building Trade Employers' Association and the Newcastle and Gateshead and South

Shields branches of the National Association of Operative Plasterers, with a sub-committee of the Newcastle Education Committee acting as intermediary, when several alterations in the working rules governing the plasterers' trade were agreed upon, the revised regulations to come into operation from Monday last. It was mutually agreed that the standard rate of wages should be 9½d. per hour.

Current Rates of Wages in Large Centres.

Towns.	Masons.	Bricklayers.	Carpenters and Joiners.	Plasterers.	Slaters.	Plumbers.	Painters.	Labourers.
Aberdeen -	d. 8	—	d. 8	d. 8	d. 8	d. 8	d. 8	d. 4½-5½
Accrington -	9	9	8½	9	7½	8½	—	5-5½
Ashton - under-Lyne -	9½	10	9	10	8½	9	8½	5½-6½
Barnsley -	9	9	8½	9	8½	8	8	6½
Barrow-in-Furness -	9	9	8½	9	9	8½	8½	6-6½
Bath -	7½	7½	7½	7½	7½	7½	7½	5-5½
Belfast -	8½	8½	8½	8½	8	8½	8	19s. wk.
Birkenhead -	9½	9½	9½	9½	9	9½	8½	5-6½
Birmingham -	10-10½	9½	9½	10	9	9½	8½	6½-7
Blackburn -	9½	10	9	9	9	8	8	5½-6½
Blackpool -	9½	9½	8½	9½	8½	9	8½	5½-6½
Bolton -	9½	10	9½	10½	9	8½	8½	6-7
Bournemouth -	8½	8	8	8	8	8	8	5½
Bradford -	9	9	8½	8½	9	9	8	6-6½
Brighton -	9	8	8	8	8	9	7	5½
Bristol -	9	9	9	9	9	9	8½	8-8½
Burnley -	—	—	8½	—	—	—	—	—
Burton-on-Trent -	8½	8½	8½	—	—	—	—	5½-6
Bury -	9	10	9½	9	9	9	8½	5-6½
Cardiff -	9	9	9	9	9	8	8	5½
Carlisle -	8½	8½	8	8	9	8	8	5-5½
Cheltenham -	8	8½	8	7½	8	8	8	5½
Cork -	7½	7½	7½	7½	7½	7½	7½	5
Coventry -	7½	8½	8½	8½	8½	8	8	5
Crewe -	8½	8	7	9	8	8	7	5
Darlington -	9	9	8½	9	9½	8	7½	6
Derby -	9	9	8½	9	9	8½	7½	5½-6
Dublin -	8-8½	8½	8-8½	8	8	8½	7½	4½-4¾
Dudley -	8½	8	8	8½	8	8	8	5½
Dundee -	8-8½	10	9	8½	8½	8½	8½	5½-5¾
Eastbourne -	8	8	8	9	pce.	9	7½	5
Edinburgh -	8½	9½	9	—	—	—	—	—
Exeter -	8	8	7½	7½	7½	9	6½	5
Glasgow -	—	9½	10	9½	9	7½	9	5½-6
Gloucester -	7½	8	8	7½	7½	8	7½	5
Greenock -	9½	10	9	9½	9½	9	9	5½
Grimby -	—	9	8	9	pce.	9	7½	6-6½
Halifax -	9	9	8½	8½	8½	8½	7½	6
Hartlepool -	9½	10	9½	9½	—	—	—	7-7½
Hastings and St. Leonards -	8	8	8	8	—	8	7	5½-6
Huddersfield -	9	9	11	8½	9	7½-8	7	6½-7
Hull -	9½	9	9	9	9	9	8	6½-7
Ipswich -	8	8	8	8	9	8	7½	5-5½
Keighley -	8	8½	8	7½	8½	7	7	6
Leeds -	9½	9½	9	10	9	9	8	6½-7
Leicester -	9	9	9	9	9	9	8	5-6
Lincoln -	8½	8	8	9	8	8	7½	5-6
Liverpool -	9½	9½	9½	9½	9½	9½	8½	5-6
London -	10½	10½	10½	11	—	11	—	—
Manchester -	9½	10	9½	10	9	9½	8½	5½-7
Merthyr Tydfil -	8½	8½	8	8½	8	8	7½	5½
Middlesbrough -	9	9½	9½	9½	10	9	8	6½-7
Newcastle -	9	9½	9½	9½	10	9	8	6½-7
Newport (Mon.) -	8½	8½	7½	8½	8½	8½	7½-8	5½
Northampton -	8½	8½	8½	8½	8½	8½	7½-8	5½
North Shields -	10	10	10	10½	9½	8½	8	6½-7
Norwich -	8	8	8	8	9½	8	6½	5
Nottingham -	9	9	9	10	9	9	8	6½-7
Oldham -	9½	10	9½	9	8½	9	8½	5½-7
Oxford -	8½	8	8	8	8	8	7	5½
Paisley -	9	9½	9	9	9	9½	9	6
Plymouth -	8	8	8	8	8	8	7	5
Portsmouth -	8½	8½	8	8½	8½	8½	6½-7	5
Preston -	9	10	9	8½	8½	8½	8½	5½-6
Rochdale -	9½	10	9	9	8½	8½	8½	5½-6
Rotherham -	9½	9½	8½	8½	8	8½	7½	5½-6½
Sheffield -	9½	9½	9	9	pce.	8	7	6
Southampton -	8	8	8	8	9	9	8½	6
Southport -	9	9	8½	9	—	—	—	—
South Shields -	9½	—	9½	—	10	8½	9	6
St. Helens -	9	9	9	9	9	8½	8½	5½-6
Stockton - cn. Tees -	9	9½	9½	9½	10	9	8	6½-6¾
Stockport -	9½	9½	9½	10	8½	8½	8	4½-7
Sunderland -	9½	10	9½	10	10	8	9	6½-7
Swansea -	8½	—	8½	8½	—	8½	7½	5½
Swindon -	—	—	—	—	—	—	—	—
Wakefield -	9	8½	8	8½	8	7½	7½	6
Walsall -	9	8½	8½	8½	8	7½	7½	5½-6½
Warrington -	8½	9½	9½	9½	8½	8½	8	5½-6½
West Bromwich -	9½	9	8½	9	pce.	8½	8	6-6½
Wigan -	9½	10	9	9	8½	9	8½	5½-7
Worcester -	8½	8½	8½	8½	8½	8½	7	5½
Wolverhampton -	9	9	8½	8½	8½	8½	7	6-6½
Yarmouth -	7	7½	7½	A	7½	7½-7	6	4-4½

A. Done by bricklayers.

The Month's Trade.

(Reports by our Special Correspondents.)

STONE, GRANITE AND MARBLE TRADES.

We have heard on all sides that these industries are depressed, but quarryowners and stone and marble workers look forward to a revival of trade in the near future. The labour returns of the Board of Trade again show that employment in January was slack, as it has been for many months. As regards limestone, the reports for January show, however, that employment was good in Cumberland and Weardale. Employment was moderate in the Buxton district, where the weather interfered somewhat with work, but work was dull in the Plymouth district. It was dull also at the Bath stone quarries in the Bristol district, being about the same as a month ago and a year ago.

In other stone January showed that employment was moderate in the building-stone quarries in the Rowsley district and was slightly better than a year ago; employment was also moderate at Barnsley, but slack at Normanton. In Forfarshire employment continued bad, and short time was worked.

With granite workers employment continued dull on the whole in Aberdeenshire, and much short time was worked. It was bad also in Devonshire and Cornwall.

The monthly returns for imports of stones, slabs and marble, rough, hewn and manufactured, for the month ending January 31st, 1906, as compared with the same month in 1904 and 1905, are as follows:—

Tons.			Value.		
1904.	1905.	1906.	1904.	1905.	1906.
112,113	88,585	109,803	£125,429	£99,324	£122,174

Portland Stone.

The production of Portland stone on the island in Dorsetshire has, since the beginning of the year, been of a very fluctuating character; high winds, rain and gales such as are seldom experienced in London have prevented the steady output of this famous building stone. There are indications of a distinct falling-off in the sale of Portland stone, which appears to have been one of the last in the stone trade to feel the effect of the general depression in the trade. But Portland stone has been looked upon so much as an ideal stone for London that there is little doubt that when building schemes reach fruition it will again be in great demand. The output has grown with the demand, as the enormous Government buildings which have been erected, and are now being erected, in London have set the pace, and also the standard in both quality and workmanship. The Combefield Quarries, one of the largest in the island, are in full work, but those to the south of the cliff only work intermittently in consequence of the weather. Kingbarrow, from which the stone was taken for the new War Office, is not so busy, but we understand that the stone from this district has been booked for several large contracts.

Bath Stone.

The Bath stone trade was in a more or less depressed state throughout the whole of last year, and so far shows little signs of a revival. It is satisfactory to note that the principal demand is for those quarries which have created for themselves a name and standing for their high quality and soundness. The Monk's Park Quarries and the Box Ground are having a large share of the trade, while the masonry works at Box and Corsham are producing finished work in quantity equal to the corresponding month of 1905. There never was a time when greater care was exercised in the production of Bath stone of an approved quality, and the firms engaged in this industry look forward to increased trade when the turn of the tide comes. The prospects for the present year

are more favourable. Many large buildings are in contemplation, and numerous applications are daily received from contractors and builders for prices of block and stone worked ready for fixing. Bath stone is well known all over the country for its free working and handsome appearance, and durability as a weather stone if used on its proper bed. Large stocks are on hand of summer-dried stone ready to meet any emergency. A new quarry has been developed at Gastards, adjoining Monk's Park, which will largely add in the future to the output of the Bath stone series.

Marble.

The depression in the money market naturally affects the marble industry closely, because building owners are first to substitute other forms of decoration and imitations for such expensive work. The largest marble contracts of late have been the Lambeth municipal buildings, the Victoria Memorial and the Victoria and Albert Museum. These of course, are public works, and private persons and companies do not seem able yet to afford to use this most beautiful material to any large extent.

Granite.

Granite seems to be increasingly used in buildings, but much of the work is going to Norway, which is certainly supplying a good deal that is good. Aberdeen continues to hold a front place among native granites, but we hear of attempts being made to develop Irish and Cornish granite. New works in Galway will shortly be entering the market with very fine grey and red varieties. When trade revives, granite workers look forward to a large share of work.

THE SLATE AND TILE TRADES.

The slate trade still continues to be in a state of great depression. With the exception of Lancashire, South Wales and the neighbourhood of Leicester, no improvement seems to be taking place, and there appears to be little immediate prospect of better times during this year. Most of the quarries in Wales are at present working on short time, and with few exceptions there is little difficulty in obtaining supplies readily, but there is great difficulty in obtaining the larger sizes of Welsh slates, especially 24ins. by 12ins., unless considerable notice is given of requirements. The demand for this slate is very great in South Wales and Ireland, and it is to these localities that the bulk of the output of this size is sent.

In London and the south-eastern counties there seems to be a more general depression than in most other districts in England, especially in the country. There is a considerable demand at the moment for Westmorland slates in the northern counties, several large municipal buildings where these slates have been specified being now nearly ready. The demand for this roof covering in the London district has been very small, one reason being that the area covered with slates has decreased considerably during the past few years in favour of lead or asphalt flats, and the tendency in future would seem to point to a reduction rather than an increase in this respect.

The import of foreign slates has decreased very considerably during the past three years, the imports in 1903 having amounted to about 120 M tons, in 1904 to 87 M tons, and in 1905 to 72 M tons. A very large proportion of these slates find their way into the London market, most of them being used for speculative work in the suburbs. In spite of the large decrease in the import of these slates (which are obtained chiefly from France) it is still difficult to find a lucrative market for Welsh slates of any description.

The demand for tiles and tiling is much

better than in the case of slates, and there seems at the present time to be a distinct revival in favour of tiled roofs. The works producing hand-made sand-faced tiles appear to be holding their own, and they are still able to retain prices, whereas the prices for slates generally have fallen very considerably during the past year. The tiling works are able to be generally busy, and in certain instances are delaying dispatching consignments.

The tiles from the Broseley and Staffordshire districts seem most in favour. The prices are reasonable as compared with the country-made tiles. This is accounted for by the regularity of their make and the decrease in the cost of labour in making them, and a practical immunity of breakage in transit, and, as an instance, prices for these tiles compare favourably in the Brighton and Eastbourne districts with those in the immediate district. There is an increasing demand for old tiles, which in most cases there is great difficulty in supplying. There is no regular market for these, and country builders who may be fortunate in possessing them in any considerable quantities are not usually disposed to part with them on any terms.

Labour.

The labour market so far as slaters and tilers are concerned is fairly free, and the relations between employer and employee are on the whole satisfactory. Of late there has been a dispute between the masters and the men on the north-east coast over the question of a reduction in wages, a strike having lasted about five or six weeks. We understand, however, that a settlement has now been effected.

THE CLAYWORKING INDUSTRY.

The clayworking industry is very depressed at the present time. Bricks are so integral a part of the general building trade of the country that the limitation of building throughout the country has been felt very much by the manufacturers. The result has been excessive competition for the small volume of trade doing, and the consequence is that there is little profit to be made—the business is like giving two half-pennies for a penny. The common brick trade, such as in Flettons and stocks, is in a serious state, and it will be some time before it revives. The glazed brick trade is almost as bad. Flettons have now displaced stocks for general cheap work, and the latter are now being used mostly for facings. Makers find difficulty in getting rid of their inferior qualities, and builders are forced to pick the stocks themselves if the specifications require them. A few makers have been smart enough to spend their energies in producing porous clay fire-resisting floor and partition blocks and bricks, and have secured a good many large and remunerative orders recently. Terra-cotta is likewise largely unremunerative, except perhaps the glazed kind, *i.e.*, faience, which is coming more extensively into use in our smoky towns, for which it is most suitable. Glazed tiles are naturally likely to be increasingly used. Glazed sanitary ware is in less request than some time ago, but this is also a growing feature. Comparing the general level of wholesale prices for bricks in recent years with the Board of Trade index number of 100 for the base year of 1871, we see a general decline. The mean for 1871-1880 was 99.5, for 1881-1890 it was 84.9, for 1891-1900 97.3, for 1901-1905 92.21, for 1903 and 1904 90.09, and for last year 88.5.

The Board of Trade returns for January show that employment in the brick and tile trades generally was slack, and about the same as for several months past. It was still good, however, at Exeter, and fair in South Wales.

THE PORTLAND CEMENT TRADE.

Portland cement manufacturers have not yet shared in the briskness which prevails in the iron and general metal trades.

In the year 1900 a great change took place in the Portland cement trade. Some thirty manufacturers, having an annual capacity of nearly 1,500,000 tons, combined together, and now trade under the title of the Associated Portland Cement Manufacturers (1900), Ltd. It is an open secret that on the formation of this company consumers very generally became apprehensive as to the prices they would be called upon to pay for Portland cement in the future, thinking that the combine would adopt the policy which is so general in other directions of making use of their power to force prices upwards. So pronounced was this apprehension that many important buyers in this country, including one of the leading Government departments, actively concerned themselves in arranging for their future supplies from the Continent, but these fears were soon allayed, and consumers now generally recognize that new departure was telling to their interest. The exchange of ideas of managers controlling various works have naturally resulted in various economies taking place, coupled with a substantial improvement in quality, while the fact of one large organization working under one office has also tended towards the same result. This has benefited the consumers, as the company has by their efforts been able to reduce their prices during the five years by several shillings per ton.

A marked feature in the trade during the past few years has been the importation of large quantities of Belgium natural cement into this country, but owing to the introduction of the British standard specification, and a general awakening on the part of the consumers to the inferiority of the natural product, these importations have largely diminished, and it may now be safe to say that this indifferent and unreliable product is only used surreptitiously or for inferior work. In these days the Portland cement industry is not entirely dependent on the building trade, as concrete in which cement enters so largely is every year becoming more popular not only for building but for general constructional and civil engineering works, and this, with the expected increase of trade, leads manufacturers to expect better times.

Perhaps the brightest feature in the outlook, apart from the improved general trade position, is the growth in the number of uses to which Portland cement is now being put in this country. In this respect it is notorious that we have for a long while lagged behind other countries, notably the United States, France and Germany, but our engineers and architects appear at last to have begun to realize the advantages of reinforced concrete as a constructional system, and in the near future very great developments in this direction may be expected.

There are further very large schemes on the tapis in various parts of the world, such as the Grand Trunk Pacific Railway of Canada, various railways in the Argentine, Dock extensions in Chili; and in Europe there is a new Baltic canal in contemplation, also an expenditure of £10,000,000 on the Antwerp Docks, which together with the intention of many of our harbour authorities to provide increased accommodation for the very large mercantile boats that are now built, should lead to a very large consumption of cement.

It is the knowledge that these various civil engineering schemes are in contemplation, and the expectation that spring will bring an increased demand for the general building and contracting trades, that produces the feeling that exists amongst manufacturers that prices have now touched bottom, and that within a few months we shall see enhanced values.

THE TIMBER TRADE.

The Board of Trade reports that employment in January with mill-sawyers and woodcutting machinists continued dull, but was better than a year ago. Trade unions with a membership of 4,422, showed 231 (or 5·2 per cent) unemployed at the end of January, compared with 6·6 per cent. at the end of January, 1905. Employment was reported as good at Coventry and Wellington; as fair at Birmingham, Lancaster, Liverpool, Preston, Huddersfield, Reading, Edinburgh, Aberdeen and Glasgow; as improving in the Shields district and at Sunderland and Loughborough; and as moderate at Oldham, Bradford, Chorley and Darlington.

The London Market.

We have published a monthly report on the timber trade for some time now. January's news have already been given in our columns, and the full February reports are not yet to hand. The mid-monthly report with regard to hardwoods, from Messrs. C. Leary & Co., states that the consumption of mahogany is satisfactory, and with restricted supplies a practical certainty for the present values will doubtless tend to harden; with the exception of moderate quantities of Honduras and Cuba, first hand stocks are almost non-existent.

As regards cedar, Mexican, Honduras and Panama descriptions still command high prices. Cuba and Trinidad are in excellent request, and further shipments are wanted.

The Liverpool Market.

Builders' timber has been in good demand since the disturbance caused by the general election subsided. Much has been sent inland by rail. A considerable number of deals have been supplied to large users at Earlestown, Newton-le-Willows and the vicinity, where engineering and railway wagon work are carried on. Deals, flooring boards and other builders' woods have also been sent in some quantity to towns on the borders of Lancashire and Cheshire, between Warrington, Stockport and Ashton-under-Lyne, when important industries and some large new buildings are in progress. The prospects for the spring, so far as consumption is concerned, are good at present.

The regular "liners" have brought steady, though moderate supplies of these woods from St. John's, which have gone far towards counterbalancing withdrawals from stocks. The aggregate stock of New Brunswick spruce deals is slightly greater than a year ago while that of Quebec deals is less, though quite ample for demands which are likely to arise. The arrivals of Quebec deals have been small; much less than the extent of the deliveries from stock. The difference has not, however, any unfavourable significance as regards supplies and prices in the near future, the stock in hand being sufficient to serve for six months' consumption on the basis of recent deliveries. Baltic red deals and flooring boards have come to hand in small quantities, but fair consignments of boards have gone direct to Manchester. The arrivals of Norway boards at Liverpool have also been small. Stocks of Baltic red deals and boards at Liverpool are more than one-third greater than a year ago, and practically equal in quantity to what they were in the early part of 1904. The stock of Norway boards is slightly less than a year ago. From the United States, planks and boards have come to hand freely and large stocks of these are now held at Liverpool. Values of fair-to-prime quality wood are weak; poorer qualities are cheaper.

A good demand, small stocks and light arrivals have combined to make the position of pitch-pine strong. Higher prices are looked for and are talked of. Hewn timber has been in very fair demand, wood of superior quality finding a ready sale. The

present stock of hewn is equal to two-thirds of the stock held at the corresponding date last year. Sawn has come to hand in larger quantities but the deliveries have been large, and much in excess of arrivals. The stock is consequently very small, comparatively, being less than one-third of what it was in the early part of 1905 and less than one-fifth of what it was early in 1904. Prices are consequently higher and holders are very firm in their demands. Recent sales have been at the rate of about 1s. 6d. to 1s. 10d. per cub. ft. for sawn. Deals and boards have also been in good demand, and though recent arrivals have been on an average scale; stocks are light. These woods are, therefore, dearer; planks ranging from 1s. to 1s. 2d. per cub. ft., and boards of first quality from £16 10s. to £18 10s. per standard. British Columbian and Oregon pine has arrived in large quantity, and the stock is now heavy, more than double that of a year ago. Values have, however, kept steady.

Oak of United States growth is held in fair quantity, though the stock is smaller than that held last year. The consumption has not been on a large scale, and prices continue at the recent low figures. Planks have been in large demand, much in excess of arrivals, and the stock is now small in comparison with recent deliveries. Prices are well maintained, from 1s. 9d. to 2s. 1d. per cub. ft. being the range in late transactions.

Supplies of Java teak have come to hand somewhat freely, and adequate stocks are now held, the consumption only being on a moderate scale. From £13 to £20 per load has been the recent range of values. Planks have been in larger demand, but present stocks quite ample. Prices are very firm.

Auction sales of mahogany held by Messrs. Farnworth & Jardine on February 9th were marked by a readiness to take up lots of useful wood, which spoke well for business in general.

These and the ordinary sales of builders' timber showed that the trade at Liverpool was in a very healthy state.

THE GLASS TRADE.

The glass trade is better than a year ago, and is fair so far as relates to the building industry. The election interfered somewhat with trade. Figured rolled and plate and wired glass is increasingly used nowadays. The last is an excellent fire retardant, and will no doubt be widely adopted in future for commercial buildings. The figured glass is now being ornamented in colours, up to three different colours being combined in one sheet. This picks the pattern out distinctively and should meet with favour. The Board of Trade report that employment in January with sheet-glass makers and flatteners at St. Helens continued good. It was bad, and worse than a month ago, with pressed-glass makers in the Tyne and Wear district. With plate-glass bevellers and silverers at Birmingham it continued fair. Employment was good, and better than a month ago, with glass blowers in London. From the various glass works in Belgium the United States is continuing to be a heavy buyer in plate glass. England is sending orders with some briskness, while the Far East and Australia export trade is very favourable. Orders are, however, decreasing, especially for the inferior qualities of glass, and factories are suffering the effects of over-production. To counteract this a scheme has been proposed for the establishment of a central bureau for receiving orders which will be submitted to the manufacturers by the bureau and eventually given to the lowest bidder. The bureau would sell direct to the customer with a profit, the latter to be divided among all manufacturers supporting the bureau. In other words, competition among the manufacturers would remain free, but would be exercised to their own profit.

THE METAL TRADES.
Past, Present and Future.

After a long period of quiet trade, dismal prices and prospects which seemed to justify the pessimism which had become pretty deeply rooted in our minds, a faint evidence of change made itself felt last year, just in time to exert an influence on the twelve months' trade.

No order of things, however good or however bad, can continue indefinitely, but when the vagaries of time bring round a prolonged period of dulness our perspective becomes limited and our efforts circumscribed, and this tendency always results in our becoming acclimatized to prevailing conditions and ceasing to expect better things.

Gradually, as the year drew on, we were obliged to admit that the clouds were dispersing, and brighter tints were bearing upon the perspective. The promised boom has now come about with unmistakable vigour, and its influences have spread far and wide.

Confining ourselves to iron and steel products, which are gradually becoming a dominating factor in the building trade of this and all other progressive countries, the consistent advance in prices and increased output from the first indication of activity to the present day are important things to note.

We are not interested in the dead year or even the past month, but their influences upon to-day's affairs are not to be lightly passed by.

The questions which come foremost in importance are: Has the high-water mark been reached? Is the present congestion of many sources of supply and the consequent healthy prices and slow deliveries likely to continue for long? These questions are difficult to answer, but certainly there appears to be a tendency to steadiness of prices throughout, and in odd instances just a suggestion of falling-off in prices. This latter, however, is not sufficiently significant to be regarded seriously.

In present circumstances it would be futile to prophesy, but the general complexion of affairs gives the idea that prices all round will continue to advance for the present, so far as iron and steel are concerned, without necessarily implying that the advances will show anything startling.

Galvanized sheets, from more causes than one, have shown a steady increase from the commencement of the healthy period, rising from £10 to something in the region of £13; the advance has been consistent, and maintained pretty well without a break. During the past few weeks, however, the movement has been in a downward direction, but the change has only been slight. Makers have considerable orders on their hands, although they are not coming forward so quickly at the present moment. Prospects are, however, good, and it is fairly safe to assume that we need not look for any material shading of prices in the near future.

As regards lead, recent consumption has not been remarkably rapid. Prices are, of course, still at a pretty high pitch. Soft foreign stands at something like £15 15s., and English but slightly higher; pipes £19, and sheets £18 10s. These of course show a very fair shading off, but do not necessarily indicate a consistent movement.

In copper there is not a particularly hopeful tendency, and prices have also been slightly shaded latterly, but nothing considerable; touching sometimes £77. The current price of £78, therefore, shows an advance of £10 over the prevailing figure this time last year. This market is always more or less sensitive, and rather more than less at the present moment, and those affected will watch its movements in the near future with particular interest.

English Iron and Steel.

English manufactured iron and steel, being the most familiar products, have of course

displayed the most obvious advance over the past twelve months. Taking Staffordshire marked bars as a criterion, the present price of £9 represents an enhancement of just 20s. over the price of a year ago. A corresponding advance has taken place in "common" bars, which are now pretty firm at £7 5s. These prices have not changed much during the past few weeks. New business has not been very great, but manufacturers have plenty of orders on their books, and there are no indications of any falling off in trade in the near future. The trade in rolled steel for constructional purposes continues to be brisk. Makers have plenty of orders on their hands, and good enquiries continue to come forward.

In Scotland the increased activity in the shipbuilding trade during the last few weeks has had the usual effect of improving prices. All makers are fully engaged and the income of business is steadily maintained. Middlesbrough has been affected from the same cause, and the demand for all classes of manufactured steel continues steady, and makers are kept pretty well employed.

Foreign Steel.

Various circumstances have combined to make the building trade of this country look to Germany and Belgium as important sources of supply. Comparatively cheap production and easy freights have enabled the manufacturers of those countries to put their material on the English market in increasing quantities. The trade, conducted through the medium of the English merchants, has reached considerable dimensions, and prevailing conditions on the Continent are deserving of attention. Steadier markets are now the order of the day, as a result of the creation and successful organization of the export sale arrangements in Germany in so far as rolled steel joists and channels are concerned. Belgium has followed the example of her stronger neighbour in these very important products, and its organization becoming complete, a degree of co-operation between the controllers of the two markets has been the result. To-day, and we may safely assume for some time to come, the prices of German and Belgian joists will not enter into mutual conflict to the advantage of the British consumer. At the same time it is only just to say that although a marked and steady increase has taken place since this time last year, there is nothing absolutely crushing in to-day's market prices. During the period mentioned the advance in prices of Basic steel joists for a fair specification has been from about £4 16s. to £5 16s. per ton c.i.f. Thames, or equal East Coast ports. The tendency is of course still an upward one, and works are full up with orders. Advances may perhaps be looked for, although not of very alarming character.

Merchants on this side who keep well in touch with the progress of events on the

Continent are handling large quantities of joists rolled to British standard shapes, some German works having turned rolls to the precise dimensions laid down by the Engineering Standards Committee. These include pretty well all the sections up to 12ins. high, and some of the heavier shapes.

Basic steel angles and tees stand on a somewhat different footing to the heavier sections, and the tendency is not in the direction of steadiness of prices. However, since this time last year prices have kept more or less in sympathy with the general advance, and have in fact shown latterly a somewhat rapid development. The larger demand at home has had something to do with this, and the mills are heavily booked with orders. The last twelve months has seen an increase in the price of angles from £5 5s. to £6 12s. in the Thames, and tees from £5 11s. to £6 17s. in the Thames or equal East Coast ports.

Needless to say, to-day's prices in these lines do not show up very well in competition with English prices in many parts, especially to consumers who are well situated as regards freights for the latter. Forward bookings, however, are still being made in Continental bars, and many buyers, not in immediate requirement, are content to watch and wait for the events of the near future.

THE IRONMONGERY TRADE.

The builders' ironmongery trade is very bad, and although every one is looking forward to the promised revival in the building trade it will be some time before the ironmongery trade receives much stimulus from speculative building, which forms such a large portion of the demand. We have heard on all sides of the scarcity of orders, and the Board of Trade returns for January are also depressing. Employment in January at Wolverhampton continued bad in the lock and latch trade, much short time being worked. It was fair on cast-iron hollow-ware, and good on iron fences and hurdles. In the hollow-ware trade it was slack at Sheffield, but continued to improve at Birmingham and West Bromwich. In the edge-tool trade it was fair at Sheffield, Birmingham and Wolverhampton. Employment in the stove, grates, &c., trades was slack at Sheffield and Rotherham, fair at Falkirk and Glasgow, and better than a month ago at the latter place. Employment with nut and bolt makers continued good in Darlaston and Winlaton, and fair at Birmingham and in South Wales. With wire nail, shoe rivet, and cut nail makers at Birmingham it continued fair; at Black Heath with rivet and nail makers it was fairly good.

THE WALLPAPER TRADE.

The wallpaper trade has continued fairly good. Foreign competition is not a very serious amount, although imports are more than last year. Our exports have, however, also increased.

THE PAINT TRADES.

The paint trades are fairly good considering the time of year. As regards materials, the returns for imports and exports

for the month ending January 31st, 1906, as compared with the same month in 1904 and 1905, are as follows:—

	IMPORTS.					
	1904.	1905. Cwts.	1906.	1904. £	1905. Value.	1906. £
White lead	24,444	27,705	29,173	18,899	22,404	25,268
Zinc oxide	-	18,527	27,468	18,527	18,600	26,855
Other colours and pigments	132,243	115,939	141,784	78,327	64,438	67,570
Turpentine	49,717	31,299	35,602	105,230	54,976	76,781
Lac-dye, seedlac, shellac and sticklac	13,983	9,568	7,821	117,821	83,836	66,911
		Tons.				
Linseed oil	633	98	2,401	12,724	1,842	49,500
	EXPORTS.					
		Cwts.				
White lead	24,444	27,705	29,173	18,899	22,404	25,268
Zinc oxide	-	18,527	27,468	18,527	18,600	26,855
Other colours and pigments	132,243	115,939	141,784	78,327	64,438	67,570
Turpentine	-	-	-	-	-	-
Lac-dye, seedlac, shellac and sticklac	-	-	-	-	-	-
		Tons.				
Linseed oil	2,136	2,323	1,965	45,665	42,170	42,692

Complete List of Contracts Open.

VERY nearly all building contracts are nowadays obtained in competition, and immediate and full information regarding contracts open for tendering is so important (indeed it is almost essential) to every contractor that we propose to devote special attention to the provision of such news. Each week we shall publish full information upon all contracts open in a way which no other building journal attempts. No pains will be spared to render this list accurate in its information, and inclusive of the latest news from all parts. News of large contracts abroad open to international competition will also be a special feature.

[Unless expressly stated to the contrary all deposits required for bills of quantities, &c., are returned on receipt of *bona fide* tenders.]

BUILDING.

Mar. 1. Manchester.—*Stable, male and female conveniences, &c.*, for the Parks Committee. Drawings may be seen and specification and bill of quantities obtained at office of City Architect, Town Hall, upon payment of £1 rs. Sealed tenders, enclosed in the official envelope, to W. Henry Talbot, town clerk, Town Hall, Manchester, by 5 p.m. on Mar. 1.

Mar. 1. Shrewsbury.—*County buildings*, for the County Council. Drawings and specifications may be seen and quantities obtained at County Surveyor's Office, Shrewsbury, on payment of £3 3s. Sealed tenders on the form supplied, endorsed "County Buildings," to A. T. Davis, county surveyor, Shirehall, Shrewsbury, by Mar. 1.

Mar. 1. Accrington.—*Public library*, for the Corporation. Plans and drawings may be inspected and forms of tender, with specifications, general conditions, bill of quantities, &c., obtained on application to the architect, William J. Newton, M.S.A., A.M.I.C.E., borough engineer, Town Hall, on payment of £5. Sealed tenders, endorsed "Tender for Public Library," to be delivered to A. H. Aitken, town clerk, Town Hall, Accrington, by Mar. 1.

Mar. 1. Llanelli.—*Re-modelling of Park Street School Buildings*, for the Education Committee, in accordance with plans and specification prepared by William Griffiths, F.S.I., architect, Llanelli, which can be seen at the Education Office, Llanelli. Sealed tenders, marked "Tender for Re-modelling Park Street School Buildings," to Ior W. Watkins, clerk of committee, Education Office, Llanelli, by noon on Mar. 1.

Mar. 2. Navan.—*Banking premises*, for the Belfast Banking Co., Ltd. Drawings and specification may be inspected at the architects' offices, where bill of quantities may be obtained upon deposit of £3 3s. Sealed tenders, endorsed "Tender for Belfast Bank, Navan," to Anthony Scott & Son, architects, 34, Lower Sackville Street, Dublin, by Mar. 2.

Mar. 2. Stockport.—*Three shelters*, for the Parks Committee. Plans and sections may be seen and bills of quantities, specification and forms of tender obtained from Borough Surveyor, Stockport. Tenders sealed, and endorsed "Tenders for Shelters, Vernon Park," to John Atkinson, A.M.I.C.E., borough surveyor, Borough Surveyor's Office, Stockport, by Mar. 2.

Mar. 2. Devizes.—*Twelve cottages and offices, &c.*, in Gain's Lane, for the Urban D. Council. Plans and specification may be seen and copy of bill of quantities obtained from Borough Surveyor's Office, Devizes, on payment of £1 rs. Sealed tenders, endorsed "Tenders for Cottages," to F. G. Billingham, borough surveyor, Town Hall, Devizes, by noon on Mar. 2.

Mar. 3. Dalraddy.—*Two workmen's houses* at Dalraddy Loop, near Aviemore, for the Highland Railway Co. Plans and specifications may be seen with William Roberts, engineer-in-chief, Inverness, or with the station agent at Aviemore. Sealed tenders, marked on the outside "Houses, Dalraddy," to Robert Park, secy., Highland Railway Co.'s Offices, Inverness, by Mar. 3.

Mar. 3. Glasgow.—*Public conveniences* in (a) Nelson Street, S.S., and (b) Rutherglen Road, for the Corporation. Specifications and forms of offer may be had on application at the Office of Public Works, City Chambers, 64, Cochran Street. Sealed offers, marked outside "Offer for — Convenience," must be lodged with A. W. Myles, town clerk, City Chambers, Glasgow, by Mar. 3.

Mar. 3. Dalkey.—*Working-class dwellings*, for the Dalkey Urban D. Council. Plans and specifications may be seen at the Council's Office, Town Hall, on any weekday between 10 and 2. Tenders, including the names of two solvent sureties, to be under cover and marked "Tenders for Dwellings" to J. P. Gahan, clerk of the Council, Town Hall, Dalkey, by Mar. 3.

Mar. 5. Sheffield.—*Extension of the Training College*, Collegiate Crescent, for the Education Committee. Specifications and drawings may be seen and copies of the bills of quantities obtained from Gibbs & Flockton, 15, St. James's Row, Sheffield. Tenders to John F. Moss, secy., Education Committee, Sheffield, by Mar. 5.

Mar. 6. Clitheroe.—*Public slaughter-houses* to be built at Fouliskeys. Plans and specifications may be seen and quantities obtained at the Borough Surveyor's Office. Tenders sealed, and endorsed "Tender for Slaughter-houses," to be delivered at the Town Clerk's Office by noon on Mar. 6.

Mar. 6. Alfreton.—(a) *Cemetery lodge, Leabrooks*; (b) *steam-roller house and cart-sheds at Cotes Park*. Plans may be seen and copies of the specification and bills of quantities obtained from E. Houlton, surveyor, on payment of £1 for each set. Tenders enclosed in sealed envelopes, and endorsed "Cemetery Lodge" and "Cart-sheds" respectively, to E. Houlton, surveyor, King Street, Alfreton, by noon on Mar. 6.

Mar. 6. Blackpool.—*Additions and extensions* to the Victoria Hospital in Whitegate Drive. Plans can be seen and bills of quantities obtained on application to the architect on deposit of £1 rs. Sealed tenders,

endorsed "Hospital Extensions," to R. B. Mather, hon. architect, 34, Birley Street, Blackpool, by Mar. 6.

Mar. 6. Witton.—*Alterations, repairs, &c.* at Witton Hall for the Guardians. Drawings and specifications can be seen, and the building inspected, on application to the Caretaker, at the Hall. The person whose tender is accepted will be required to pay to his workmen not less than the recognised rate of wages current in the district. Sealed tenders must be sent to John North, clerk to the guardians, Union Offices, Vauxhall Road, Birmingham, by noon on Mar. 6.

Mar. 6. London, E.—*Alterations to kitchen* of the Bromley Asylum, in accordance with plans and specifications prepared by J. & W. Clarkson, architects, 136, High Street, Poplar, E. Drawings and conditions of contract to be seen at the offices of the architects and a copy of specification and form of tender obtained upon payment of £5. Tenders sealed, and endorsed "Tender for Alterations to Kitchen," to Walter R. Foskett, clerk to the managers, Devon's Road, Bromley-by-Bow, London, E., by 10 a.m. on Mar. 6.

Mar. 6. Belfast.—*Four one-storeyed pavilions*, laying water mains, constructing drains, walks, tanks, &c., erecting a two-storeyed hospital for a mortuary, and also for additions and alterations to Administrative Building, at "The Abbey" Sanatorium, for the Guardians. Copy of schedules of quantities and forms of tender from S. C. Hunter, building surveyor, Scottish Provident Buildings, on payment of 6d. Tenders made out on the forms, and endorsed "Abbey," to be lodged in the Tender-box, Boardroom, Union Workhouse, Belfast, before noon on Mar. 6.

Mar. 7. Kinsale.—*Completion of three unfinished labourers' cottages*, which are situated in the townland of Horsehillbeg, Horsehillmore North, and Shanavally, respectively, for the Rural D. Council. The contractor shall remedy all defective work, including defective chimneys, and have the entire completed before June 1. The amount for each cottage must be given in tender. Tenders will be received by John Murphy, clerk of the council, Council Office, Kinsale Workhouse, by 11 a.m. on Mar. 7.

Mar. 7. Stamford.—*Buildings*:—(1) Pulling down old buildings, excavation, brickwork and stonework; (2) carpenters' and joiners' work; (3) slaters' work; (4) plumbers and glaziers' work; (5) plasterers' work, and (6) painters' work. Required in connection with the erection of buildings at the town hall. Drawings may be seen and specifications and bills of quantities with form of tender obtained on application at the office of Frederick R. Ryman, borough engineer, on payment of £1 each for Nos. 1 and 2 and 20s. each for Nos. 3, 4, 5 and 6 specifications. Tenders, endorsed respectively "Tender for Brickwork, Stonework, &c., Carpenters' and Joiners' Work, Slating, Plumbing and Glazing, Plastering and Painting," to Charles Atter, town clerk, Town Clerk's Office, Stamford, by Mar. 7.

Mar. 8. Little Eaton.—*School and chapel*, for the United Methodist Free Church. Plans and specifications may be seen and bills of quantities had on payment of £1 rs. Tenders to be sent to A. E. Eyre, architect, Almond Villas, Almond Street, Derby, by Mar. 8.

Mar. 8. London, E.C.—*Lighthouse, dwelling, &c.*, at Strumble Head, for Trinity House. Plans may be inspected and forms of tender and specifications obtained either at the Trinity House, London, between 10 and 5, or on application to the Officer-in-charge, Coastguard Station, Fishguard, Pembrokeshire. Copies of surveyor's quantities may then be obtained on application to Corderoy, Selby & Corderoy, 21, Queen Anne's Gate, Westminster, London, S.W. Tenders, sealed and marked outside "Tenders for Strumble Head Lighthouse," to A. Owen, secy., Trinity House, London, E.C., by Mar. 8.

Mar. 8. Dorchester.—*Works* for the Town Council as follows:—(1) For renovating and improving the south and west fronts of the Town Hall. (2) For alterations and additions to the Corn Exchange. Plans and specifications may be inspected at the Borough Surveyor's Office during usual office hours, where also forms of tender can be obtained. Tenders, made out on the proper form, enclosed in separate sealed envelopes and endorsed (1) "Tender for Town Hall Repairs," and (2) "Tender for Alterations to Corn Exchange," must be sent to A. G. Symonds, Town Clerk, 11, South Street, Dorchester, by Mar. 8.

Mar. 9. Wenaston.—*Enlargement of Wenaston Council School*, for the East Suffolk County Education Committee. Drawings, specification and form of contract deposited at Wenaston School, in charge of the Managers, and application for permission to inspect same should be made to Wallace Ellis, Wenaston, corresponding manager. Tenders on the prescribed form in sealed envelopes, endorsed "Tender, Wenaston School," to W. E. Watkins, secy., White House, Tower Churchyard, Ipswich, by Mar. 9.

Mar. 10. Bakewell.—*Extension of board room and out-buildings*, and steam boiler and heating apparatus for the guardians. Plans and specifications of the work are deposited at the office of the Board's Architect, E. M. Longsdon, Town Hall, Bakewell, and may be inspected at all reasonable hours of the day. The Architect will

supply a copy of the bill of quantities on deposit of 10s. (extensions) and 5s. (heating apparatus). Forms of tender may be obtained from the Architect. The person whose tender is accepted will be required to find sufficient security for the satisfactory completion of the contract. Tenders, properly sealed, and endorsed "Tender for Extensions, &c.," must be delivered to Alfred Hawes, clerk to the guardians, Union Offices, Bakewell, by 11 a.m. on Mar. 10.

Mar. 10. Salford.—*Alterations* at the Union Infirmary, Hope, near Eccles, also for laying drains and other sanitary works for the Guardians. Plans may be seen and bills of quantities obtained at the office of the Architect, Henry Lord, 42, Deansgate, Manchester, by payment of a deposit of £1 rs. Tenders must be delivered to F. Townson, clerk to the guardians, Union Offices, Eccles New Road, Salford, by 9 a.m. on Mar. 10.

Mar. 10. Leeds.—*Police-station, &c.*, for the Watch Committee of the Corporation. Plans and specifications to be seen, and bills of quantities, together with the general conditions of contract and forms of tender, obtained at the offices of William H. Thorp, F.R.I.B.A., architect, Phoenix Chambers, South Parade, Leeds, on payment of £1 rs. Tenders, endorsed "Tender for Meadow Lane Police-station," to Robert E. Fox, town clerk, Town Hall, Leeds, by Mar. 10.

Mar. 10. Prussia Cove.—*Alterations and additions* at Trenalls Farm, also additions and alterations to King's Cottage, Prussia Cove, for the proprietor, L. W. F. Behrens, of Prussia Cove. Drawings and specifications may be seen at the office of the architect, Oliver Caldwell, F.R.I.B.A., Victoria Square, Penzance. Sealed tenders, endorsed "Tenders for Trenalls and King's Cottage," to be sent under separate cover to the same address by Mar. 10.

Mar. 12. Poole.—*Secondary School* at Seldown, Poole, for the Education Committee. Drawings and specification may be seen and forms of tender, together with bill of quantities and other particulars, may be obtained from G. A. Bligh Livesay, F.R.I.B.A., architect, Fir Vale Chambers, Old Christchurch Road, Bournemouth, any day during office hours upon payment of a deposit of £2 2s. Sealed tenders in the envelopes provided, endorsed "Tender for New Secondary School," together with sealed priced bill of quantities, must be delivered to Charles Lisby, secretary, Fish Street, Poole, by noon on Mar. 12.

Mar. 12. Gobowen.—*School*, for the Elementary Education Department. Plans and specifications may be seen and bills of quantities obtained at the offices of Shayler & Ridge, architects, Oswestry, or F. H. Shayler, architect, 16, Pride Hill, Shrewsbury, on payment of £1 rs. Sealed tenders, endorsed "Gobowen Council School," to H. E. Wade, secy., 11, College Hill, Shrewsbury, by 11 a.m. on Mar. 12.

Mar. 13. St. Erith.—*Renovation, re-seating, new roof* and other alterations and additions to the Wesleyan Methodist Church, St. Erith. Drawings and specifications may be seen at the offices of the architect, Oliver Caldwell, F.R.I.B.A., Victoria Square, Penzance, by appointment. Sealed tenders, endorsed "Tenders for St. Erith Wesleyan Methodist Church," to be sent to the same address by Mar. 13.

Mar. 14. Warrington.—*New post-office*, for the Commissioners of H.M. Works and Public Buildings. Drawings, specification and a copy of the conditions and form of contract may be seen on application to the Postmaster between the hours of 10 and 5. Bills of quantities and forms of tender may be obtained on payment of £1 rs. Tenders must be delivered to the Secretary, H.M. Office of Works, &c., Storey's Gate, London, S.W., endorsed "Tenders for Warrington Head Post Office," before noon on Mar. 14.

Mar. 15. London, N.—*New blocks and additions*, for the Guardians of the parish of St. Mary, Islington. Further information can be obtained from William Smith, architect, 65, Chancery Lane, W.C., where also, on depositing £5, form of tender and copy of bills of quantities and conditions of contract can be obtained, and plans and specifications can be inspected until Mar. 2. Sealed tenders, endorsed "Tender for Works," addressed to the Guardians' Offices, St. John's Road, Upper Holloway, N., by 4 p.m. on Mar. 15.

Mar. 15. Feniscowles.—*Public elementary school* at Feniscowles, near Blackburn, for the Lancashire Education Committee. Plans may be seen and bills of quantities obtained from Henry Littler, county architect, 16, Ribblesdale Place, Preston, on payment of £2. Tenders, sealed and endorsed, to Mr. C. E. Bygrave, Union Offices, Cardwell Place, Blackburn, by Mar. 15.

Mar. 20. Great Wratting.—*Elementary School*, to accommodate eighty children. Drawings, specifications, and form of contract may be inspected at the Education Committee's Office, 5, Crown Street, Bury St. Edmunds, and at the office of A. Ainsworth Hunt, building inspector, Sudbury. Sealed tenders, endorsed "Great Wratting Council School," must be sent to F. R. Hughes, secretary to Education Committee, 5, Crown Street, Bury St. Edmunds, by Mar. 20.

Mar. 20. Haverhill.—*Addition of a Class-room*, to accommodate forty-six children, with a cookery-room built over, for the West Suffolk Education Committee. Drawings, specifications, and form of contract may be inspected at the office of the Education Committee, 5, Crown Street, Bury St. Edmunds, and at the office of A. Ainsworth Hunt, building inspector, Sudbury, Suffolk. Sealed tenders, endorsed "Haverhill Council School," must be sent to Fred R. Hughes, Secretary to the Education Committee, 5, Crown Street, Bury St. Edmunds, by Mar. 20.

Mar. 21. Bushey.—*Elementary school and cookery centre* at London Road, Bushey, for the Education Committee. Persons desirous of tendering for the work may see the drawings, specification, agreement, &c., at the County Surveyor's office, Hatfield, after Mar. 8, between 10 and 4 (Saturday 10 to 12). A copy of the schedule of works and prices (quantities) and a form of tender can be obtained at the County Surveyor's Office upon payment of £2 2s. Sealed tenders, endorsed "Tender for School, Bushey," must be delivered to Urban A. Smith, county surveyor, County Surveyor's Office, Hatfield, by 5 p.m. on Mar. 21.

Mar. 21. St. Albans.—*Additions and alterations* to the Priory Park County Council School, St. Albans, for the Education Committee. Persons desirous of tendering for the work may see the drawings, specification, agreement, &c., at the County Surveyor's Office, Hatfield, after Mar. 8, between 10 and 4 (Saturday 10 to 2). A copy of the schedule of works and prices (quantities) and a form of tender can be obtained at the County Surveyor's Office upon payment of £2 2s. Sealed tenders, endorsed "Tender for Additions and alterations to Priory Park C.C. Schools, St. Albans," must be delivered to Urban A. Smith, county surveyor, County Surveyor's Office, Hatfield, by 5 p.m. on Mar. 21.

April 2. Lytham.—*Elementary school* at Commons Lane, Ansdell, Lytham, for the Education Committee. Plans may be seen, and bills of quantities obtained at the office of the County Architect, Henry Littler, 16, Ribblesdale Place, Preston, by payment of a deposit of £2. Tenders must be delivered, sealed and endorsed, to F. H. Brown, Fyde Union Offices, Kirkham, by noon on April 2.

April 2. Penzance.—*Business premises*, in the Green Market, Penzance, for the Public Benefit Boot Co., Ltd. Drawings and specifications may be seen at the offices of the architect, Oliver Caldwell, F.R.I.B.A., Victoria Square, Penzance, by appointment. Sealed tenders, endorsed "Tenders for New Premises, Penzance," to be sent to T. J. Leonard, Queen's Road, Bristol, on or before April 2.

No date. Penarth.—*All Saints' Parish Church Rooms*, Penarth. For bills of quantities and to inspect drawings, apply J. Coates Carter, Bank Buildings, Cardiff.

No date. Swansea.—*Extensions and renovations* to the Mermaid Inn, Port Tennant, Swansea, for E. Evans Bevan, Neath. Plans and specification and bills of quantities may be seen at the offices of J. Cook Rees, architect, Neath, to whom tenders must be sent.

No date. London, S.W.—*Rebuilding of shop premises* on Strutton Ground, Westminster. Drawings and specifications may be seen at the office of Charles Granville Baker, architect, 5, Bloomsbury Square, W.C., from whom bills of quantities may be obtained on personal application on payment of £1 1s.

ENGINEERING.

Mar. 1. Chatteris.—*Water supply* for the Urban D. Council. The works include about 6½ miles of 7-inch cast-iron main pipes, and about 3¼ miles of smaller mains, and fittings; also a brick and slate meter-house and meters. Specifications and general conditions, with forms of detailed estimate and tender, may be obtained on deposit of £1. Sealed tenders, endorsed "Waterworks," to be sent to Alfred Giddings, clerk to the Council, Chatteris, Cambs., by Mar. 1.

Mar. 1. Belfast.—*Two steam boilers*, with economisers and superheaters, at the new Municipal Technical Institute. Plan can be seen and copies of specifications obtained at the office of the Municipal Technical Institute, College Square North, Belfast, on a payment of 10s. Tenders, endorsed, and addressed to the "Chairman of the Library and Technical Instruction Committee, Belfast," must be received at the Town Hall, Belfast, by 11 a.m. on Mar. 1.

Mar. 1. Croydon.—*Wiring and electrical lighting* at the Croydon Central Fire Station, Park Lane, Croydon, for the Borough Council. Plans, specification and forms of tender can be obtained of G. F. Carter, A.M.I.C.E., borough engineer, Town Hall, Croydon, upon payment of £1 1s. Tenders, endorsed "Central Fire Station Lighting Contract No. 3," to F. C. Lloyd, town clerk, Town Hall, Croydon, by 11 a.m. on Mar. 1.

Mar. 2. Antwerp.—*Heating apparatus*. The date for receiving tenders for supplying heating apparatus for the new Flemish theatre in course of construction at Antwerp has been extended to Mar. 2. A copy of the specification may be seen at the offices of the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall Street, London, E.C.

Mar. 2. Nottingham.—*Bridge* over the Nottingham Canal, Trent Street, for the Improvement Committee. The work will be divided into two contracts. No. 1 will comprise the erection of the abutments, &c., for the new bridge, and the taking down of the present structure, &c. No. 2 will comprise about 95 tons of steelwork in plate and lattice girders, trough flooring, buckled plates, &c. Drawings may be seen and copies of the specifications, bills of quantities, and forms of tender obtained on applying to Arthur Brown, M.I.C.E., city engineer, Guildhall, Nottingham, on payment of £2 2s. for each contract. Sealed tenders, endorsed "Trent Street Bridge, Contract No. 1 or 2," as the case may be, to Samuel G. Johnson, town clerk, Guildhall, Nottingham, by Mar. 2.

Mar. 3. Pontypridd.—*Waterworks*, for the Urban D. Council, as follows:—Section K, reservoir; Section L, condensing plant, cooling tower and tank; Section U,

artesian well. Specifications, quantities, general conditions and forms of tender may be obtained at the offices of the Consulting Engineer, Reginald P. Wilson, 66, Victoria Street, Westminster, or at the Council Offices, Pontypridd, on payment of £3 3s. for each section. Tenders must be sent in on the official form, and all instructions contained therein must be complied with. Tenders, endorsed "Section K, Reservoir, or Section L, Condensers, or Section U, Artesian Well," must be addressed to the Clerk of the Pontypridd Urban D. Council, and delivered at the Council Offices, Pontypridd, by noon on Mar. 3.

Mar. 3. Horsforth.—*Pumping station* at the water works borehole, Scotland Lane, Horsforth, for the Urban D. Council. Plans and printed copies of the general conditions, specification and bill of quantities to be obtained on payment of £5 from E. J. Silcock, M.I.C.E., 10, Park Row, Leeds. Sealed tenders, endorsed "Pumping Station," to Robert R. Jones, clerk, Council Offices, Horsforth, near Leeds, by noon on Mar. 3.

Mar. 3. Stockport.—*Five double-deck top covered electric cars*, single-truck type, complete with electrical equipment for overhead traction. Particulars and general conditions may be obtained upon application to John Atkinson, A.M.I.C.E., borough surveyor, Stockport. Tenders, marked "Tender for Cars," to Town Clerk's Office, Stockport, by noon on Mar. 5.

Mar. 3. Bromfield.—*Footbridge* at Bromfield Station, for the Joint Committee of the London and North-Western and Great Western Railway Co.'s. Plans, specifications and contract deed may be seen and forms of tender and bills of quantities obtained at the Office of the Joint Engineer, Woodside Station, Birkenhead. Tenders, marked "Tender for Footbridge at Bromfield," to A. E. Bolter, secy. to Joint Committee, Paddington Station, London, by Mar. 5.

Mar. 5. Southampton.—*Stores, fittings, &c.*, required in the Electric Tramways Department during a period of twelve months. Specification and conditions from Mr. H. F. Street, general manager, Tramway Offices, Above Bar Street, Southampton. Tenders, upon the printed form, endorsed "Tender for Stores, &c., Tramways Department," to R. R. Linthorne, town clerk, Municipal Offices, Southampton, before 2 p.m. on Mar. 5.

Mar. 5. West Hartlepool.—*Extension of electricity station* in Burn Road, for the Corporation. Plans, sections and specification to be seen upon application at the office of the Borough Engineer, Municipal Buildings, where also the bills of quantities can be obtained upon payment of £2 2s. Tenders, endorsed "Electricity Station Extension," and addressed to the Chairman of the Electric Lighting Committee, are to be delivered at the office of the Town Clerk, 78, Church Street, West Hartlepool, by 10 a.m. on Mar. 5.

Mar. 6. Sheffield.—*Steel roof*, 263ft. long by about 57ft. span, together with the raising of the two existing side spans, one of which is 263ft. long by 19ft. 10ins., and the other 145ft. long by 19ft. 6ins.; the whole forming part of the roof over the No. 2 retort house at their Neepsend Station, for the Sheffield United Gaslight Company. Drawings may be seen, and bill of quantities, with specification and form of tender obtained, upon application to the Company's Engineer, John W. Morrison, Commercial Street. Sealed tenders, endorsed "Tender for Roof," must be delivered by post to Hanbury Thomas, General Manager and Secretary, Commercial Street, Sheffield, by the first post on Mar. 6.

Mar. 6. Bristol.—*Fire-escape staircases and emergency exits*, Ham Green Hospital, Bristol. A copy of the specification and drawings can be obtained at the City Engineer's office on deposit of a cheque value £1. Tenders must be delivered at the office of the City Engineer, Bristol, by 10 a.m. on Mar. 6.

Mar. 6. Selby Bok.—*Removing and refixing Cornish boilers* for the King's Norton and Northfield Urban District Council. Drawings, specifications, and other particulars may be seen on application at the Surveyor's Office, 23, Valentine Road, King's Heath, and form of tender obtained on deposit of £1 1s. Tenders, endorsed "Tender for Removing Boilers," are to be delivered to Edwin Docker, Clerk to the Council, 10, Newhall Street, Birmingham, by noon on Mar. 6.

Mar. 6. Carshalton-on-Hill.—*Installation of woodwork and other kitchen fittings* at the Southern Hospital, for the Metropolitan Asylums Board. Drawings, specification, conditions of contract and form of tender may be inspected at the office of the Board, Embankment, London, E.C., and obtained upon payment of £2. Tenders, addressed as noted on the form, to the office of the Board not later than 10 a.m. on Mar. 6.

Mar. 7. London, E.C.—*Electrical equipment for transformer house*, for the East Indian Railway Co., as per specification to be seen at the Company's Offices. Tenders, endorsed "Tender for Electrical Equipment," to be sent to C. W. Young, secretary, Nicholas Lane, E.C., by noon on Mar. 7.

Mar. 9. Huddersfield.—*Supply and erection of the following plant*: One vertical cross-compound condensing engine, and steam piping in connection therewith. One 750 K.W. traction generator; extension to switchboard, cables, &c., for the Corporation. Drawings may be inspected and specifications, bills of quantities, forms of tender and other particulars obtained on application to the Engineer, K. F. Campbell, M.Inst.C.E., M.I.E.E., on payment of a deposit of £3 3s. Tenders must be on the official forms, and the printed instructions contained therein must be strictly complied with. Each tender in a sealed envelope, which will be provided, along with the filled up bill of quantities, must be delivered to the Town Clerk, Town Hall, Huddersfield, not later than 10 a.m. on Mar. 9.

Mar. 12. Curegham, Belgium.—*Electric lighting installation* at the new Veterinary Medical School at Curegham. Tenders will be received up to Mar. 12 at the "Direction Generale des ponts et Chaussées, 38, Rue de Louvain, Brussels." The estimated cost is 48,000 frs. (£1,920), and a deposit of 4,800 frs. (£192) is required to qualify any tender. Conditions, price fr. 80c. (about 1s. 6d.), and plans, price 25fr. 90c. (about 11s. 9d.), may be obtained from 15, Rue des Augustins, Brussels.

Mar. 26. Clonmel.—*Heating* two new blocks in course of erection at Clonmel Asylum. Plans and specifications may be seen at the asylum and at the office of the undersigned, J. F. Fuller, architect, 179, Great Brunswick Street, Dublin. Tenders, addressed to the Resident Medical Officer, to be lodged with him on or before Mar. 26.

IRON AND STEEL.

Mar. 1. London, E.C.—*Ironmongery*, for Trinity House. Forms of tender may be obtained at Trinity House between 10 and 5, and samples inspected at Trinity Wharf, Blackwall. Tenders, marked outside "Tenders for Ironmongery," to A. Owen, secy., Trinity House, E.C., by Mar. 1.

Mar. 3. Padiham.—*Cast-iron pipes* (111 yds. of 6in., 120 yds. of 4in. and 222 yds. of 3in., for the Urban D. Council. Forms of tender may be obtained from J. Gregson, A.M.I.C.E., district engineer, Padiham. Tenders, endorsed "Tenders for Pipes," to Chairman of Water Committee, Town Hall, Padiham, by Mar. 3.

Mar. 3. Swansea.—*Cast-iron pipes and castings, steel tubes, water meters, hydrants, valves and pig lead*, for the Town Council for a period of 12 months. Printed copies of the specifications and forms of tender can be obtained from the Waterworks Engineer, Guildhall, Swansea. A payment of £1 1s. must be made for the form of tender for cast-iron pipes and castings. Sealed tenders, endorsed "Tenders for —," accompanied in the case of a tender for pipes and castings, by a cheque for £50 as a guarantee to John Thomas, town clerk, Swansea, by noon on Mar. 3.

Mar. 5. Seaford.—*100 yds. of 15in. cast-iron pipes, with manholes, &c.*, on the L.B. & S.C. Railway Co.'s property, for the Urban D. Council. Plans and specification may be inspected at the offices of Pollard & Tingle, M.M.I.C.E., of 31, Old Queen Street, Westminster, S.W., and also at the office of the Council. Sealed tenders, endorsed "Tender for Drainage," to W. H. Pawson, clerk to the Council, Council Offices, 3, Clinton Place, Seaford, by 4 p.m. on Mar. 5.

Mar. 5. Khartoum.—*Light railway material and rolling stock*, consisting of steel rails, steel sleepers, clips and bolts, fishplates, switch points, locomotives, rolling stock, and turntable for the use of the Khartoum Light Railway. Copies of the specifications may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall Street, E.C., or may be obtained from Lieut.-Col. J. H. Western, R.E., Queen Anne's Chambers, Westminster, S.W. Tenders will be received up to Mar. 5.

Mar. 7. Poole.—*Cast-iron main pipes and connections* for the Poole Waterworks Co. Plans, specifications, conditions and forms of tender can be seen at the Company's Offices, Towngate Street, Poole, where tenders are to be delivered by Mar. 7, endorsed "Tender—Main Pipes."

Mar. 12. Nottingham.—*Ironwork* required in connection with the erection of coal sheds and for wrought-iron ornamental boundary fencing at the Boughton Water Pumping Station, for the Water Committee. Plans may be seen and specifications, bills of quantities and forms of tender obtained at the office of W. B. Starr, architect, 12, St. Peter's Gate, Nottingham, on payment of £1 1s. Sealed tenders, endorsed "Tender for ironwork, Boughton," to be delivered to Samuel G. Johnson, town clerk, Guildhall, Nottingham, by Mar. 12.

PAINTING AND PLUMBING.

Mar. 1. Newcastle-on-Tyne.—*Cleaning of the walls and ceilings, &c.*, of the several police-stations of the city, for the Watch Committee. The work will be divided into two tenders, viz.:—(1) Central, North Road, Red Barns, East End, and Walker stations; (2) Westgate, Arthur's Hill, Scotswood Road, and Benwell stations. Specifications of the work to be done can be seen and bills of quantities obtained at the City Property Surveyor's Department, Town Hall. Sealed tenders, addressed to the "Chairman of the Watch Committee," and endorsed "Tender for Cleaning, &c., Police Stations," must be delivered at the Committee Clerk's Office, Town Hall, before noon on Mar. 1.

Mar. 1. Normanton, &c.—*Painting, &c.*, cottages at Normanton and Royston, and stationmaster's house at Sandal and Walton. Specification may be seen, quantities and particulars obtained, on application at the Engineer's Office, Derby. Sealed tenders to be forwarded by post to the Secretary of the Way and Works Committee, Midland Railway, Derby, not later than 9 a.m. on Mar. 1.

Mar. 2. Wigan.—*Cleaning painting, &c.*, of the Lamberhead Green Police Station, for the Corporation. Specification may be obtained from the office of the Borough Engineer, King Street West, Wigan. Tenders, endorsed "Lamberhead Green Police Station," must be delivered to Harold Jevons, Town Clerk, Wigan, by Mar. 2.

Mar. 3. Penzance.—*Painting* at the Morrab Gardens, for the Pleasure Grounds Committee. Specification can be seen at the Borough Surveyor's Office, Public Buildings. Sealed tenders, endorsed "Tender for Painting at the Morrab Gardens," to be sent to Frank Latham, M.I.C.E.I., borough engineer and surveyor, Public Buildings, Penzance, by Mar. 3.

Mar. 3. Edinburgh.—*Painter work* at mortuary buildings, High School Yards, according to specification, which may be seen, and schedules of quantities obtained on personal application at the Public Works Office. Estimates sealed and marked "Tender for painter work for city mortuary" must be sent to Public Works Office, City Chambers, Edinburgh, by 10 a.m. on Mar. 3.

Mar. 5. Lancaster.—*Painting* at the Royal Infirmary. Tenders, sealed and endorsed "Tenders for Cleaning and Painting," to be sent to Allan Sewart, hon. secretary, Royal Lancaster Infirmary, Lancaster, by Mar. 5.

Mar. 6. London, E.—*Outside painting, &c.*, at the Blackwall Branch of the Poplar and Stepney Sick Asylum District. The drawing and conditions of contract may be seen and a copy of the specification and form of tender

obtained from J. & W. Clarkson, architects, 136, High Street, Poplar, E., upon payment of £5. Tenders, sealed Asylum," to Walter R. Foskett, clerk to the managers, and endorsed "Tender for Alterations at Blackwall Branch Devons Road, Bromley-by-Bow, London, E., by 10 a.m. on Mar. 6. Parties tendering will be required to declare that they pay the rate of wages and observe the hours of labour that are generally recognized by the trade unions, and considered fair in the trade. The managers do not bind themselves to accept the lowest or any tender.

Mar. 7. Tyburn.—Supply of the following stores and materials for 1906-7, for the Birmingham Tame and Rea District Drainage Board:—Iron, steel and hardware, oils, paints, timber, brushes and brooms, stoneware pipes, &c. Samples and patterns may be inspected at the Board's Offices, Tyburn, near Birmingham (Castle Bromwich, Station, M.R.), where also general conditions, specification, schedule of prices and form of tender may be obtained. Sealed tenders, endorsed "Tender for Stores," to John D. Watson, engineer, to the Board, Drainage Board Offices, Tyburn, near Birmingham, by Mar. 7.

Mar. 16. Manchester.—Painting the iron bridges on the line of aqueduct from near Ambleside to Agecroft, near Manchester, for the Waterworks Committee. Specification, form of tender, and all other information may be obtained on application to the Secretary, Waterworks Offices, Town Hall, Manchester. Tenders must be delivered to Wm. Henry Talbot, town clerk, Town Hall, Manchester, by Mar. 16.

ROADS AND CARTAGE.

Mar. 1. Saltburn-by-the-Sea.—Street works, for the Urban D. Council, as follows:—(a) Forming and paving with scoria bricks four back streets adjoining Upleatham Street; (b) making Upleatham Street with tarred macadam. Plans and specifications may be seen and quantities obtained from G. S. L. Bains, C.E. surveyor, on deposit of £1 rs. Tenders, endorsed "Street Works," to be delivered at the Council Offices, Windsor Street, Saltburn-by-the-Sea, by Mar. 1.

Mar. 1. Guildford.—Draining, forming, metalling, kerbing, channelling, paving and making-up the following roads, for the Town Council:—Gardner Road, 177 yds. in length; Linden Road, 57 yds. in length; Chesnut Road, 80 yds. in length; Sycamore Road, 103 yds. in length; Acacia Road, 123 yds. in length; Bell Fields, 430 yds. in length; Elm Grove Road, 175 yds. in length; Grange Road, 118 yds. in length. Plans and specifications may be seen and a form of tender obtained on application to C. G. Mason, A.M.I.C.E., borough surveyor, Tun's Gate Tenders, endorsed "Tender for making-up Private Roads," to be sent to F. S. Miller, town clerk, Town Clerk's Office, Bridge Street, Guildford, by noon on Mar. 1.

Mar. 2. Hull.—Draining, paving, &c., required to be performed in Gloucester Street, Chatham Place, and in backways in Manchester Street and Prince's Avenue for the Corporation. Forms of tender may be obtained at the City Engineer's Office. Tenders endorsed "Tender for Private Improvement Works," are to be addressed to the Chairman of the Works Committee, and delivered at the Town Clerk's Office by noon on Mar. 2.

Mar. 3. Chingford.—Granite and use of steam-roller, for the Urban D. Council. About 400 tons of Quenast or Guernsey granite to be in and 1½ in. gauge, and delivered in trucks at Chingford Station as and when required. For the use of steam-roller and the necessary labour in connection therewith, and also including the use of scarifier, as and when required, at per day consisting of 8½ working hours. Samples of granite must be submitted with each tender, and the sample selected will be strictly adhered to. Tenders, which will be for twelve months as and from April 1, 1906, to Mar. 31, 1907, to be sealed and endorsed respectively "Granite," "Steam-roller," to be sent to Leonard C. Bowen clerk to the Council, 34 Station Road, Chingford, by noon on Mar. 3.

Mar. 3. Bromley.—Road watering in the parishes of Hayes, Mottingham, Orpington, St. Mary Cray, St. Paul's Cray, and West Wickham, from April 1, 1906, to Sept. 30, 1906. Forms obtainable from the clerk's office. Tenders, addressed "Road Watering," to Edward Haslehurst, clerk to the Council, Park House, Bromley, Kent, by Mar. 3.

Mar. 3. Stoke-upon-Trent.—Making-up of Back Shelton Road (South), east of Victoria Street, for the Borough Council. Drawings may be seen and quantities obtained at the Borough Surveyor's Office, Town Hall. Sealed tenders, properly endorsed to A. Burton, borough engineer and surveyor, Town Hall, Stoke-upon-Trent, by noon on Mar. 3.

Mar. 3. Worsley.—Making-up of the following streets, for the Urban D. Council:—Campbell Street, Back Campbell Street South, Back Allen Street, Chatsworth Street, Back Chatsworth Street, Back Bolton Road. Plans sections and details may be seen, and copies of the specification together with bills of quantities may be obtained at the office of the Engineer and Surveyor. J. A. Corson, District Offices, Walkden, on payment of £1 rs. Sealed tenders endorsed "Private Street Works," must be delivered to J. Phethean Monks, law clerk to the Council, District Offices, Hilton Lane, Walkden, by noon on Mar. 3.

Mar. 3. Erpingham.—Supply of road materials and team labour during the year ending Mar. 31, 1907, for the Rural D. Council. Forms of tender, containing full particulars, can be obtained on application to Robert Mann, district surveyor, Holt. Sealed tenders, endorsed "Tenders for Road Materials," must be delivered to Thomas Ling, clerk to the Council, Northrepps, Norwich, by Mar. 3.

Mar. 5. Lewisham.—Kerbing, artificial stone paving, metalling and channelling work in part of Longhurst Road, for the Council. Plans and specifications may be seen and forms of tender obtained at the Town Hall, Catford (Surveyor's Department). Copies of the specification may also be had on payment of the sum of 5s. in each case. Tenders must be enclosed in an envelope, sealed and endorsed "Tender for —" and placed in the box at the Town Hall there provided for the purpose by 4 p.m. on Mar. 5.

Mar. 5. Luddenden Foot.—Reconstruction of 780 super. yds. of granite setts paving upon a concrete under-foundation certain portions of the main road, for Urban D. Council. Drawings may be inspected and copies of the specification, bill of quantities and tenders obtained from J. Stockwell Bottomley, surveyor, Council Chambers, Luddenden Foot. Sealed tenders, endorsed "Main Road, Contract No. 2," to C. W. Moss, clerk to the Council, by Mar. 5.

Mar. 5. Luddenden Foot.—Granite and limestone macadam, chippings, flags, kerb setts, channel stones, &c., for the Urban D. Council, for the twelve months ending Mar. 31, 1907. Form of tender, together with other particulars, may be had upon application to J. Stockwell Bottomley, surveyor, Council Chambers, Luddenden Foot, to whom tenders must be delivered by Mar. 5.

Mar. 5. Bangor.—Re-making of the following streets, in accordance with plans and specifications prepared by E. L. Woods, C.E., town surveyor, which can be seen at the Town Hall during office hours, namely:—Farnham Road, Somerset Avenue, Wrackey Loaning, and that part of Queen's Parade known as the Kinnegar. The repair of Farnham Road and Wrackey Loaning consists of surface repairs and completion. That of Somerset Avenue, sewerage, surface repairs and completion (tar macadam). All tenders must be on forms to be had on application at the Town Hall. Sealed tenders signed by the persons tendering and naming two sufficient sureties for the performance of the contract, will be received by James Milliken, clerk to the Council, Town Hall, Bangor, up to noon on Mar. 5.

Mar. 5. Handsworth.—Making-up Selborne Road, for the Urban D. Council. All particulars may be obtained on application to the Surveyor. Sealed tenders, endorsed "Selborne Road," to be delivered at the office of the Surveyor, Council House, Handsworth, Birmingham, by Mar. 5. The contractor will be required to pay not less than the recognised standard rate of wages current in the district.

Mar. 5. Claypole.—Carting of about 5,000 tons of granite and slag from the following railway stations: Sedgbrook, Barkston, Thorpe, Navenby, Newark, Claypole, Leadham, Cotham, Caythorpe, Hougham, Swinderby, Collingham and Harmston, to the various highways in the district, for the Rural D. Council. Forms of tender, showing the quantity of materials for each parish, and the station from which it is to be carted, may be obtained on application to the Surveyor, F. C. Meyrick, Brant Broughton, Newark. Tenders, marked on the cover "Tender for Team Labour," to be sent to A. J. Franks, clerk, Union Offices, Newark, by Mar. 5.

Mar. 5. Northwood.—Laying new edging and footpath in the Rickmansworth Road, Northwood, for the Urban D. Council. Forms of tenders, quantities and full particulars may be obtained from W. Louis Carr, surveyor, Council Offices, Northwood, R.S.O., Middlesex. Tenders, endorsed "Footpath," to be delivered to Edmund R. Abbott, clerk, Northwood, R.S.O., Middlesex, by Mar. 5.

Mar. 6. London, S.W.—Supply of the following materials, for the Middlesex Council:—12,000 tons (more or less) of zin. blue Guernsey granite, basalt or Cleve Hill stone; 2,000 tons (more or less) of zin. chippings; and 600 tons (more or less) of dust from the machines, to be delivered free to the various railway stations in Middlesex. Particulars, with specification and form of tender may be obtained from H. T. Wakelam, M.I.C.E., county engineer and surveyor, Middlesex Guildhall, Westminster. Tenders must be sent to the Clerk of the County Council, Middlesex Guildhall, Westminster, S.W., not later than Mar. 6.

Mar. 6. Bourne.—Carting granite, &c., from the various railway stations to the highways in the several parishes in the district for the Rural D. Council. Forms of tender can be obtained from the District Surveyor, A. J. Metcalfe, West Street, Bourne. Tenders to be sent to Cecil W. Bell, clerk, Bourne, by Mar. 6.

Mar. 6. Cheshunt.—Making-up, paving, kerbing, channelling, and constructing about 300ft. run of 4ft. diameter concrete tube culvert and about 1,350ft. run of 12in. and 6in. surface-waters in Cromwell Avenue in Cromwell Avenue, for the Urban D. Council. Plans and specification can be seen and forms of tenders obtained from Reginald H. Jeffes, M.S.E., engineer and surveyor to the Council, Manor House, Cheshunt. Sealed tenders, endorsed "Cromwell Avenue Making-up," and addressed to the Chairman of the Council, Manor House, Cheshunt, by 4 p.m. on Mar. 6.

Mar. 6. Cleethorpes.—Tar macadam, footpaths, &c., in the Kingsway Gardens, for the Urban D. Council. Plans, &c., may be seen and specifications and quantities obtained on application to the Surveyor. Sealed tenders, to be addressed to the Chairman of the Sea Defence Committee and endorsed "Tender for Garden Footpaths," to be sent to the Council House, Cleethorpes, by Mar. 6.

Mar. 6. Smallburgh.—Road materials: Stones (broken to pass 2in. gauge and free from silt), marl, beech stones (hand-picked), clay and team labour for carting same to the various parishes throughout the district. Further particulars and forms of tender may be obtained on application to the District Surveyor, W. L. Lewis, Stalham. Tenders to be forwarded to Fairfax Davies, clerk to the Rural D. Council, North Walsham, by 3 p.m. on Mar. 6.

Mar. 6. Stroud.—Clee Hill stone, Tytherington stone, and Cheshop stone for the twelve months ending Mar. 31, 1907, for the Urban D. Council. Tenders, marked "Tender for Stone," to E. Northam Wittichell, clerk, Urban D. Council Offices, Stroud, by Mar. 6.

Mar. 7. Bingham.—Road materials as undermentioned, for the repair of the district roads during twelve months from Mar. 31, 1906—Granite, 3,930 tons; cinders, 3,410 tons; cinder screenings for paths, 465 tons. Sealed tenders (on forms giving full particulars to be obtained at clerk's office), marked "Materials," to R. H. Beaumont, clerk, Market Place, Bingham, by Mar. 7.

Mar. 7. Clacton.—Making-up Page Road, Anchor Road, Russell Road and Prior Road, for the Urban D. Council. Drawings, specifications and conditions may be

seen and copies of the quantities obtained from A. R. Robinson, surveyor, Town Hall Buildings, Clacton-on-Sea. £1 rs. will be charged for the quantities of each road. Tenders, sealed and endorsed, to G. T. Lewis, clerk to the Council, Town Hall Buildings, Clacton-on-Sea, by noon on Mar. 7.

Mar. 7. Burton-on-Trent.—Levelling, paving, &c., a portion of the footways of Dallow Street and Victoria Road, for the Corporation. The plans, sections and general conditions of contract may be seen, and specifications, bills of quantities and forms of tender, &c., obtained at the Borough Surveyor's Office. No tender will be accepted from any party who pays his employees, whether artisans or labourers, less than the standard rate of wages paid in this borough, or who does not conform to the hours and conditions of labour generally recognized in each branch of industry affected, and clauses to ensure compliance with this regulation are inserted in the general conditions of contract. Sealed tenders, endorsed "Dallow Street and Victoria Road," must be delivered to George T. Lynam, borough engineer and surveyor, Town Hall, Burton-upon-Trent, by 10 a.m. on Mar. 7.

Mar. 7. Enfield.—Making-up Leighton Road, Bush Hill Park, for the Urban D. Council. Plans and specifications can be seen, forms of tender and all information obtained from Richard Collins, surveyor, Public Offices, Enfield. Tenders endorsed "Tender for Leighton Road," to be sent to T. W. Scott, clerk, Public Offices, Enfield, by noon on Mar. 7.

Mar. 7. Failsforth.—Private street works in Victoria Street, for the Urban D. Council. Plans and specification may be seen and forms of tender with quantities obtained at the Surveyor's Office, Town Hall, Failsforth. Tenders, endorsed "Tender for Private Street Works," must be delivered to H. C. Broome, clerk to the Council, Failsforth, by noon on Mar. 7.

Mar. 8. Leeds.—Paving and flagging of the following streets:—Cross Alcester Road, Alcester Road, Back Hill Top Mount, Back Alcester Road, Alcester Terrace, Back Alcester Terrace, Alcester Place, Back Alcester Place, Hill Top Mount and Clifton Grove. Plans and specifications may be seen at the City Engineer's Office, Municipal Buildings. Tenders, on forms supplied, addressed to the Highways Committee, and endorsed "Tender for Private Street Work," must be sent to the Town Clerk's Office, Leeds, by Mar. 8.

March 10. Aberdare.—Bridge and road at Aberdare, for the Urban D. Council. Plans and specifications may be seen and form of tender obtained at the office of the Surveyor, Town Hall, Aberdare, between 10 and 5. Sealed tenders, endorsed "Tender for Bridge and Road at Aberdare," to T. Phillips, clerk to the Council, Town Hall, Aberdare, by Mar. 10.

SANITARY.

Mar. 1. Nottingham.—Sewers, for the Works and Ways Committee. Drawings may be seen and copies of the specification, bill of quantities and form of tender obtained from Arthur Brown, M.I.C.E., city engineer, Guildhall, Nottingham, on payment of deposit of £2 2s. Sealed tenders, endorsed "King's Meadows Outfall Sewer," to Samuel G. Johnson, town clerk, Guildhall, Nottingham, by Mar. 1.

Mar. 1. Greenwich.—Underground convenience for both sexes on a site near the junction of Creek Road with Evelyn Street, Deptford, for the Borough Council. Copies of the drawings, specification and conditions (which are to be returned), forms of tender, and other particulars, obtainable at the office of the Borough Engineer and Surveyor, Town Hall, Greenwich Road, S.E., between 10 and 4 (Saturdays between 10 and 12), on deposit of £2 2s. Tenders, which must be made on the forms to be obtained at the Town Hall, must be sealed up and endorsed "Tender for Construction of Convenience," to Francis Robinson, town clerk, Town Hall, Greenwich Road, S.E., by noon on Mar. 1.

Mar. 1. Surbiton.—Reconstructing the combined drain belonging to Nos. 7 to 12, Woodside Villas, Ewell Road, for the Urban D. Council. Plan and specification and form of tender from William Nesfield, A.R.S.I., sanitary inspector, at the Council Offices during office hours, on payment of a deposit of 10s. 6d. Sealed tenders to Council Offices, Surbiton, by 10 a.m. on Mar. 1.

Mar. 1. Tillington and Castlechurch.—About 6,800 yds. of cast-iron and stoneware sewers, manholes and appurtenant works, for the Rural D. Council. Drawings may be seen and copies of the specification, bill of quantities and form of tender obtained from R. & W. Berrington & Son, engineers, Bank Buildings, Wolverhampton, on payment of £5 5s. Sealed tenders for each parish, endorsed "Tender for Drainage of Castlechurch" or "Tender for Drainage of Tillington," to William Morgan, clerk to the Council, Council Offices, 4, Martin Street, Stafford, by noon on Mar. 1.

Mar. 1. Guildford.—Surface-water drainage as follows, inclusive of all necessary manholes, gulleys and connections, outfalls, &c., for the Town Council:—318 yds. run of 36in. armoured concrete tubes, 209 yds. run of 30in. armoured concrete tubes, 204 yds. run of 30in. unarmoured concrete tubes, 170 yds. run of 24in. armoured concrete tubes, 213 yds. run of 24in. unarmoured concrete tubes, 915 yds. run of 18in. armoured concrete tubes, 791 yds. run of 18in. unarmoured concrete tubes, 613 yds. run of 15in. unarmoured concrete tubes, 1,808 yds. run of 12in. stoneware pipes, 1,233 yds. run of 9in. stoneware pipes. Plans and sections may be seen and copies of the specification, bill of quantities and form of tender obtained on application to C. G. Mason, A.M.I.C.E., borough engineer and surveyor, upon payment of £2 3s. Sealed tenders, endorsed "Tender for Surface-Water Drainage," to be sent to F. S. Miller, town clerk, Town Clerk's Office, Bridge Street, Guildford, by noon on Mar. 1.

Mar. 5. Yardley.—Construction of the following foul-water sewers and drains (mostly in bad ground and running sands), viz., 630 yds. of 15in. sewer, 288 yds. of 12in. sewer, 261 yds. of 9in. sewer, 330 yds. of 6in. house drains, together with manholes, lampholes, flushing chambers and other works appertaining thereto, in

accordance with plans, drawings, specification and conditions of contract, which may be seen on application to the Engineer and Surveyor, Arthur W. Smith, Council House, Sparkhill, near Birmingham, between 10 and 1 and 3 and 5 (Saturdays, 10 and 1). Specification, bill of quantities and form of tender can be obtained on payment of £3 3s. Tenders, endorsed "Re-sewerage of Stratford Road, Sparkhill," to be delivered to Francis Ladbury Thompson, clerk of the Council, the Council House, Sparkhill, near Birmingham, by noon on Mar. 5. The contractor whose tender is accepted will be required to pay his workmen not less than the minimum standard rate of wages in the district for each class of labour respectively, and to observe the recognized hours and conditions of labour generally, and shall forfeit to the Council the sum of £1 for each infringement of this clause and a further sum of £1 for each day such infringement continues after his attention has been called to it.

Mar. 5. Pembroke.—*Pater ward sewerage*, being a rearrangement of the penstocks and penstock chambers and lowering of the 30-in. cast-iron outfall pipes for a length of 300ft., and other works connected therewith, for the Borough Council. Drawings and specification can be seen and forms of tender supplied at the office of the Borough Surveyor, 37, Bush Street, Pembroke Dock, from 10 to 4, or by appointment. The borough surveyor will give intending contractors full particulars by letter of the scope and nature of the work. Sealed tenders to be delivered to the Town Clerk, Municipal Offices, Pembroke Dock, by noon on Mar. 5.

Mar. 10. Colchester.—*600 tons of best hand-picked Buxton or Derbyshire stone lime* for sewage precipitating purposes. The contract will commence on April 1, 1906, and expire on Mar. 31, 1907. Specifications and forms of tender can be obtained upon application to Herbert Good-year, A.M.I.C.E., borough engineer and surveyor, Town Hall, Colchester, to whom sealed tenders, endorsed "Tender for Lime," must be sent by Mar. 10.

MISCELLANEOUS.

Mar. 1. Birmingham.—*Supply of the following materials*, for the Interception Sub-Committee:—Iron and steel ware, timber, brushes and miscellaneous stores. The tender of any person or firm paying less than the minimum standard rate of wages current in the district will not be accepted. Specifications and forms of tender may be obtained on application to the Superintendent, Montague Street Wharf, to whom tenders are to be sent by noon on Mar. 1.

Mar. 2. Sheffield.—*Undermentioned labour and materials*, for the Corporation, for the year ending Mar. 25, 1907:—Asphalting (labour and materials) for two years; bricks: red, blue, square and radiated; castings for sewer and other work; cement and lime (including lime for sewage works); earthenware, pipes, blocks, traps, &c.; freestone and gritstone: flags, kerbs, setts, concrete flags, quarry sand, &c.; granite: kerbs, ringsmall, setts, &c.; limestone: lump and chippings; pitch, tar and creosote oil; slag; lump and shingle. Particulars and forms of tender may be obtained, and samples of materials and workmanship inspected, at the office of Charles F. Wike, city surveyor, Town Hall, Sheffield, on payment of the sum of 10s. Applications to be endorsed "Annual Contracts." Tenders enclosed in official envelope provided, and accompanied by samples, addressed to the Chairman of the Highway and Sewerage Committee, to be delivered at the City Surveyor's Office by 10 a.m. on Mar. 2. The contract will comprise the fair wages and conditions of labour clause which has been adopted by the Sheffield Corporation, particulars of which will appear in the specification.

Mar. 2. Bishop Auckland.—*Supply of the following materials and stores*, for the Rural D. Council:—Road metal, creosoted fencing, timber, cement, plate bricks, sanitary pipes, shovels, hacks, brooms, water grates, coal tar, oils, nails, scoria bricks, paint, fire bars, &c. Forms of tender and any further information from John Heslop, surveyor, Cockton House, Bishop Auckland. Tenders properly endorsed to Sam Adams, clerk to the Council, Union Offices, Bishop Auckland, by Mar. 2.

Mar. 3. Coventry.—*Supply of the following materials* during the year ending Mar. 31, 1907:—Broken road stone, granite kerbs, granite setts, stoneware pipes, castings and workmen's tools. Forms of tender and full particulars obtainable from the City Engineer's Office, to whom tenders, sealed and endorsed "Tenders for Materials," must be sent before 10 a.m. on Mar. 3.

Mar. 3. Hereford.—*Supply of the following materials and stores*, for the Roads Committee:—Timber and sawing; hauling and horse hire; sewer pipes, kerbs, blue bricks, &c.; cement, cast-iron gulleys and pans; brushes and brooms; paints, black varnish, oils, &c. Sanitary Committee:—Disinfectants. Waterworks Committee:—Lamp columns and other iron castings. Outfall Works Committee:—Cast-iron manhole covers, &c. Watch and Markets Committee:—Oil for police lamps. Gasworks Committee:—Hauling and horse hire. General conditions and specifications to be seen at City Surveyor's Office. Tenders must be upon the official forms prescribed, and after being sealed, endorsed "Tender for —," and addressed to the chairman of the respective committees, must be sent to Thomas Lewis, committee clerk, Town Hall, Hereford, by 1 p.m. on Mar. 3.

Mar. 3. Padiham.—*Supply of the following stores and materials*, for the Urban D. Council:—Castings; cement; curbs, flags, channels, setts; earthenware pipes; granite, broken stone; chippings; limestone; brick. Forms of tender may be obtained from J. Gregson, A.M.I.C.E., district engineer, Padiham. Tenders, endorsed "Yearly Contract," addressed to Chairman of Building Committee, Town Hall, Padiham, by Mar. 3.

Mar. 3. London, W.—*Supply of the following materials, &c.*, for the Paddington Borough Council for one year, commencing April 1, 1906:—Disinfectants; lamp columns, &c.; lanterns and fittings; asphalt paving works; paving material; broken granite; gravel and hoggins; scarifying and rolling; wood paving blocks; Australian wood paving blocks; lime and cement; oilmen's goods; ladders, barrows, &c.; iron, steel and general ironmongery; brooms and brushes; grease, oil and

engineer's sundries; harness material; wheels for vans and carts; tiring and re-tiring wheels; timber (No. 1), ash, oak, &c.; timber (No. 2), deal pine &c.; tar and pitch; reception and removal of slop, &c.; bricks, tiles, slates, &c.; ballast, sand and shingle; drawing materials; cartage of material from railway stations; horse hire (day work); electric lamps and shades. Upon application at the Borough Surveyor's Office, Town Hall, Paddington, W., between 10 and 4 (Saturdays 10 and 1), or by a written request for the same, printed forms of tender will be forwarded. Tenders must be delivered at the Town Hall, Paddington, W., by Mar. 3.

Mar. 3. Londonderry.—*Supply of the following materials and stores*, for the Corporation:—Plumbing, iron-work, glazing, tools and materials, sanitary requisites, horse and cart work, lubricating oils, engine-room stores, carbons, electric meters, cables, bitumen, hose, fuse boxes, Portland cement, road metal, gravel and sand. Separate specifications, schedules and forms of tender can be had upon application at the offices of the Town Clerk, City Surveyor, and Electrical Engineer. Tenders sealed, and endorsed "Tender for —, &c.," as the case may be, together with samples of goods, to Town Clerk's Office, Guildhall, Londonderry, by noon on Mar. 3.

Mar. 3. Manchester.—*Supply of the following materials and stores*, for the Tramways Committee of the Manchester Corporation:—(1) Cement; (2) chippings and broken stone; (3) veterinary services; and (4) general stores, comprising the following:—Motor parts and accessories; controllers, resistances, &c.; fuses, switches, &c.; trolley poles; arc and incandescent lamps; telephones; lighting material and bells; insulating material; carbon brushes and carbons; cable; copper, brass and steel wire; overhead line material; timber; oils, lubricants, &c.; disinfectants, &c.; paints and varnishes; transfers; glass; lamp glasses, globes, &c.; porcelain and brownware insulators; crucibles; workshop tools and appliances; handcart, barrows, &c.; spades, picks and hammers; emery wheels and grindstones; lamps, buckets, cans, &c.; bolts, screws and washers; sundry ironmongery and brassware; iron and steel; springs; cast-iron and malleable-iron castings; white metal, tin, lead, &c.; ornamental car platform fences, &c.; steel stampings; paint and varnish brushes; and enamelled iron plates. Specifications and forms of tender may be obtained on application to J. M. McElroy, general manager, Corporation Tramways 55, Piccadilly, Manchester. Tenders, addressed to the Chairman of the Tramways Committee, 55, Piccadilly, Manchester, must be received by 1 p.m. on Mar. 3.

Mar. 3. Northampton.—*Supply of the following materials and stores*, for the twelve months ending Mar. 25, 1907, for the Corporation:—Broken granite, granite kerb, setts, &c.; York flagging, artificial stone paving, stoneware pipes, gulleys, &c.; Portland cement and lime, ironmongery, wrought-iron, steel, &c.; pitch, tar, paving, and disinfectants, oils, colours, &c.; bricks, local lime, gravel and sand, brooms and brushes, iron castings, timber, team labour. Specification, schedules and forms of tender from Alfred Fidler, borough engineer, M.I.C.E., Guildhall, Northampton. Sealed tenders, endorsed, to Herbert Hankinson, town clerk, Guildhall, Northampton, by noon on March 3.

Mar. 3. South Shields.—*Supply of the following materials and stores* required by Corporation between April 1, 1906, and March 31, 1907:—Northumberland whinstone, Fifeshire whinstone, slag, limestone, Caithness flags, Portland cement, cement-concrete, flags, cast ironwork, shovels, scavenging brooms and machine brooms, coal disinfectants, sanitary pipes, paints, paint oils, glass, timber, iron, horse-shoe nails, cart axles, springs, &c.; tar, pitch, oils and general stores. Specifications and forms of tender may be had on application to S. E. Burgess, M.I.C.E., borough engineer and surveyor, Chapter Row, South Shields. Tenders to Town Clerk, Court Building, South Shields, by noon on Mar. 3.

Mar. 3. Swansea.—*Supply of the following stores, &c.*, for the Borough Council during the year to end Mar. 31, 1907:—Ironmongery, tools, iron, &c.; oils and grease, paints, &c.; disinfectants, timber, bricks, pipes, slates, &c.; cement and lime, flagging, stone for kerbing, channelling and pitching, plumbing materials, bass brooms, lamp pillars, copper lanterns, cast-iron gulleys, broken syenite (about 4,250 tons), broken limestone (about 2,500 tons), chippings (about 1,200 tons), gravel (about 650 tons) and sand, and for such haulage work as may be required. Forms of tender and further particulars may be obtained at the Borough Surveyor's Office, 13, Somerset Place, Swansea. Sealed tenders, endorsed "Tender for —," to John Thomas, town clerk, Guildhall, Swansea, by noon on Mar. 3.

Mar. 3. Larnie.—*For work and stores*, for the Urban D. Council, for the year ending Mar. 31, 1907:—Cleansing ashpits (not to exceed 1s. 8d. for single pits); providing two horses and two men for general cartage in connection with the scavenging, &c.; scavengers' brushes, shovels, spades and shafts; granite kerbs and square setts; Portland cement; whinstone broken to pass a 2-in. ring; steam rolling; gully traps. Tenders, which must be on the official forms supplied for the purpose, sealed and endorsed "Tender for —," as the case may be, must be sent to W. G. Young, clerk of Council, Town Hall, Larnie, by 10 a.m. on Mar. 3.

Mar. 3. Whitehaven.—*Supply of the following stores* for one year for the Town Council:—Iron castings; granite setts, channelling, &c.; flags; disinfectants; bricks and earthenware socket pipes; Portland cement; water and electric fittings, glass, &c.; electric glow lamps; oils, paints, tar, pitch, &c.; brushes. Applications for forms of tender must be made to the Borough Engineer and Surveyor, Town Hall, Whitehaven, and sealed tenders must be delivered to Thomas Brown, town clerk, Town Hall, Whitehaven, by 10 a.m. on Mar. 3.

Mar. 3. Newburn.—*Supply of the following for year ending Mar. 31*, for the Urban D. Council:—(1) For the leading of road materials required within their district from the various railway stations. (2) For the leading of road scrapings in the villages of Newburn and Leamington. (3) Highway materials to be delivered in such quantities and at such times as required by the surveyor: granite and whinstone kerbs, whinstone macadam and chippings, limestone macadam, castings, sand and gravel. (4) Ashpit

refuse-disposal: for the cleansing and disinfecting of all the ashpits within the districts of North Walbottle and Westerhope. Full particulars and forms of tender for the several contracts may be obtained from Thomas Gregory, surveyor, Council Offices, Newburn. Tenders to be sent to George Wilkinson, clerk, 1, Mosley Street, Newcastle-on-Tyne, by noon on Mar. 3. The lowest or any tender will not necessarily be accepted.

Mar. 5. Batley.—*Supply of the following stores and materials* for twelve months, for the Town Council:—(1) Flagstones, setts, pavos and kerbs; (2) sanitary tubes; (3) pitch and oil; (4) cement; (5) broken granite; (6) ironmongery; (7) brushes. The items (6) and (7) are open to local firms only. Forms of specification and tender may be obtained from the Borough Engineer, Oscar J. Kirkby, Town Hall, Batley. Sealed tenders, endorsed "Tenders for," to J. H. Craik, town clerk, Town Hall, Batley, by Mar. 5.

Mar. 5. Esher.—*Supply of the following stores*, for the Urban D. Council of Esher and the Dittons:—(1) Broken granite and other hard stone, granite and limestone chippings, hand-broken flints, coarse and fine Farnham and Coombe gravel and clinkers; (2) lime, cement, &c.; (3) stoneware pipes; (4) scavengers' brooms and ironmongery; (5) white lead, oils, paint, &c.; (6) disinfectants; (7) tar paving and kerbing, jobbing works, and the supply of granite kerbing, granite setts and tar paving materials in bulk. Forms of application and all information from A. J. Henderson, A.M.I.C.E., engineer and surveyor. Tenders in sealed envelopes, endorsed outside with the subject tendered for, to E. A. Everett, clerk, Council Offices, Brabant Villa, Thames Ditton, by noon on March 5.

Mar. 5. Levenshulme.—*Supply of following stores*:—6-in. Lancashire setts, 3-in. best and seconds barns flags, 12-in. by 8-in. curb, artificial stone flags, iron manhole and lamp-eye covers, street grids, best salt-glazed earthenware, sewer and drain pipes and intercepting traps, 3-in. and 3-in. limestone chippings, pitch, creosote oil and tar, shovels, spades, scavenging brushes, carbolic disinfecting powder, for the Urban D. Council. Forms of tender obtainable from James Jepson, 8a, Tiviot Dale, Stockport, surveyor to the Council, to be accompanied by stamped addressed foolscap envelope. Tenders sealed, and endorsed "Tenders for Stores," to S. J. Ogden Hardwick, clerk to the Council, Northern Assurance Buildings, Albert Square, Manchester.

Mar. 5. London, W.—*Supply of the following materials*, for the Heston and Isleworth Urban D. Council, for one year ending Mar. 31, 1907:—Lime and cement, forage, stoneware pipes, broken Gurnsey granite, disinfectants, flints (Kentish), tools, brooms, &c., and castings. Forms of tender may be obtained from P. G. Parkman, surveyor, Council House, Hounslow, W., and sealed tenders, endorsed "Tender for Disinfectants," or as the case may be, delivered to H. J. Baker, clerk to the Council, Council House, Hounslow, W., by noon on Mar. 5.

Mar. 5. Middleton.—*Supply of the following stores*, for the Corporation:—Sundry stores for the gasworks (meters, tubes and fittings, fireclay goods, oils, lime). Further particulars and form of tender from E. E. J. Anderson, M.I.M.E., gas engineer. Tenders, addressed to the Chairman of the Gas Committee, endorsed "Tender for Sundry Stores," to Town Clerk by Mar. 5. Materials for Highways, Sewers, &c. Department (setts, kerbs, flags, macadam, lime, drain pipes, manhole and grid tops, &c.). Further particulars and form of tender from W. Welburn, borough surveyor. Tenders, addressed to the Chairman of the Surveyor's Committee, endorsed "Tender for Materials," to be delivered at Town Clerk's Office by Mar. 10. Sanitary Department: disinfectants. Further particulars from C. H. Norton, sanitary inspector. Tenders, addressed to the Chairman of the Health Committee, endorsed "Tender for Disinfectants, &c.," are to be delivered at the Town Clerk's Office by Mar. 5. Persons or firms tendering for these articles or goods are required to conform to a fair wages clause which is contained in each form of tender.

Mar. 6. London, N.—*Supply of the following materials*, for the Tottenham Urban D. Council:—Road materials, lime and cement, disinfectants, for one year. Specifications and forms of tender can be obtained on application to the undersigned, at the offices, Council Buildings The Green, Tottenham, any day during office hours. Persons tendering will be required to deposit the sum of £5. The contractor will be required to pay all workmen on the Council's work the recognized trade union rate of wages. A schedule of such wages will be inserted in the contract, and a copy of the schedule must be exhibited on the pay office at the works. Sealed tenders on the form supplied, endorsed "Tender for —" (as the case may be) to be delivered to Edward Crowne, clerk of the Council, Tottenham, by noon on Mar. 6.

Mar. 6. Margate.—*Supply of the following stores and materials*, for the Borough Council:—Iron-work; paints, oils, colours, &c.; ironmongery, tools, &c.; glazed stoneware sanitary pipes, gulleys, &c.; timber; cement; flags, kerb, &c., and paving material. Forms of tender and particulars as to samples, &c., from the Borough Surveyor's Office, Town Hall, Margate. Sealed tenders, endorsed "Tender for —," to Edward Brook, town clerk, 18, Cecil Square, Margate, by 10 a.m. on Mar. 6.

Mar. 6. London, N.W.—*Supply of the following works and materials*, for the District Council, for a period of one year or three years, commencing April 1st, viz., jobbing works in construction of sewers, &c.; jobbing works in mason and pavior; supply of artificial slab paving; supply of tar-paving and execution of tar-paving works; supply of horses, carts and drivers for cartage of various descriptions; supply of gravel, flints, broken ballast, &c. for repair of roads &c.; supply of broken granite for repair of roads, &c.; supply of lime, cement, stoneware pipes, &c.; supply of lamp columns and fittings, complete; supply of disinfectants; collection, removal and disposal of house refuse; barging of road-slop, &c., from Fernoy Wharf; supply of ironmongery and tools; supply of sulphate of alumina and aluminiferous; supply of timber; maintenance of Council's telephones and wires. Specifications and forms of tender may be obtained upon receipt of 5s. for each tender form upon application to

O. Claude Robson, M.I.C.E., engineer to the Council, Public Offices, Dyne Road, Kilburn, N.W. A £10 note to be enclosed with each tender, which will be returned to all unsuccessful contractors immediately tenders are accepted, and to all successful contractors after execution of contract and bond. Tenders to be delivered to Stanley W. Ball, clerk to the Council, Public Offices, Dyne Road, Kilburn, N.W., by 4 p.m. on Mar. 6.

Mar. 6. Croydon.—Supply of the following stores, for the Visiting Committee of the Croydon Mental Hospital, for the year ending Mar. 31, 1907:—Oil and oilman's goods; brushes and turnery; lead, glass and painter's materials; ironmongery, hardware and gardening tools; asbestos; packing, &c. Printed forms of tender (upon which alone tenders will be received) and conditions of contract from the Clerk of the Asylum, Croydon Mental Hospital, Warrington, Surrey. Sealed tenders, endorsed "Croydon Mental Hospital, Tender for —," as the case may be, to F. C. Lloyd, clerk to the Visiting Committee, Town Hall, Croydon, before noon on Mar. 6.

Mar. 6. London, N.—For the supply of the following stores, for the Finchley Urban D. Council, for the year ending Mar. 31, 1907:—Heavy castings; disinfectants; gravel, hoggins and flints; broken granite; (a) lias lime and Portland cement, (b) grey lime; stoneware pipes and goods—(a) London make, (b) country make; removal of dust and house refuse (for whole district or separate wards); slab footway paving and tar paving; team labour—(a) cartage to and from railway station, (b) general cartage; horsing water-vans, brooms, scrapers, &c.; shovels, brooms and general ironmongery; petroleum and sundries. Forms of tender, conditions and full particulars from the Council Offices, Finchley, N. Sealed tenders, marked "Tender for No. —," to E. H. Lister, clerk to the Council, Council Offices, Finchley, N., by 5 p.m. on Mar. 6.

Mar. 6. London, N.W.—Supply of the following stores and materials, for the Great Central Railway Co., during the twelve months ending April 30, 1907:—Fire-bricks, &c.; brushes; iron chain; colours—dry, ground in oil, &c.; crucibles; electric-light materials; steel ferules; files; fire appliances; glass—plate, embossed, sheet, lenses, &c.; brass gas and water fittings; gas fittings—incandescent, iron, gold leaf; hardware; hinges; iron; keys, treenails, fencings, tool shafts, buffer bars and navy barrows; lamp fittings; lime and cement; locks, &c.; nails; oil, tar, pitch, turpentine and naphtha; linseed oil; pipes, earthenware, drain, &c.; screws—coach, bolts, washers, rivets, &c.; screws, iron and brass, wood; slag, broken, &c.; slates; steel plates, angles, &c.; sundry tools; tin sheets; tracing paper, cloth, &c.; tubes, iron and steel boiler; varnish; wire, ironmongery, &c. Samples and patterns can be seen from Feb. 26 to Mar. 5, 1906, inclusive, between 9 and 5, Saturday 9 to 12, on application to A. W. Longden, storekeeper, Cornwall Street, Openshaw (near Gorton Station) from whom also specifications and forms of tender can be obtained. Sealed tenders, endorsed "Tender for —," to Oliver S. Holt, secy., Marylebone Station, London, N.W., by 10 a.m. on Mar. 6.

Mar. 6. Woodford.—For the following works and supplies, for the Urban D. Council, for twelve months ending Mar. 31, 1907:—(1) Team labour; (2) road watering; (3) supply of granite for tar paving; (4) supply of pitch and tar. Particulars and forms of tender from Council's Surveyor, Woodford Green. Sealed tenders, endorsed "Tender for —," as the case may be, to William Farrington, surveyor to the Council, Council Offices, Woodford Green, by noon on Mar. 6.

Mar. 6. London, S.W.—Supply of the following stores, for the Asylums Committee of the London County Council for twelve calendar months:—Oils, oilman's goods, ironmongery, &c., tools, hardware, tinware, wrought-iron pipes and fittings, brushes, turnery, &c. lead and glass, builders' materials, timber, disinfectants and electric-light sundries, to the London County Asylums, viz.:—Banstead Asylum, near Sutton, Surrey; Bexley Asylum, Bexley, Kent; Cane Hill Asylum, Coulsdon, Surrey; Claybury Asylum, Woodford, Essex; Colney Hatch Asylum, New Southgate, N.; Hanwell Asylum, Hanwell, W.; Horton Asylum, Epsom, Surrey; the Manor Asylum, Epsom, Surrey; Epileptic Colony, Ewell, Surrey. Printed forms of tender (upon which alone tenders will be received), conditions of contract and particulars of estimated quantities may be obtained at the office of the Asylums Committee, 6, Waterloo Place, S.W. Tenders must be delivered in sealed envelopes at the said office by 9.30 a.m. on Mar. 6. Tenders will be opened on the same day, and the result will be communicated to successful contractors after Wednesday, Mar. 14, 1906. Persons tendering will be required to declare in their tenders that they pay such rates of wages and observe such hours of labour as are recognized and in practice obtained at the date of the tender by the trade unions of the district where the work is to be done.

Mar. 7. Barrow-in-Furness.—Stores and materials, for the Corporation, during the year ending Mar. 25, 1907. Forms of tender and further particulars obtainable on application at the Borough Engineer's Office, Town Hall, Barrow-in-Furness. Sealed tenders, addressed to the Chairman of the Health Committee, and endorsed "Tenders for Stores and Materials," to Town Clerk's Office, Town Hall, Barrow-in-Furness, by noon on Mar. 7.

Mar. 7. Halesowen.—Sewering Maple Road Hill, alterations to Council buildings, laying of house connections, Hayley Green, for the Rural D. Council. Plans, sections and specifications to be seen at the Surveyor's Office, Great Cornbow, Halesowen, between 10 and 4. Tenders under cover to William Whitworth, surveyor, Public Offices, Great Cornbow, Halesowen, by 12 on Mar. 7.

Mar. 7. Cheadle and Gatley.—Supply of the following materials, for the Urban D. Council, for the year April 1, 1906, to Mar. 31, 1907:—Broken granite for macadam, Lancashire setts, kerbs and flags, artificial or concrete flags, glazed earthenware pipes and sundries. Specifications and forms of tender may be obtained on application to Edward Sykes, C.E., surveyor to the Council. Tenders, endorsed "Materials," to Arthur Briggs, clerk to the Council, Public Offices, 9, High Street, Cheadle, near Manchester, by 2 p.m. on Mar. 7.

Mar. 8. Leyton.—For the supply of the following materials, for the Urban D. Council:—Granite pitchers, granite kerb, Thames sand and ballast, flints and lime and cement; patent stone paving of the following classes: Victoria indurated stone, Croft adamant stone, Aberdeen adamant stone, imperial stone, patent indurated stone and Atlas stone; broken granite for road metalling of the following classes: blue Guernsey granite, Alderney granite, Quenast granite, basalt granite, Clee Hill granite and croft granite; scavengers' brooms, &c.; shovels, picks, and other tools; also for horse hire (watering), cartage and slopping. Forms of tender and further particulars obtainable between 10 and 4 (Saturdays 10 and 12) at the office of William Dawson, M.I.C.E., surveyor to the Council, Town Hall, Leyton. Tenders for the several contracts above-named to be enclosed in separate envelopes supplied with the forms must be delivered at a meeting of the Council to be held at 7 p.m. on Mar. 8.

Mar. 9. Carlisle. Supply of the following stores and materials for the Corporation for one year, from Mar. 31, 1906. Granite and whinstone paving stones, Lazonby and concrete flags, edging, channelling, and other stones; Portland cement, timber, sewer and drain pipes, &c.; sewer ironwork, scavengers' brooms and machine brushes, bricks and tiles (local manufacture), paints, oils, and varnishes, iron and steel, nails, screws, bolts, shovels, files, spouting, paint brushes, general ironmongery, &c.; glass, &c. Form of tender, with specification, schedule, and particulars of each of the above classes of goods may be obtained at the City Engineer's Office, 36, Fisher Street, Carlisle. Tenders, sealed and endorsed with the name of the materials tendered for, must be delivered to Henry C. Marks, M.Inst.C.E., city engineer and surveyor, 36, Fisher Street, Carlisle, by Mar. 9.

Tenders.

Addressed postcards on which lists of tenders may be stated will be sent post free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Fetter Lane, E.C. Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Aylesbury.—For the erection and completion of grammar school, master's house, playing sheds and fences, &c., in Walton Road, Aylesbury, for the Governors. Mr. Fred Taylor, A.R.I.B.A., architect, Aylesbury. Quantities by Messrs. W. T. Farthing & Son, 45, Strand, London:—
J. Mead, Chesham ... £9,130
Dennis & Co., Eastbourne ... 8,981
Mayne & Son, Aylesbury ... 8,840
R. Cleaver, Northampton ... 8,750
F. Gough, Hendon ... 8,394
Jackman & Son, Slough ... 8,185
W. J. Bloxham, Banbury ... 8,150
T. Stimson, Wokingham ... 8,069
Henson & Son, Wellingborough ... 8,050
Honour & Son, Tring ... 8,044
G. Darlington, Amersham ... 8,010
A. Faulks, Loughborough ... 7,950
Wallis & Son, Maidstone ... 7,867
Lawrence & Son, Waltham Cross, N. ... 7,844
Hunt & Son, High Wycombe ... 7,822
G. & T. Cannon, Aylesbury ... 7,765
Webster & Cannon, Aylesbury ... 7,498
G. H. Gibson, High Wycombe ... 7,463
Hacksley Brothers, Wellingborough ... 7,228
* Accepted.

Aylesbury.—For the erection of a pair of villas, Tring Road, Aylesbury, for Messrs. Jones & Cocks. Mr. Fred Taylor, A.R.I.B.A., architect, Aylesbury:—
G. & T. Cannon ... £1,158
Mayne & Son ... 1,100
Webster & Cannon ... 1,098
* Accepted.

Barry.—For the erection of new schools for boys, girls and infants, together with manual instruction rooms, cookery kitchen and caretaker's house, &c., at Gladstone Road, for the Local Education Authority. Mr. G. A. Birkenhead, architect, 21, Park Avenue, Barry, and 102, St. Mary Street, Cardiff. Quantities by architect:—
C. Thomas & Sons, Mountain Ash ... £20,450 0 0
Gibby & Cleak, Barry Dock ... 17,947 9 1
J. Groult, Barry Dock ... 17,877 0 0
D. Davies, Cardiff ... 17,600 0 0
D. W. Davies, Cardiff ... 17,297 0 0
W. Williams, Cardiff ... 17,236 0 0
Lloyd & Tape, Barry Dock ... 17,111 7 7
W. Britton, Barry Dock ... 17,094 0 0
E. T. Bevan, Penarth ... 17,093 0 0
E. Turner & Sons, Cardiff ... 16,816 15 6
A. Richards, Barry Dock ... 16,790 17 9
F. Bond, Cardiff ... 16,697 0 0
* Accepted.

Bristol.—For the erection of a Baptist Mission Hall, at Freeland Buildings, Eastville, Bristol. Mr. B. Wakefield, architect, 45, Nicholas Street, Bristol:—
W. Townsend ... £1,377 0 0
W. J. Hurford ... 1,351 9 0
R. F. Ridd ... 1,337 0 0
H. W. & E. I. Neale ... 1,295 0 0
S. Farr ... 1,288 17 6
W. E. Carey, Porishead ... 1,242 0 0
E. J. Stock, Blagdon ... 1,200 0 0
A. Dowling ... 1,194 0 0
* Accepted. [Rest of Bristol.]

Buckingham.—Accepted for additions to the National School, Lillingstone Lovell, for the Managers. Mr. Fred Taylor, A.R.I.B.A., architect, Aylesbury:—
J. T. Marshall ... £292
Evesham.—For the erection of a Wesleyan church and Sunday schools, Evesham. Mr. Frederic Foster, M.S.A., architect, Coventry and Leamington:—
T. Broad, Ltd., Malvern ... £7,125 0 0
J. Parnell & Son, Rugby ... 6,905 0 0
A. Escourt & Sons, Gloucester ... 6,882 0 0
J. E. White, Evesham ... 6,700 0 0
G. Huins & Sons, Redditch ... 6,692 0 0
R. Bowen, Leamington ... 6,656 0 0

R. Cleaver, Northampton and Rugby ... £6,575 0 0
C. Hope, Berkswell ... 6,540 0 0
H. Dorset, Cradley Heath ... 6,172 0 0
Espley & Co., Evesham ... 6,150 0 0
C. Griffiths, Lye, Stourbridge ... 5,982 0 0
Co-operative Builders, Kettering ... 5,765 8 6
[Architect's estimate, £6,300.]
* Accepted, revised to £6,300.

Folkestone.—Accepted for the construction of a shelter with ladies' and gentlemen's conveniences in the Marine Gardens, for the Corporation. Mr. A. E. Nichols, A.M.I.C.E., borough engineer:—

S. T. Binfield, 227, Dover Road ... £1,279
London.—For the reconstruction of the tramways from Shoreditch to Stamford Hill, and from Bloomsbury to Poplar, which together comprise the first section of the County Council's Northern Tramways (about 2½ miles of single track) to be reconstructed for electrical traction:—
Shoreditch to Stamford Hill route.
R. W. Blackwell & Co., Ltd., London ... £147,887 5 5
J. Mowlem & Co., Ltd., London ... 147,717 0 0
W. Griffiths & Co., Ltd., London ... 145,501 9 2
Dick, Kerr & Co., Ltd., London ... 143,105 6 0
J. G. White & Co., Ltd., London ... 141,399 6 9
[Estimate (comparable with tenders) £135,980 9 9]
Bloomsbury and Poplar route.
J. Mowlem & Co., Ltd., London ... £243,190 10 0
W. Griffiths & Co., Ltd., London ... 242,425 12 8
J. G. White & Co., Ltd., London ... 239,995 5 6
Dick, Kerr & Co., Ltd., London ... 238,015 12 8
[Estimate (comparable with tenders) £226,831 18 8.]
* Accepted.

London, E.—For the construction of an underground convenience in Sutton Street, St. George-in-the-East, for the Stepney Borough Council. Mr. M. W. Jameson, A.M.I.C.E., borough engineer:—

F. & G. Foster, Norwood Junction ... £3,201 0 0
Davis & Bennett, Westminster ... 3,200 0 0
F. & T. Thorne, Isle of Dogs ... 3,100 0 0
G. Barker, Whitechapel ... 3,098 0 0
Spencer, Santo & Co., London, S.W. ... 2,999 0 0
W. Shurmur & Sons, Upper Clapton ... 2,997 0 0
Rowley Brothers, Tottenham ... 2,949 0 0
S. Lissner, St. George-in-the-East ... 2,948 0 0
B. E. Nightingale, Albert Embankment ... 2,842 0 0
A. E. Symes, Stratford ... 2,825 10 0
F. & E. Davey, Southend-on-Sea ... 2,648 0 0
* Accepted.

London, S.E.—For the erection of St. Stephen's Vicarage, Southwark, S.E., and appurtenances, for the Rev. W. Dodge. Mr. John W. Rhodes, architect, Mitre Court Chambers, Mitre Court, Temple, E.C. Quantities by Messrs. Matthews & Coleman, 11, Old Queen Street, Westminster, S.W.:—

F. Dicksee ... £2,480
G. Gray ... 2,393
H. H. Hollingsworth ... 2,362
Harris & Wardrop ... 2,227
A. White & Co. ... 2,225
Patman & Fotheringham ... 2,123
C. North ... 2,084
C. G. Hill ... 2,006
Richards & Co. ... 1,989
Spiers & Son ... 1,988

Plumstead.—Accepted for alterations to 33 and 35, Plumstead Common Road, Plumstead, Kent, for the Con, servative and Unionist Club. Mr. Frederick J. Gurney, architect and surveyor, 72, Cantwell Road, Shooter's Hill, E.C.:—
Thomas & Edge ... £515

Romford.—For the erection of three new classrooms and cloakrooms, Hornchurch Park Lane Schools, for the Essex Education Committee:—

J. T. Luton, Stratford ... £2,895 0 0
E. Pavitt & Sons, Aveley, Essex ... 2,860 0 0
E. F. Scowen, Islington ... 2,827 0 0
W. H. C. Heath, Ilford ... 2,750 0 0
J. F. Robey, London, E. ... 2,748 0 0
Harvey & Co., London, E.C. ... 2,591 17 0
J. W. Jerran, East Ham ... 2,562 0 0
L. F. Lamplough, Notting Hill ... 2,481 0 0
H. Butcher, Stanford-le-Hope ... 2,478 9 9
A. Partridge Brothers, Romford ... 2,474 0 0
J. F. Holliday, Commercial Road ... 2,457 0 0
W. H. Hyde, Norwood Junction ... 2,437 0 0
Eaby & Chivers, Leigh-on-Sea ... 2,389 19 11
J. Barker & Co., Kensington ... 2,387 0 0
W. E. Westgate, Romford ... 2,375 0 0
F. & E. Foster, Norwood Junction ... 2,349 0 0
J. S. Hammond & Sons, Romford ... 2,265 0 0
Dowsing & Davis, Romford ... 2,250 0 0
W. R. Elvy, Southend-on-Sea ... 2,249 0 0
J. C. Flaxman, Southend ... 2,249 0 0
F. & A. Willmott, Ilford ... 2,229 0 0
Myall & Union, Clacton ... 2,210 0 0
F. & E. Davey, Southend-on-Sea ... 2,187 0 0
W. J. Maddison, Canning Town ... 2,153 0 0
T. Bruty, High Street, Hornchurch, Romford ... 2,100 0 0
[Architect's estimate, £2,258.]
* Accepted.

St. Albans.—For the erection of a new infants' school, Sandridge, Newtown, St. Albans. Mr. Urban A. Smith, county surveyor, Hatfield:—

W. & D. Wilkins, Watford ... £2,992 5 5
F. W. Stanley ... 2,537 4 10
W. Tout, Hendon ... 2,450 9 0
Goldhawk & Son, Kimpton, Welwyn ... 2,397 11 11
A. W. Nash, Dunstable ... 2,379 15 3
E. Dunham ... 2,331 12 6
J. T. Bushell ... 2,314 7 6
J. Hammond & Son ... 2,298 3 0
F. Gough & Co., Hendon ... 2,272 0 0
E. Willmott & Sons, Cambridge ... 2,245 14 0
C. W. Dupleton ... 2,241 8 10
C. Miskin & Sons ... 2,169 0 0
F. & G. Foster, Norwood Junction ... 2,165 0 0
W. H. Hyde, Norwood Junction ... 2,125 0 0
Oak Building Co., Cambridge ... 2,099 0 0
G. Darlington, Amersham ... 2,080 0 0
G. Henson & Son, Wellingborough ... 2,043 3 8
J. Willmott & Sons, Hitchin ... 1,922 0 0
[Rest of St. Albans.]
* Accepted.

Roehampton.—For the erection of a house, for Mr. W. Gibson. Mr. T. Merrison Garwood, F.S.I., architect, Birkbeck Bank Chambers, High Holborn, W.C. Quantities by Mr. Stephen A. Barnes, F.S.I., 17, Surrey Street, W.C.:

G. Gray...	£1,565
J. Gibbs...	1,556
W. K. Williams...	1,456
W. Renshaw...	1,449
W. Kelland...	1,315

Taunton.—For the erection of new branch premises in Greenway Avenue, Rowbarton, for the Taunton Co-operative Society. Mr. F. W. Roberts, architect, 2, Hammet Street, Taunton:—

Branch premises.

J. Chapman...	£1,255 17 0
Westbury & Jarman, Bridgwater...	1,170 0 0
F. W. Rowsell...	1,161 0 0
T. H. Moggridge...	1,153 0 0
E. G. Coles...	1,120 0 0
H. W. Pollard, Bridgwater...	1,116 0 0
T. Manning & Son...	1,115 0 0
A. J. Spiller & Son...	1,098 0 0
H. G. Smith*	1,029 0 0

Six terrace houses adjoining.

J. Chapman...	£1,500 0 0
A. J. Spiller & Son...	1,380 0 0
H. G. Smith...	1,307 0 0
T. Manning & Son*	1,219 10 0
T. H. Moggridge...	1,218 0 0
Westbury & Jarman...	1,200 0 0
H. W. Pollard...	1,195 0 0

* Accepted. [Rest of Taunton.]

Watford.—Accepted for alterations to Yew Croft, Bushey Heath, Watford. Mr. Fred Taylor, A.R.I.B.A., architect, Aylesbury:—

D. Cook & Son, Leighton Buzzard...	£568
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Willington Quay.—For the erection of the Catholic church of Our Lady and St. Aidan. Mr. F. Davidson, M.S.I., architect, Central Buildings, Wallsend-on-Tyne:—

T. Robson, North Shields...	3,279 11 0
W. T. Weir, Howden-on-Tyne...	3,250 0 0
J. Mackarg, Wallsend-on-Tyne...	3,219 0 0
G. Park, North Shields...	3,205 0 0
T. R. Bell & Co.,* North Shields...	3,183 17 7

* Accepted.

Partnerships.

Dissolutions of Partnerships.

(The date when the partnership was dissolved is given in parentheses where known.)

FOGERTY & PARNELL (JOHN FREDERICK FOGERTY and WILLIAM CLIFFORD PARNELL), architects and surveyors, Bournemouth. (Feb. 1.) Debts by J. F. Fogerty.

SMITH & WOOD (DAVID SMITH and WILLIAM WOOD), joiners and builders, Lonsdale Street, Stoke-upon-Trent. (Jan. 1.) Debts by W. Wood.

DAWSON & FRITH (JOHN HENRY DAWSON and JOHN FRITH), builders and contractors, Chapel-en-le-Frith. (Jan. 1.) Debts by J. Frith.

COLLINS & OAKENFILL (HENRY JOHN COLLINS and WALTER OAKENFILL), timber merchants, 108A, Pritchards Road, Hackney Road. (Feb. 2.) Debts by H. J. Collins, who continues.

GEORGE WARREN (RICHARD WARD WARREN and JOHN WARREN), painters and decorators, Leicester. (Dec. 31.) Debts by R. W. Warren, who continues in his own name.

HAMES & JOHNSON (WILLIAM HAMES and WILLIAM HENRY JOHNSON), masonry contractors, 58, Andalus Road, Stockwell, S.W. (Jan. 25.) Debts by W. H. Johnson.

DAVY & SALTER (ROBERT CLIFTON DAVY and STEPHEN SALTER), architects and surveyors, Oxford and Maidenhead. (April 30, 1905.) Debts of the business at Maidenhead by R. C. Davy and of the business at Oxford by S. Salter.

FOSTER & CO. (JOHN SUTHERLAND FOSTER and HAROLD HENRY WYNDHAM NEWMAN), architects and surveyors, Blaenau Ffestiniog and Portmadoc, engineers. (Jan. 25.) Neither partner will be responsible for any future debts incurred or created in the name of the firm.

Bankruptcies.

(Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Ad.—Adjudication.)

THE NUMBER OF RECEIVING ORDERS GAZETTED during January, 1905, and January, 1906, in various trades and occupations were respectively as follows:—Builders 26, as against 28; decorators, painters, plumbers, &c., 15 and 11; contractors, 3 and 2; carpenters and joiners, 2 and 2; stone, marble and monumental masons, &c., 2 and none; ironmongers, 1 and 3; architects and surveyors, 1 and 2; timber merchants and wood dealers, 1 and 1.

DURING THE WEEK ending February 23rd thirty-two failures in the building and timber trades in England and Wales were gazetted.

W. WHITE, builder, Bristol. R.O. Feb. 15th.

J. SAUNDERS, builder, Bromley. R.O. Feb. 13th.

W. HUGHES, builder, Liverpool. R.O. Feb. 15th.

H. VOGG, plumber, Yeovil. R.O. Feb. 17th.

HERBERT & JONES, builders and contractors, Kew Gardens. P.E., Wandsworth C.C., March 8th, at 12.

NELSON, NELSON & SON, builders, Aberystwyth. R.O. Feb. 12th.

A. PARKER, builder, London. Estimated liabilities £1,200; assets £325.

J. B. SQUIRE, contractor, London, S.W. Gross liabilities £13,906; assets £419.

R. BALDWIN, builder, Small Heath. Liabilities £254; assets £38.

D. CAMERON, builder, Thornliebank. Liabilities £3,741; assets £164.

A. ASHFORD, builder, London. Unsecured liabilities £305; estimated assets £18.

G. S. BUTCHER, builder, Kessingland. Gross liabilities £448.

E. HARRISON, builder and contractor, Whittington Moor. P.E., Chesterfield C.C., March 16th, at 2.

F. N. & J. H. BOYD, builders and contractors, Darlington. P.E., Stockton-on-Tees C.C., Feb. 28th, at 10.30.

A. POWELL, builder's merchant, Catford. Adj. Feb. 16th.

H. DODD, builder and contractor, Liverpool. P.E., Liverpool C.C., March 5th, at 11.

J. & T. GOODIER, plumbers, Withington, Manchester. R.O. Feb. 16th.

J. PENNINGTON, builder and contractor, St. Helens. R.O. Feb. 16th.

R. HARRIS, glazier, Fulham. First meeting, London Bankruptcy Court, March 5th, at 12. P.E., same, March 28th, at 11.

PUBLIC WORKS CO., contractors, London, S.W. First meeting, London Bankruptcy Court, Feb. 28th, at 11. P.E., same, March 16th, at 11.30.

C. J. POPHAM, plumber, Wellingborough. First meeting, O.R.'s, Northampton, Feb. 28th, at 12. P.E., County Hall, Northampton, March 13th, at 12.

J. C. COOKE & SON, painters and decorators, West-Bromwich. First meeting, 191, Corporation Street, Birm'ngham, Feb. 28th, at 11. P.E., West Bromwich Mag Courts, March 1st, at 10.30.

Current Market Prices

FORAGE.

		£	s.	d.	£	s.	d.
Beans	per qr.	1	12	0	1	17	0
Clover, best	per load	3	12	0	4	2	6
Hay, good	do.	3	5	0	3	12	6
Sainfoin mixture	do.	3	5	0	3	15	0
Straw	do.	1	8	0	1	14	0

MISCELLANEOUS.

Bricks Stocks, d/d to job	per 1,000	1	14	0	—
Do. Flettons on rail	do.	1	4	0	—
Do. Pressed Wire Cuts, d/d to job	do.	1	16	0	—
Do. Blue brindled wire cuts	do.	1	1	0	—
Do. do. wire cuts	do.	1	5	0	—
Do. do. pressed facings	do.	1	17	6	—
Coke Breeze, into carts at gasworks	per load	0	2	0	—
Do. d/d to job	do.	0	4	0	—
Castor Oil, French	per cwt.	1	10	0	1 2 0
Colza Oil, English	do.	1	5	3	—
Copperas	per ton	2	0	0	—
Lard Oil	per cwt.	2	15	0	2 17 0
Lead, white, ground, carbonate	per ton	16	0	0	—
Do. red	do.	15	0	0	0 19 0
Linseed Oil, barrels	per cwt.	1	0	3	—
Petroleum, American	per gal.	0	0	6	0 6 1/2
Do. Russian	do.	0	0	5	0 0 5 1/4
Pitch	per barrel	0	8	0	—
Shellac, orange	per cwt.	9	15	0	—
Soda, crystals	per ton	3	2	6	3 5 0
Tallow, Town	per cwt.	1	7	0	1 7 6
Tar, Stockholm	per barrel	1	5	0	—
Turpentine	per cwt.	2	8	1 1/2	—

METALS.

Standard Copper	per ton	77	10	0	78 0 0
Do. Strong sheets	do.	92	10	0	—
Lead, Soft Foreign	do.	15	13	0	15 16 0
Do. English	do.	15	15	0	15 16 0
Do. pipes	do.	18	17	6	—
Do. sheets	do.	18	8	6	—
Galvanised Corrugated sheets	do.	12	7	6	12 13 0
Spelter G.O.	do.	26	0	0	26 10 0
Antimony, Scotland	do.	6	15	0	—
Bars do.	do.	7	15	0	—
Marked bars, Staffs	do.	9	0	0	—
Common bars do.	do.	7	5	0	7 10 0
Angles, M'boro.	do.	6	10	0	6 15 0
Joists do.	do.	6	7	6	6 10 0
Angles, Midlands	do.	6	15	0	7 0 0
Joists do.	do.	7	2	6	7 7 6
Girdler plates, Midlands	do.	7	15	0	8 0 0
Angles, Foreign, c.i.f.	do.	6	2	6	6 7 6
Tees do. do. do.	do.	6	7	6	6 10 0
Joists do. do. do.	do.	5	12	6	5 16 0
Channels do. do. do.	do.	5	15	0	5 18 0
Nails, Wire	do.	9	2	0	9 5 0
Tin, Foreign	do.	164	10	0	165 0 0
Do. English insets	do.	166	0	0	1 8 0 0
Zinc, sheets, Silesian	do.	29	10	0	—
Do. do. Vieille Montagne	do.	30	0	0	—

TIMBER.

SOFT WOODS.

Fir, Dantzic and Memel	per load	2	15	0	5 0 0
Pine, Quebec, Yellow	do.	4	2	6	7 10 0
Do. Pitch, American	do.	2	19	0	5 0 0
Laths, log, Dantzic	per cu. fath.	4	0	0	6 0 0
Deals, Archangel, Yellow, 2nd, 3x11	per std.	15	15	0	16 0 0
Do. do. do. 2nd, 3x9	do.	14	10	0	—
Do. do. White, 1st, 3x9	do.	12	5	0	—
Do. do. do. 2nd, 3x9	do.	10	15	0	—

Deals, Mesane, White, 1st, 3x11	per std.	14	10	0	—
Do. do. Yellow, 2nd, 3x9	do.	15	10	0	—
Do. Galatz, White, 1st & 2nd, 3x11	do.	8	10	0	—
Do. Nederkalix, Yellow, 1st, 3x9	do.	11	10	0	—
Do. do. do. 2nd, 3x7	do.	10	5	0	—
Do. Räfsö, Yellow, 1st, 3x9	do.	14	15	0	—
Do. do. do. 2nd, 3x7	do.	11	5	0	—
Do. Kem Yellow, 1st, 3x9	do.	19	10	0	—
Do. do. do. 2nd, 3x9	do.	15	15	0	—
Do. Skutskar, Yellow, 1st and 2nd, 3x7	do.	12	0	0	—
Do. Langrör, White, Unsorted, 2x7	do.	8	15	0	—
Do. Lewisport, Pine, 3rd, 3x7	do.	7	5	0	9 0 0
Do. Ingramport, White, Unsorted, 2x7	do.	8	10	0	—
Do. Quebec, Yellow, 3rd, 3x11	do.	11	15	0	—
Do. do. Spruce, Unsorted, 3x10	do.	9	5	0	—
Do. do. do. 2nd, 3x7	do.	8	15	0	—
Do. Montreal, Bright Pine, 1st, 3x9	do.	22	0	0	23 10 0
Do. do. do. do. 3x8	do.	21	0	0	—
Do. do. do. do. 3x7	do.	20	15	0	—
Battens, Gelfe, Yellow, planed, Unsorted, 3x4	do.	10	0	0	—
Do. do. do. do. 3x3	do.	9	0	0	—
Do. do. do. do. 2x4	do.	9	15	0	—
Do. do. do. do. 1x9	do.	10	10	0	—
Do. do. White, do. 1x11	do.	10	0	0	12 5 0
Do. Mesane, Yellow, 3rd, 2x9	do.	11	5	0	—
Do. Nederkalix, Yellow, 1st, 2x7	do.	10	15	0	—
Do. Skien, White, 5th, 2x6	do.	6	10	0	—
Do. do. do. do. 2x5 1/2	do.	6	10	0	—
Do. do. do. do. 2x5	do.	6	10	0	—
Do. do. do. do. 2x4	do.	7	15	0	—
Do. Fredrikshamn, Yellow, Unsorted, 2x6	do.	8	5	0	—
Do. do. do. do. 2x5	do.	7	10	0	8 0 0
Do. Transung, Yellow, Unsorted, 2x4	do.	8	15	0	9 0 0
Do. Hommelvik, Yellow, Unsorted, 2x4	do.	8	15	0	—
Do. Lappvik, Yellow, Unsorted, 2x4	do.	9	0	0	—
Do. Abo, Yellow, Unsorted, 2x3 1/2	do.	8	5	0	—
Do. Sandarne, White, planed, 1st, 1x11	do.	12	5	0	—
Do. Christiania, Yellow, planed, 3rd, 1x9	do.	10	5	0	—
Do. do. do. do. 1x11	do.	11	5	0	—
Do. Mon. Sundswall, Yellow, 1st, 1x8	do.	10	0	0	—
Do. do. do. do. 3rd, 1x9	do.	9	15	0	—
Do. do. do. do. 1x8	do.	8	15	0	—
Do. St. Petersburg, Yellow, Unsorted, 1x7	do.	8	15	0	—
Do. Ingramport, White, Unsorted, 2x5	do.	7	5	0	—
Do. do. do. do. 2x4	do.	8	0	0	—
Do. do. do. do. 1x7	do.	7	15	0	—
Do. do. do. do. 1x5	do.	6	10	0	—
Flooring Boards, Montreal, Brightpine, 1st, 1x7	per square	12	0	0	—
Do. do. do. do. 1st, 1x5	do.	10	5	0	—
Do. Christiania, White, 3rd, 1x7	do.	0	9	6	—
Do. Mon. Sundswall, White, Unsorted, 1x7	do.	0	10	3	—
Do. do. do. Yellow, do. 1x7	do.	0	8	0	—
Do. do. do. do. 1x6	do.	0	7	3	—
Do. do. do. do. 2nd, 1x6	do.	0	10	6	—
Do. do. do. 3rd, 1x6	do.	0	9	9	0 10 0
Do. Sandarne, Yellow, 2nd, 1x6 1/2	do.	0	11	0	—
Do. Gelfe, Yellow, Dry, 3rd, 1x6	do.	0	9	3	0 9
Do. do. White, 1x5 1/2	do.	0	7	9	—

HARD WOODS.

Ash, Quebec	per load	4	0	0	7 15 0
Birch, New Brunswick	do.	2	7	6	4 10 0
Do, Quebec do.	do.	2	12	6	5 0 0
Box, Turkey	per ton	7	0	0	20 0 0
Cedar, Cuba	per ft. sup.	0	0	3	0 0 4
Do. Honduras	do.	0	0	7 ³ / ₄	—
Do. Tobasco	do.	0	0	5 ¹ / ₂	—
Do. Brazilian	do.	0	0	4 ¹ / ₂	—
Elm, Quebec	per load	4	5	0	8 10 0
Jarrah, plank	per ft. cu.	0	2	6	0 3 0
Mahogany, Average Price					
for Cargo, Honduras	per ft. sup.	0	0	4 ¹ / ₂	0 0 5 ¹ / ₂
Do. Tobasco	do.	0	0	5 ¹ / ₂	—
Do. Cuba	do.	0	0	11 ¹ / ₂	—
Do. African	do.	0	0	3 ¹ / ₂	—
Do. Lagos	do.	0	0	3 ¹ / ₂	—
Oak, Wainscot	per log.	3	15	0	7 5 0
Teak, Indian, logs	per load	10	0	0	19 0 0
Do. do. planks	do.	13	0	0	20 0 0
Whitewood, American,					
logs, ...	per ft. cu.	0	1	3	0 1 6
Do. do. planks and					
boards	do.	0	1	3	0 3 0

Builders' Current Price List of Specialities.

WE have received numerous letters and verbal suggestions from readers pointing out the various difficulties they experience in ascertaining the cost of the many specialities employed in buildings. Their requirements range themselves under the following heads:—

- (1) A record of fluctuations in the price of specialities to be published more frequently than the yearly builders' price-books.
- (2) A list of new specialities with registered names which give no indication of their makers or agents, as well as of older goods still on the market.
- (3) A price list of new materials and goods which will serve to place such goods prominently before the attention of architects and contractors.
- (4) More direct means of inter-communication between buyer and seller.

Architects when preparing drawings and writing specifications require to know what goods are available, and their cost, while builders often have to prepare estimates hurriedly, without sufficient time to write for quotations. Estimating then becomes guesswork, and a contractor often learns his tender is out of the running, or else learns after he has obtained a contract that he is bound to lose on certain items.

Yearly price-books have been published with the idea of offering a ready means of consultation for estimating purposes. These are no doubt valuable for roughly approximating prices of goods, but are quite unreliable for practical estimating, because the prices of specialities fluctuate so quickly.

We believe this list will meet these requirements. Our space is restricted, but in future numbers the list will be enlarged and the prices of other goods substituted,

so that by keeping these special monthly issues of "The Contractors' Supplement" contractors and other purchasers will have ready to hand an accurate compendium of prices for quick consultation.

We shall be glad to receive from readers suggestions as to any improvements and additions to this list of prices which would render it of still greater service to the architectural profession and the building trade.

This list is not intended to promote undercutting, and prices are subject to discounts for a quantity and for cash. Readers are advised to write for these. Where prices for goods are standardised and fluctuation takes place in trade discounts, our prices have the discounts deducted. In some cases it is difficult for firms to quote prices, and we have stated where they will be pleased to send catalogues and quotations immediately on application.

Goods.	Description.	Merchants or Manufacturers.	Address.	Size.	Weight.	Quantity. per	Price		
							On Rail.	Dlvrd. at London Termini.	Dlvrd. to Buyer.
Baths:									
Iron	Rolled edge, white vitreous enamelled.	Doulton & Co., Ltd.	Lambeth, London	5ft. 6in. inside.	—	each	£4 7s. 6d.	—	—
Bath Room Suites	Complete as advertised	Standard Sanitary Manufacturing Co.	22, Holborn Viaduct, London.	—	—	—	—	—	£18 18s.
Blinds:									
"Japa"	Sanitary	Japa Blinds, Ltd.	55, Barbican, London, E.C.	All sizes	72 long 36 wide.	—	—	From 2s. 6d. to 16s. doz.	Free.
Boilers:									
Saville	Wrought-iron for hot-water heating and supply.	Hartley & Sugden, Ltd.	Halifax	30 x 14 to 72 x 30.	3 cwt. to 17 cwt.	each	£9 5s. to £52.	Free in Great Britain.	—
Bricks:									
Blue	Staffordshire pressed	Hathern Station Brick and Terra Cotta Co., Ltd.	Loughborough	9 x 4½ x 2½	3½ tons	1000	£2 15s.	£3 13s.	—
Facing	Blue and brindled	G. Woolliscroft & Sons, Ltd.	Hanley, Staffs.	9 x 4½ x 3	3½ tons	1000	35s. to 37s. 6d.	£4 3s. to £3 5s. 6d.	—
Fire	Phoenix brand	Archibald Vickers	25, Victoria Street, S.W.	9 x 4½ x 2½	3 tons	1000	£2 10s.	£3 18s.	—
Facing	Red terra-cotta	G. Woolliscroft & Sons, Ltd.	Hanley, Staffs.	9 x 4½ x 3	3½ tons	1000	£2 10s.	£3 18s.	—
Stocks	Sand stocks	Gibbs Brothers	Loughborough	9 x 4½ x 2½	2½ tons	1000	£2	£2 15s.	—
Carving:	Sculpture and Carving	Sculpture and Carving Syndicate, Ltd.	62 & 64, Summer Street, London, S.E.	all sizes	—	—	Prices on application.		
Casements and Sashes:									
Metal Casements	Iron, steel, and bronze	George Wragge, Ltd.	London and Manchester	Registered sections.	—	each	From 15s.	16s.	—
Metal Sashes	Ditto	Ditto	Ditto	Ditto	—	ft. super.	From 6d.	—	—
Cement, Lime, &c.:									
Cement	Portland	Associated Portland Cement Manufacturers (1900), Ltd.	Dixon House, 72, Fenchurch Street, E.C.	—	—	—	Prices on application.		
Lime	—	Associated Portland Cement Manufacturers (1900), Ltd.	Dixon House, 72, Fenchurch Street, E.C.	—	—	—	Prices on application.		
Chimney Cows:									
Terra-cotta and Metal	Various	Acme Ventilating and Heating Co.	Liverpool	9 to 12 diam., &c.	—	each	From 13s.	rs. extra	—
Perry's	Galvanized iron and terra-cotta.	Perry's Certainty Smoke Curing Cowl Co.	58, Pall Mall, London, S.W.	3ft. 6ins.	—	each	—	£1 1s.	—
Chimney Pieces:	Carved Oak	Bromsgrove Guild	Bromsgrove	—	—	complete	From £15.	From £16 5s.	—
Closets:									
Cisterns, Seats, &c.	With iron grate and fire-bricks and marble surround. For houses	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	set, with fittings.	£2 to £10	—	—
Latrines	For schools and workmen	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	stall	30s. to 70s.	—	—
"Simplicitas"	—	Doulton & Co., Ltd.	Lambeth, London	—	—	each	£1 15s.	—	—
Columns	Cast-iron	Measures Bros., Ltd.	53B, Southwark Street, London, S.E.	stock patterns.	—	ton	£7	£7	—
Concrete:									
Armoured	Floors and roofs	Trussed Concrete Steel Co.	11, Tothill Street, London	—	—	sq. yard	—	—	8s.*
Conduits:									
"Simplex" steel	Light gauge, ordinary	Simplex Steel Conduit Co., Ltd.	Garrison Lane, Birmingham.	½ to 2 diam.	20lbs. to 140lbs.	100ft.	—	—	5s. to £1 15s.
Doors:									
Strong Room	Steel, in horn frame	Milner's Safe Co., Ltd.	London; branches and agents everywhere.	5ft. 6ins. x 2ft. 6ins.	8 cwt.	each	£16 3s.	Any station in U.K.	—
Door Furniture:									
Door Springs	With silent check	Robert Adams (patentee)	3 & 5, Emerald Street, London, W.C.	For medium doors.	—	each	D.A. 46s. S.A. 42s.	D.A. 46s. S.A. 42s.	—
Knobs, Levers, or Pulls	Cast, bronze or brass	Bromsgrove Guild	Bromsgrove	—	—	pair	15s. 15s. 6d.	15s. 15s. 6d.	—
Elevators:									
"Otis"	Electric and hydraulic	Otis Elevator Co., Ltd.	4, Queen Victoria Street, London.	—	—	—	Prices on application.		
Enamels:									
"Sanaline"	Pure white or colours	Aspinall's Enamel, Ltd.	New Cross, London	—	—	gallon	—	—	18s.
Enamel:									
White and coloured	For elevations	Alfred Whitehead	Prudential Build'gs, Leeds	—	—	sq. yard	74s. 6d.	79s.	—
Fans:									
Fans, Blowers, and Motors.	Belt, electric or steam driven.	Matthews & Yates, Ltd.	Cyclone Works, Swinton, Manchester.	all sizes	—	—	Prices on application.		
Felt:									
Ruberoid Sacking Felt	High-grade inodorous felt	Robert W. Blackwell & Co., Ltd.	59, City Road, London, E.C.	36 x 72	44lbs.	roll,	—	—	13s. 6d.
Fencing:									
Iron	"Greenhill" patent automatic railing.	Hill & Smith	Brierley Hill Iron Works, Staffs.	3½ft. high ½ verticals.	40lbs. yd.	24sq. yds. yard	4s. 5d.	4s. 9d.	—

* Executed.

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Builders' Current Price List of Specialities—(continued).

Goods.	Description.	Merchants or Manufacturers.	Address.	Size.	Weight.	Quantity.	Price			
							On Rail.	Divrd. at London Termini.	Divrd to Buyer.	
							per			
Fireproofing (See also Partitions):										
Terrawode Brickwood	-	Fireproof floors	Jabez Thompson & Sons	Northwich, Cheshire	4ins. thick	—	sq. yd.	6s.	7s.	—
Columbian	-	Reinforced concrete floors and roofs.	Columbian Fireproofing Co.	37, King William Street, London.	—	—	—	Prices on application.		
Steel Sheeting	-	For partitions, reinforced concrete, damp course, &c.	The Fireproof Co., Ltd.	10, York Buildings, Adelphi, W.C.	all sizes	all weights.	sq. yard	from 1s. 3d.	from 1s. 3d.	plus rail charge.
Expanded Steel	-	Reinforcement for every description of concrete work.	New Expanded Metal Co.	York Mansion, York Street, Westminster, S.W.	up to 16ft. x 8ft.	2lbs. to 30lbs.	sq. yard	5d. to 4s. 9d.	Price list on application.	
Floors and Roofs	-	Steel concrete	Homan & Rodgers	17, Gracechurch Street	—	—	sq. yd.	—	—	7s.*
Floors and Roofs	-	Reinforced concrete	Trussed Concrete Steel Co.	11, Tothill Street, London	—	—	sq. yd.	—	—	8s.*
Stuarts'	-	Reinforced concrete buildings in their entirety.	Stuarts' Granolithic Stone Co., Ltd.	Glengall Road, Millwall, London, E.	—	—	yd. sup.	—	—	8s.
Floors:										
Columbian	-	Concrete fireproof floors and roofs.	Columbian Fireproofing Co.	37, King William Street, London.	—	—	—	Prices on application.		
"Euboelolith"	-	Patent flooring	Euboelolith Patent Flooring	3, Victoria Street, Westminster, S.W.	—	—	yard sup.	5s. to 6s.	—	—
Galvanised Iron:										
Sheets	-	Corrugated	Baldwins, Ltd.	5, Fenchurch St., London, E.C.	5ft. to 9ft. x 2ft. x 22 or 24 G.	—	ton	—	£14 10s.	—
Sheets	-	Flat	Baldwins, Ltd.	5, Fenchurch St., London, E.C.	72 x 24 to 36 x 20 or 24 G.	—	ton	—	£15	—
Buildings	-	Of every description	Baldwins, Ltd.	5, Fenchurch St., London, E.C.	—	—	—	Prices on application.		
Gas Generators:										
Acetylene	-	Five-light portable	Strode & Co.	48, Osnaburgh Street, London.	15ins. diameter, 24ins. high.	—	each	—	£3	—
Guards, Wire:										
Straight Lattice	-	Half mesh	Richard Johnson, Clapham, & Morris, Ltd.	Manchester	6ft. x 3ft.	14lbs.	sq. ft.	5d.	5½d.	5¾d.
Joinery:										
Panelling	-	High class 1-in. Austrian oak panelling.	Elliott's Moulding & Joinery Co., Ltd.	Newbury	3ft. to 7ft. high.	ft. super.	2s.	2s. 1d.	—	—
Joists:										
Steel	-	English and foreign	Columbian Fireproofing Co.	37, King William Street, London.	—	—	—	Prices on application.		
Steel	-	Belgian and German	Measures Bros., Ltd.	53B, Southwark Street, London, S.E.	3 to 20 deep.	—	ton	£6 10s. basis sections. £20 to £110.	£6 10s. basis sections. £20 to £112 10s.	—
Laundry Machinery:										
Washing Machines	-	Improved rotary	W. Summerscales, Ltd.	Keighley, Yorks	many sizes	—	—	—	—	—
Lavatories:										
Glazed Ware	-	For schools, workmen, and private houses.	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	set, with fittings.	£1 10s. to £4.	—	—
Lifts:										
Hand-power	-	All kinds, for all purposes	George Johnson	227, St. John's Hill, London, S.W.	—	—	—	Prices on application.		
"The Premier"	-	Dinner and service lift to raise ½ cwt.	The Lift and Hoist Co.	Premier Iron Works, Prince Street, Deptford, S.E.	Cage inside 2ft. wide, 1ft. 6 deep, 2ft. 6 high. ¾ x ½ and upwards.	—	—	—	£9 10s.	—
Lightning Conductors										
Copper tape	-	—	Joseph Lewis	5 & 6, Great Winchester Street, London, E.C.	—	—	foot run	from 1s.	—	—
Locks:										
Kaye's Patent	-	Four lever mortice, iron and brass.	Joseph Kaye & Sons, Ltd.	93, High Holborn, London, W.C.	—	—	each	—	—	7s. 6d. 10s. 6d.
"C. and B."	-	Registered mortise Nos. 1, 2, and 3.	Colledge & Bridgen	Midland Works, Wolverhampton.	6 inch	—	dozen	—	—	£3 6s. £2 5s. £1 9s.
Mantelpieces:										
White Wood	-	With overmantel	The Hardwood Trading Co.	12, New Oxford Street, London, W.C.	Opening 38 x 38.	72ins.	each	£2	—	—
Marble, Mosaic, and Stone Work:										
Mosaic	-	Plain or to designs	Bromsgrove Guild	Bromsgrove	—	—	ft. super	15s. to £3	18s. to £3 10s.	—
Glass Mosaic	-	Coloured art	The Cloisonné Glass Co.	40, Berners Street, W.	—	—	sq. ft.	—	From 3s. upwards.	—
Paint:										
"Japonika," Enamel	-	Elastic, impervious, covers 90yds. sup. per gal.	John Line & Sons, Ltd.	Alfred Place, Tottenham Court Rd., London, W.C.	—	—	gallon	18s.	—	—
Anti-corrosive, &c.	-	"Bitumastic" solution and enamel.	Wales, Dove & Co., Ltd.	Newcastle-on-Tyne, London, Liverpool, Cardiff, Birmingham, and Glasgow.	—	—	—	Prices on application.		
Partitions:										
Dovetail Corrugated Steel Sheeting.	-	For partitions, reinforced concrete, &c.	The Fireproof Co., Ltd.	10, York Buildings, Adelphi, W.C.	All sizes	All weights.	sq. yard	From 1s. 3d.	From 1s. 3d.	1s. 3d. plus rail.
Partitions	-	"Kulm" slabs	H. W. Cullum & Co.	Craven House, Kingsway, London, S.W.	—	—	sq. yard	—	—	8s.*
Patent Plaster	-	Hollow interlocking blocks	Havelock Patent Plaster Partition Co.	63, Finsbury Pavement, E.C.	29 x 17	70lbs. super. yard.	super. yard.	3s. 6d.	4s. 6d.	6s.*
Plaster	-	Partition slabs	Jabez Thompson & Sons	Northwich, Cheshire	12 x 12 x 2	—	sq. yard	3s. 6d.	4s.	—
Porous Brick	-	Porous terra-cotta blocks	Hempstead Patent Brick Co.	Hemel Hempstead	9 x 12 x 1½	—	sq. yard	2s.	2s. 4d.	—
Terrawode Brickwood	-	Partition bricks	Jabez Thompson & Sons	Northwich, Cheshire	9 x 4½ x 3	2 tons	1000 sq. ft.	£3 5s.	£4 9s.	—
School	-	—	John Stones	"Rosside," Ulverston	—	—	—	Prices on application.		
Photo Prints, Copies, &c.										
"True to scale"	-	(Dorel system)	W. F. Stanley & Co., Ltd.	13, Railway Approach, London Bridge, S.E.	—	—	—	—	—	—
True scale	-	Dorel and photo-litho methods.	Vincent, Brooks, Day & Son, Ltd.	48, Parker Street, Kingsway, London, W.C.	—	—	—	—	—	—
Autocopyist	-	Simple method for duplicating plans, &c.	Autocopyist Co.	64, Queen Victoria Street, London, E.C.	Various	—	—	—	—	From 35s.
Pipes:										
Columbian	-	Armoured cement for water and sewage conveyance.	Columbian Fireproofing Co.	37, King William Street, London.	—	—	—	Prices on application.		
Drain (iron)	-	Immense assortment of fittings stocked.	Burn Bros.	Rotunda Works, 3, Blackfriars Rd., London, S.E.	stocked 2 to 6	L.C.C. weights.	—	Prices on application.		
"Wisconsin" Graphite	-	Pipe joint paste	G. F. Hopkins & Co.	112, Westminster Bridge Road, London, S.E.	—	—	1 lb. to 60 lbs.	1s. 1d. to 6½d.	—	—
Plaster:										
Fibrous, &c.	-	For relief decoration	G. and A. Brown, Ltd.	167, Hammersmith Road, W.	—	—	—	Prices on application.		
Keenes & Parian	-	—	Associated Portland Cement Manufacturers (1900), Ltd.	Dixon House, 72, Fenchurch Street, E.C.	—	—	—	Prices on application.		
"Pytho"	-	For interior plastering	Plaster, Brick, and Stone Co., Ltd.	Wall Grange, near Leek, Staffs.	—	1 ton	—	37s. 6d.	42s. 2d.	—

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Builders' Current Price List of Specialities—(continued).

Goods.	Description.	Merchants or Manufacturers.	Address.	Size.	Weight.	Quantity.	Price		
							On Rail.	Divrd. at London Termini.	Divrd. to Buyer.
Rain Water Heads and Pipes:									
Rain Water Heads	Cast iron	Bromsgrove Guild	Bromsgrove	stock designs.	—	each	From 12s. 6d.	13s. 6d.	—
	Cast lead	—	—	—	—	—	From 11 s.	29s.	—
Rain Water Heads	Cast lead, and iron	George Wragge, Ltd.	London and Manchester	stock designs.	—	each	From 16s. 6d.	17s. 6d.	—
Roofs:									
Rubberoid Roofing	High-grade prepared roofing	Robert W. Blackwell & Co., Ltd.	59, City Road, London, E.C.	36 x 72	40lbs. to 100lbs.	216 sq. ft.	—	1 ply, 17s. 4d.; 2 ply, 16s. 6d.; From 6d. upwds.*	1 ply, 20s. 6d.; 3 ply, 34s. 6d.
Steel	—	E. F. Blakeley & Co.	Vauxhall Ironworks, Liverpool.	—	—	ft. super.	—	—	—
Sanitary:									
Syphons and Tanks	Automatic flushing	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	each	£1 to £3	—	—
Waste Preventors	" Paisley," painted	Doulton & Co., Ltd.	Lambeth, London	2 gallon	—	each	£1 3s. 6d.	—	—
Waste Preventors	" Well," painted	Doulton & Co., Ltd.	Lambeth, London	2 gallon	—	each	16s.	—	—
Scaffolding:									
Putlogs	Hewn birch	Vigers Bros.	67-68, King William Street, E.C.	—	—	dozen	5s. 3d. in docks.	—	—
Shutters:									
Revolving	No. 7 convex wood lath	Clark, Bunnett & Co., Ltd.	New Cross Road, London, S.E.	—	—	ft. super.	1s. 6d.	—	—
Sinks:									
Glazed Ware	" Krator," " Helios," Belfast, and Edinburgh.	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	each	10s. to £5.	—	—
Slates:									
" Arton "	Unfading green	Pearson Bros. & Campbell	18, Water Street, Liverpool	—	—	—	—	—	—
Buttermere or Cumberland and Westmoreland Green Slates.	Light sea green, olive, and dark.	Buttermere Green Slate and Stone Works.	Keswick	30 to 12 long.	—	ton	£4 5s.	£5	—
Slatting and Tiling	All kinds—green slating speciality.	Roberts, Adlard & Co.	London, Faversham, Brighton, &c.	as required	—	1,000	Prices on application.		
Sound Proofing:									
Deafening Quilt	Cabots' double ply	Arthur L. Gibson & Co.	19/21, Tower Street, Upper St. Martin's Lane, London, W.C.	—	120 lbs.	bale, 500sq. ft.	36s. 6d.	—	—
Stone:									
Bramley Fall	Sandstone, light and grey	B. Whitaker & Sons, Ltd.	Horsforth, near Leeds	any sizes	14ft. to 1 ton.	cube ft.	10d.	1s. 9d.	—
Granolithic	Stuarts' patent	Stuarts' Granolithic Stone Co., Ltd.	Glengall Road, Millwall, London, E.	—	144lbs. per cube foot.	cube foot	—	—	4s. abt.
Terra-cotta:									
Window Heads	Buff or red	Walwyn T. Chapman	Cleethorpes	3 x 9 4½ x 10.	10wt.	each	5s.	—	—
Tiles:									
Decorative	Floor, wall, mosaic, and faience.	Craven, Dunnill & Co., Ltd.	Jackfield, R.S.O., Shropshire.	every size	—	—	—	—	—
Coloured Enamelled	Best quality in brown, blue, green, &c.	Carter & Co.	Encaustic Tile Works, Poole.	usual sizes	1 ton	55yds. sup.	10s. 6d. per yd.	11s. per yd. sup.	11s. 2d. per yd.
Tesselated	Best quality any plain pattern	Carter & Co.	Encaustic Tile Works, Poole.	usual sizes	2 tons	80yds. sup.	5s. per yd. sup.	5s. 4d. per yd.	5s. 6d. per yd.
Decorative	Floor	Craven, Dunnill & Co., Ltd.	Jackfield, R.S.O., Shropshire.	every size	56lbs.	sq. yard	from 3s. 6d.	4s. 6d.	4s. 6d.
	Wall	Ditto	Ditto	—	40lbs.	—	from 5s. 6d.	6s. 4d.	6s. 4d.
	Mosaic	Ditto	Ditto	—	48lbs.	—	from 13s. 9d.	15s.	15s.
	Faience	Ditto	Ditto	—	170lbs.	—	from £1 3s.	£1 5s.	£1 5s.
" Opalite "	Opal glass, with Skelmerdine backing.	Wm. Griffiths	126, Hamilton Ho., Bishops-gate St. Without, E.C.	9 x 3 and 6 x 6.	—	sq. yard	—	—	10s. 6d.†
Wall	Patent undercut back	T. & R. Boote, Ltd.	Burslem	6 x 6	50 lbs.	sq. yard	6s.	6s. 6d.	6s. 9d.†
Tracing Cloth:									
" Ivorine "	Pure white	Norton & Gregory, Ltd.	Castle Lane, Westminster	30ins. x 24yds.	—	roll	—	—	19s.
" Koh-i-noor "	—	L. & C. Hardmuth	12, Golden Lane, London, E.C.	30, 36, 40, 42.	—	roll of 24yds.	Prices on application.		
" Triumph " Brand	Blue	Norton & Gregory, Ltd.	Castle Lane, Westminster	30ins. x 20yds.	—	roll	—	—	11s.
Urinals:									
Glazed Ware	Circular slab and T-backs	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	stall, with fittings.	£3 to £15	—	—
Ventilators:									
Boyle's Patent	Latest " air-pump " ventilators (design No. 175).	Robert Boyle & Son	London and Glasgow	12ins. diam. to 54ins. diam.	—	each	—	—	£1 5s. to £18 18s.
Vices:									
" Lightning "	Instantaneous action	C. Nurse & Co.	181-183, Walworth Road, London, S.E.	jaws 9 ins. opening 12	50 lbs.	each	17s.	—	—

* Erected.

† Approximate price fixed, complete, in London.

‡ Executed.

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THE BUILDERS' JOURNAL

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The Degenerates. A CONFERENCE of representatives of municipal, educational and labour interests convened by the Plumbers' Company and held last Wednesday at the Guildhall, to consider the question of the registration and training of plumbers and other skilled workmen, was an occasion which brought out some interesting speeches and pointed a moral which we think deserving of careful consideration. Mr. W. D. Caröe, Master of the Plumbers' Company, said that the three things which they had in view were the education, the examination and the registration of plumbers, and in all they had done they had had the hearty support of the men themselves. It had been borne in upon him, as an architect, that the only real system of training for craftsmen was that of apprenticeship. The work which the craftsmen of the past did, as was to be seen by an inspection of ancient buildings, could not be surpassed in the present day, and was seldom equalled. It was surprising to see, as he often had seen, work done thirty or forty years ago in restoring old buildings falling into decay, whereas the work of 600 years ago was perfectly sound. It was marvellous to observe

the way in which in the fifteenth and sixteenth centuries, particularly in Spain, the small technicalities of dealing with masonry were carried out without the slightest effort apparently, and yet always right. Architects nowadays had to give workmen a drawing for all those things. Dr. Macnamara, M.P., spoke more generally in regard to the way in which boys start life nowadays without any training, and end in joining the great army of unemployed when there is slackness of trade. In England and Wales they had 200,000 boys going out on mere errands every year. Under the age of twenty, there were 2,000,000 of them in the country, and between four and five millions under the age of thirty. Modern civilization has no room for the inefficient, and the unskilled workman has grown to be one of those sores that will have to be removed before we can expect to overcome the misery and want that exists owing to lack of employment. The skilled worker is a producer, and his labour is of value, and consequently he can be kept in full employment, because he is earning food for himself, but the unskilled workman has to be found employment. There is, however, another side to the question, which we have urged before, namely, that there should be some guarantee that the man protected by the trade unions (who insist upon a standard wage) shall be an efficient workman. They ought to see that their members are proficient. We can no more put up with the charlatan among the workers than we can among professional men, and if registration is necessary for the plumber, still more so is it necessary for the architect and the engineer. Every man who offers his services to the public should be capable. The public have a right to see that they are not deceived in this respect, and no doubt the time is soon coming when everyone will be forced to be a skilled workman. Our civilization cannot support the parasite.

Colour Effects.

THERE has been a good deal of talk at one time or another of colour in our streets, and the architectural profession has made many gallant attempts to remove the prevailing depression (as it has been called) in the appearance of our buildings by the use of strongly coloured materials, but so far as one can see the result has not been happy; in fact, the cry now is for less colour in our streets. The oppressive effect of strong gaudy colours toned down by dirty streaky soot marks is made worse when it occurs with an absorptive surface, like that of bricks or sand-faced terra-cotta, but strongly-coloured glazed materials are also somewhat too garish. The fact is, all colour combination in towns should be of a very low tone; indeed our atmosphere requires this always to be observed. Although in the open in bright sunshine strong colours are somewhat less garish, the ill-effect of too

great a use of colour in mass may be observed where we find a collection of modern-built houses in red brick with red-tiled roofs. A red house situated amidst trees looks very charming and gives just that necessary touch of colour to the landscape, but when a number of such houses are gathered together and the materials of which they are constructed do not afford opportunity for vegetable growths to tone them down, such as the hard-pressed bricks and vitreous "boiler plate" tiles, the note becomes too dominant—too blatant. The variegated tiles of Cambridge may be referred to as a thing to be desired in buildings instead of the uniform tiles in common use. If colour effects are aimed at, these should be, as stated above, of low tones, except perhaps in single instances. In a clear atmosphere, as in the open country, white is very pleasing, but it would hardly be in towns, although the white glazed ware is put forward as a solution of the problem, and certainly it seems to be fairly satisfactory. There is, too, another way of obtaining a satisfactory surface by the use of some stone which decays moderately, so as to always present a clean surface, such as Portland stone. In regard to bricks, the strong evenly coloured ones, like the hard-pressed terra-cotta bricks that do not tone down, should be used sparingly, and it seems unwise to employ them in association with red tiles, especially if the latter present such a shiny surface that they give no hold for verdure. Many of our bricks are not all good coloured; they are far too staring. The London stock, for instance, as now made, is too even, and of a bilious colour. Some stocks can be obtained which are soft and harmonious, and grizzles can be had which are uneven in colour, but our brick-makers do not seem to have learnt the lesson that too much manipulation of the clay and the desire for evenness can go too far. Luton bricks are coming into use because of their variegated colour. The Fletton brick, so largely used for cheap work, is much worse than the old stock because, although it is irregular in colour, it is striped like a zebra. Red stone looks very well in the locality where it is quarried, but the little pieces used in connection with red brickwork, and in districts where the surrounding tone is more of a bluish colour, as in Edinburgh, are altogether out of place. There is a possibility, however, of obtaining very fine effects by the use of light brown or yellow stones, which, in a clear atmosphere, weather to most beautiful soft tones. Marble, too, used in the rough unpolished state, gives some wonderfully fine colouring in some continental towns where the houses are built of the local material, and it is quite possible to use this in the form of rubble walling to a much greater extent. But however colour effects may be obtained, they will always be unsuccessful in this country unless they are quiet and restful.

MR. BAGGALLAY ON PORCHES AND APPROACHES.

THE following is a summary of the paper on "Porches and Approaches" read by Mr. Frank T. Baggallay, F.R.I.B.A., before the last meeting of the Architectural Association, our report of which was held over from last week on account of the great pressure on our space :—

Mr. Baggallay dealt with his subject historically. In this country, he said—at any rate from the time of the Druids until the last few years—there had never been any attempt to form those grandiose and impressive approaches which most other nations, ancient and modern, had deemed appropriate in the case of especially important or sacred edifices. We had no porches, which would compare, for instance, with those of some of the French cathedrals. But from the Tudor period down to the beginning of the last century the art of contriving decent and dignified approaches to private houses was well understood both in England and Scotland.

The Victorian Idea.

The ideas and circumstances of the nineteenth century led, however, to a deplorable change. Formal approaches almost disappeared with formal gardens in a vain and childish attempt to imitate the beauties of natural landscape. The stately gateway, the straight avenue, and the spacious forecourt gave way to a sort of glorified field-gate and a serpentine road which seemed to turn every few yards to avoid a laurel or a nettle, revealing, by carefully-arranged accidents, occasional glimpses of the surrounding scenery, and at last ending, sideways and unexpectedly, at the door of the mansion.

A Fine Processional Road.

From the point of view of this paper, however, it was specially worthy of note that the most striking sign of the better spirit now prevailing had been the scheming of a grand processional approach road to London's Royal palace. It was true that an untimely (and, considering the occasion, unlooked for) parsimony on the part of the public had shorn the work, for the present at any rate, of most of its architectural adornments, but the mere fact of its inception and execution was an encouragement to consider the question of architectural approaches generally.

Egyptian and Assyrian Examples.

First to consider were the great Egyptian temples as among the notable examples of the grand manner, their most striking feature—and one unique in the history of architecture—being the pair of great pylons which flanked and dwarfed the outer gate, and formed the front wall of the forecourt. When fully developed, the whole of the approaches to the Egyptian temple comprised an avenue of sphinxes, a pair of pylons, a forecourt, a hypostyle hall, then perhaps a second pair of pylons, a second court, and a deep portico or second hall of columns—constituting the most ambitious system of approaches ever carried out.

Proceeding, Mr. Baggallay dealt with the Royal palaces of Assyria, which, having been set on mounds, must have been reached by flights of steps, with inclines, probably, for the chariots. The main gateways seemed to have had semicircular arches faced with glazed tile or faïence, the responds of the arch being huge sculptured bulls with human heads. There were two very fine ones in the British Museum.

The approaches of the Mycenæan palaces differed entirely from all those hitherto noticed. They were more like the approaches to a Norman castle; indeed, the resemblance was striking if one forgot the drawbridge, and overlooked questions of style.

Grecian Examples.

Turning to Greece, the gateway on the Acropolis at Athens was undoubtedly merely a rebuilding, on a glorified and extended scale, of the gateway to the old palace of the kings of the Mycenæan period. The approach to the gates curiously enough remained the old narrow steep pathway winding round the bastion from the south. The genius of Greek art, however refined, seemed to have been narrow. A little superstition or priestly jealousy was allowed, even at Athens, to cripple or to crowd the finest works; and each had to stand alone, not one leading up to anything else, or itself the crown of a comprehensive scheme. It was true that in many, perhaps in most, cases there was a wall and portico enclosing the court or "temenos" in which the temple, or several temples with subordinate buildings, stood. But in all cases with which we were acquainted the form of the court, the position of the gate, and the situation and orientation of the various buildings seemed to have been entirely fortuitous, or decided in each case separately, without reference to the rest. In considering Greek approaches we could only admire the fine judgment and unwearied industry of the artists in refining the propor-

tions and the details of porticos such as those of the Parthenon and Theseum.

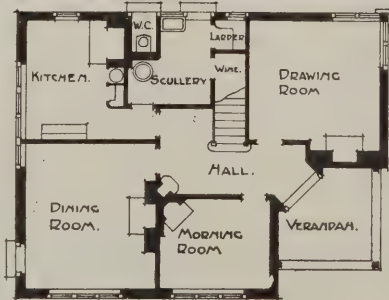
The Imperial Architects of Rome.

Of the ambitious spirit of the Imperial Roman architects in designing and carrying out the most splendid schemes of approach there was, on the other hand, ample evidence in history, and in the ruins of some of them.

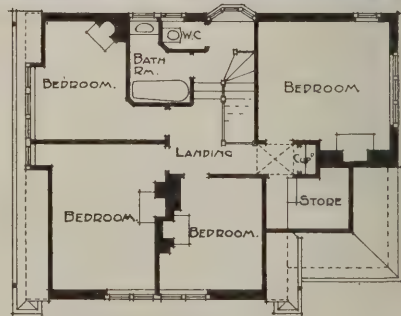
The triumphal and memorial arches erected in Rome itself seemed to have been generally isolated monuments; but the arch of Trajan was the entrance to his forum, and the forum was the forecourt to the Ulpian basilica.

Another finely-conceived approach was that to Hadrian's mausoleum, now called the Castle of St. Angelo. It took the form of a bridge over the Tiber leading from the stone quay on the city side right up to the gate of the mausoleum.

Another great example was that at Baalbec, with its flight of more than fifty steps 150ft. high, and, as its most singular feature, the hexagon court. It was suggestive, too, to note the resemblance between this plan and those subsequent ones of such buildings as the Minerva Medica at Rome and San Vitale at Ravenna, though both of these were on a much smaller scale. Another curious feature at Baalbec, and one found in



GROUND PLAN.



FIRST FLOOR PLAN.

"THE BEACON," GRIMMS HILL, GREAT MISSENDEN, BUCKS.
J. BRUCE MERSON, ARCHITECT.

This house was built last year for Mr. Alfred Dunhill. The walls are of brick, rough-cast outside and whitened, and the roofs covered with Dunton Green tiles. All the windows are casements, painted white, and the frames painted green (also all outside wood and ironwork). A pleasing feature is a high bay window on the staircase divided by two transoms, and glazed with leaded lights. The architect was Mr. J. Bruce Merson, of 76, High Road, Kilburn, N.W., and the contractor Mr. George Parsons, of Prestwood, Great Missenden.

other more or less contemporary buildings in the east of the empire, though it did not reach Italy until later, was the breaking-up of the entablature into an arch over the middle intercolumniation of the portico, the space being made especially wide for the purpose.

Mr. Baggallay then went on to trace the porches and approaches of the Early Christian era, which was almost wholly occupied with the building and rebuilding of churches.

Early Italian Examples.

By reason of the changes that had taken place, churches assumed on the outside something of the forbidding aspect of a fortress, and, among other things, the entrance was guarded by a broad narthex, or porch, and a spacious forecourt surrounded by a high wall. All the earlier courts had either disappeared or been rebuilt, and Mr. Baggallay could only show the well-known one in front of the church of St. Ambrose, at Milan, which, though it used to be attributed to the ninth century, could hardly be earlier in its present form than the twelfth. But before the end of the twelfth century the spacious portico of the ancient world was disappearing in Italy. Having given to the architecture of that country such approaches as the porticos of the Pantheon, S. Vitale, S. Ambrogio, and last, but not least, St. Mark's, it had to give way, in deference to the almost universal poverty of the times, to the porch—a feature proportioned to the door and not to the building. It was Street in his "Brick and Marble Architecture in Italy" who had called attention to the fact that the porch was a feature confined to the north side of the Alps. Though that was not strictly true, the porch certainly had never flourished in Italy. There were plenty of those deeply-recessed doorways of which it was hard to say whether they should not properly be called porches, but the porch proper was rare, and, with two or three exceptions, was only found in the form of a shallow arched hood tied with an iron rod and resting on two columns, which columns often stood on the backs of lions or griffins. Mr. Baggallay thought this irrational idea of putting the columns of the porch on the backs of animals must (though some critics would not have it) have been borrowed from the East, where the fashion was ancient and persistent.

The most remarkable of Italian church porches was the gigantic one attached to the church of S. Antonio Piacenza, and called "Il Paradiso."

The Great French and English Portals.

But however restricted one might find the subject of porches when dealing with Italy, the same could not be said of mediæval England and France, where churches and cathedrals afforded an endless and varied series of examples. The magnificent series of the great cathedral porches allied to those at Chartres and Amiens could not be equalled or approached by any series of existing works of any age or country; while among English Gothic porches, none of course could touch the great western portico of Peterborough Cathedral—indeed, notwithstanding its comparative plainness and

simplicity, it was at least as much greater artistically as it was physically than the porches of Chartres. But, unfortunately, if we looked for other English Gothic porches that anyone could think of comparing with the French ones, we should be driven to rely on the Galilees of Ely and Lincoln. Of the rest of our cathedral porches the most worthy were the triple porch at Salisbury, the south transept porch at York, and the south porch at Gloucester.

Church Porches

next claimed Mr. Baggallay's attention, these including the grand three-storey south porch of Burford Church, Oxfordshire, the south porch of Beccles Church, Suffolk, the south porch of St. Nicholas, King's Lynn, the north porch of Thaxted Church, Essex, the south porch of Boxford Church, near Sudbury, the south porch of Southwold Church, the porch of the Temple Church in London (this forming a class by itself) and the familiar porch of St. Mary's, Oxford.

Porches and approaches to the great ecclesiastical and conventual establishments were next considered. Here, too, was great diversity, there being almost every conceivable form and degree of ornamentation between the grand, but forbidding, eighteenth-century

gatehouse on the hill at Ely and the light and gracious late structure at Worcester.

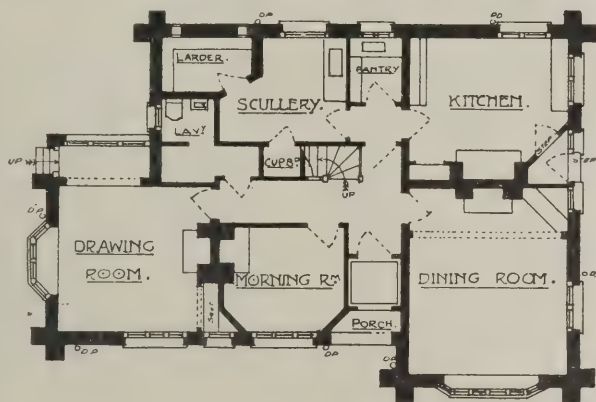
Mr. Baggallay went on to speak of old city gates, such as the Haarlem Gate at Amsterdam, and afterwards of the great gate-towers of the castellated mansions of England—at Oxburgh Hall, Hampton Court, Montacute, &c. But the best, and by far the richest, examples remaining were some of the great gatehouses to the courts of the Cambridge colleges—Trinity, Christ's and John's.

The gate-house itself was next dealt with by Mr. Baggallay, and the subsequent growth of gate-piers, the balls on which were said by some people to have been properly the gruesome emblem of a lord of a manor, since they represented the heads formerly exhibited at their gates.

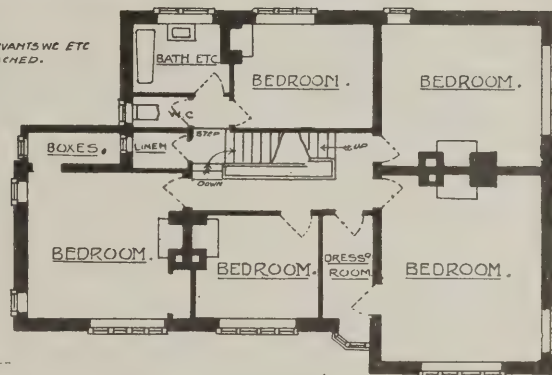
Approaches by bridges and stairs were then last considered, a great number of Italian and English examples being considered.

Discussion.

A vote of thanks was proposed by Mr. Walter Millard and seconded by Mr. A. Needham Wilson, the latter, in speaking of the advantage which bridges gave to approaches, citing Mr. E. L. Lutyens' treatment at Sonning.



GROUND-FLOOR-PLAN.



FIRST-FLOOR-PLAN.

Scale of Feet.

HOUSE AT BYFLEET, NEAR WEYBRIDGE. CHARLES HEATHCOTE AND SONS, ARCHITECTS.

This house has recently been completed at a cost of about £1,500. It is one of a number to be erected on an estate at Byfleet, each house being allotted half an acre of land. The walls are of brick, rough-cast to the first floor, and the roofs covered with red tiles. The woodwork is painted white and the windows glazed with large squares. The accommodation is shown by the plans. Messrs. Charles Heathcote & Sons, of Savoy Court, Strand, are the architects.

Correspondence.

R.I.B.A. Fellowship.

To the Editor of THE BUILDERS' JOURNAL.

SIR,—While agreeing generally with Mr. Musto's views as expressed in his letter published in your issue of February 21st, I think he is hardly correct in his first paragraph when he asks, with regard to the wholesale elections of Fellows, (1) "Is it a means of providing money for the exchequer? (2) keeping the Associates in check? or (3) a means of recognizing eminence in professional work?" The first question, I think, can answer itself, inasmuch as the Institute is not in any way hard up for funds. The second question—although a pertinent one—is answered by simply stating that any duly qualified Associate is eligible for a Fellowship. The third question (which should really be the first) is the most important one, and, in answer to that one, the true reason of the nomination and election of the group of "leading men" (I am glad Mr. Musto does not say "clever men") was not that the Institute (or the Council) wished "to honour men of power and eminence," but only to try to bolster up the present moribund Council in their absurd opposition to that which the majority of the members of the Institute wish for, namely, registration, inasmuch as nearly every one of these so-called "leading men," the new Fellows, is dead against the expressed wishes of all those earnest practitioners—hard-working and artistic men—who want our profession raised to a higher standard in public opinion, those who ask that the house agent, the auctioneer, the undertaker and the decorator shall be prohibited from calling themselves architects, or even Fellows of the R.I.B.A.

For more than twenty years past I have been working in favour of registration, and I am sure it must come to pass soon in spite of the ostrich-like attitude of the members of the present Council, the majority of whom stick their dull heads into the dead sands of past ages and refuse to see the active signs of the times, or to recognize that the Institute was not intended solely for their benefit, but, as stated in the charter, "for the general advancement of civil architecture." Up to now it seems to have been for the "general advancement" of the members of Council.—Yours truly,

HORACE T. BONNER, A.R.I.B.A.
CHEAPSIDE, E.C.

Plaster-of-Paris and Steel Preservation.

To the Editor of THE BUILDERS' JOURNAL.

SIR,—In your issue for February 7th, in the article on the preservation of iron and steel in connection with plaster coverings, while holding no brief for patent or other plasters, your comments upon the nature of plaster-of-Paris call for criticism in fairness to those whose interests are at stake. Though I have not found any free acid in the few samples of plaster-of-Paris which have come under my examination, it is possible that such free acid may occur in such plaster made artificially, though this does not seem likely and would be quite inexcusable. Natural gypsum, however, is a chemical compound, and its composition has long since been determined to be represented by the formula $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$. On raising its temperature to about 130 degs. C. it loses part of its water, and when this temperature is not exceeded a compound is produced which probably has the formula $\text{CaSO}_4 \frac{1}{2}\text{H}_2\text{O}$, which is called plaster-of-Paris, and is therefore not the same thing as gypsum. Your statement of its composition giving the percentage of its constituents is, omitting decimals, correct, but the whole of the forty-six parts of acid present are combined with the lime, and are in a perfectly fixed condition, and much less liable to obtain their freedom than the forty-

four parts of carbonic acid which constitute this percentage of ordinary chalk. When this plaster sets it absorbs about 13 per cent. of water chemically and forms crystals which have the same composition as the original gypsum; to this extent therefore the water mixed with it is at once removed as far as dampness is concerned.

Only two possible chemical reactions present themselves on contact with iron—one a reduction of the sulphate and oxidation of the iron, the other the replacement of the calcium by the iron; but owing to the high electro-positive character of calcium and the stability of the SO_4 radical neither of these reactions will take place.—Yours truly,

ALAN E. MUNBY, M.A.

LONDON, W.

[The remarks referred to were not our own. They were clearly stated as data collected by Mr. W. W. Kenly, Am.Soc.C.E., from the published experience of American engineers and contractors, and read at a discussion on the preservation of materials held by the American Society of Civil Engineers. The facts being given on the authority of Mr. Kenly, and in view of the possible discussion they might cause, we did not think it advisable to alter his original wording, although the author's chemical knowledge was obviously faulty. In view of the facts Mr. Kenly gave in respect to corrosion of iron and steel when in contact with plaster-of-Paris, and the widespread acceptance of this as the cause of many instances of corrosion that are common property in our building trades, we are surprised that Mr. Munby should deny the possibility of such deleterious action on the part of plaster-of-Paris. If further corroboration is needed we may refer to the letter below from Mr. Thomas Potter, whose long and varied experience of concrete work entitles him to rank as a foremost expert on the subject.—ED. B.J.]

Rust on Iron.

To the Editor of THE BUILDERS' JOURNAL.

SIR,—A short time ago Mr. T. G. Jackson caused some alarm by suggesting that the extensive use of steel construction in London buildings was fraught with considerable danger, as it was mostly hid from view and it was impossible to say what chemical action was going on. It has often occurred to me that this danger existed to a serious extent in the iron construction of concrete floors before the introduction of Portland cement. The matrix was then sulphate of lime, better known as plaster-of-Paris, and is a material which attacks iron with a virulence similar, on a minor scale, to the dry-rot of timber. There are a large number of buildings in London and elsewhere having concrete floors in which plaster-of-Paris is the matrix, and the question is—are they safe?

I am sending you some pieces of iron which have literally tumbled off a large compound beam during some alterations, and to which the concrete is still adhering. This beam is of rolled iron and was fixed in place about forty years ago. As you will see, the rust has taken away a thickness of $\frac{3}{8}$ in. off the bottom flange—practically about one-half, probably more. Another curious feature is that the piece of an iron tie-rod sent with the other specimens is, to a less extent, corroded 2 ins. beyond where it came in contact with the plaster concrete. Is there any possible explanation of this? The specimens sent have not been selected as the worst. A practical builder informs me he has in his experience come across much worse examples. These specimens were in contact with the concrete on one side only. What must be the condition of iron joists embedded in similar concrete and entirely in contact with the latter? Plaster-of-Paris mixed with lime-mortar is still very much used to hasten setting for inside work, and is said under those conditions not to create rust;

but is this so, or is it that the effect is delayed until long after the building is completed and handed over by the builder?—Yours truly,

THOMAS POTTER.

66, VICTORIA STREET, S.W.

ARCHITECTURAL CERAMICS.

AT the Birmingham Builders' Exchange on Thursday last Mr. J. Miller Carr gave a lecture on "Architectural Ceramics." In Birmingham, he said, there were many important examples of the use of the ordinary colours of terra-cotta in buildings. The arcades with the malachite interiors, and several fine frontages in New Street, High Street and Union Street; Central Hall, with its noble tower; Queen's College and the Y.M.C.A. were cases in point, and if they were to add to these the older examples of the Law Courts, the General Hospital and some of the frontages in Newhall Street, they had a list that the city might well be proud of. He complained, however, that during the last five years, and especially during the last three years, Birmingham had not, in the matter of decorative architecture, acted up to its motto of "Forward."

New Uses of Terra-cotta.

Dealing with new uses to which terra-cotta might be put, Mr. Carr said that some years ago he was asked if he could not apply the methods of manufacture of slab mosaic to the purpose of putting a representation of Warwick Castle on to an old wall about 30ft. by 15ft. He at once replied that it could be done with striking effect, and in order to carry out the idea he put a tracing over a steel engraving of the castle, subdued all the worrying details, and expressed the subject by just a few broad fields of colour separated by broad outlines. The lecturer gave instances of other directions in which this principle might be applied.

By the use of simple means coupled with artistic designs it was possible to express in a permanent and architectural way on the exterior of a building the purpose of any kind of manufacture or business that might be carried on within. Had they not got nearly tired of the vulgar attempt to shout each other down on the part of shopkeepers by each striving to put larger letters across his front than his neighbour could? After all, the shopkeeper only proclaimed his name, but it would be much better if he could make his building itself declare his craft.

In conclusion Mr. Carr referred to the way in which the walls of many of the principal hospitals in the country had within the last few years been enriched and rendered almost vocal by illustrations of various nursery rhymes painted on the tiles.

COMPETITION REFORM SOCIETY.

Fourth Annual Report.

THE annual general meeting of the Competition Reform Society was held on Monday evening at 29, John Street, Bedford Row, W.C., when the report for the past year was presented. This was as follows:—

The most noticeable feature of the past year has been the diminution in the number of competitions which has come before the Committee for consideration, and the increase in the proportion of those which were disapproved. The relative numbers are shown in the following table:—

Year	No. of competitions considered.	No. disapproved.
Year 1904	70	11
" 1905	35	12

No efforts have been relaxed to obtain information, and the same sources have been made use of as heretofore; thus the conclusion to be drawn is that there was a considerable dearth of competitions in the year 1905.

The following is a list of the matters dealt with (those printed in italics having been disapproved and notices sent to members in the usual form):—

Oxford	Schools
Wolverton	"
Aylesbury	"
Preston	Schools.
Caversham	"
Shepton Mallet	"
Nelson	Library.
Perth	City Hall.
Wallsend	Town Hall.
Wrexham	Library.
Wilts	Schools.
Wattstown	Chapel.
Hamilton	New Chambers.
Poulsom	Memorial.
St. George's Circus	Clock Tower.
Swindon	Schools.
* Rochester	Technical Schools.
Radcliffe	Library.
Birmingham	Municipal Offices, &c.
Harrogate	Orphanage.
Chipping Wycombe	School.
Windsor	Isolation Hospital.
Brighton	Library.
Norwich	Workmen's Dwellings.
Norwich	Shirehouse.
Darwen	Free Library.
Hove	Library.
Southampton	Cemetery Chapel.
Kingston	Workhouse.
Clifton Dartmouth-Hardness	Town Hall, &c.
Lees	Chapel.
Mirfield	Grammar School.
Hackney	Library.
Selby Oak	Schools.
Shaw	Free Library.

* Disapproval afterwards withdrawn.

Delay occurred in obtaining access to the conditions of the Caversham Schools, owing to a deposit of a guinea being required for them and to their not being otherwise immediately available, and the designs of several members were well advanced by the time they received notices of disapproval. In consequence of these unfortunate circumstances, and in view of the objections to the conditions not being of the most serious nature, it was resolved that if any member submitted his design the matter should be overlooked.

The competition for a school at Shepton Mallet was a limited one and not strictly within the scope of the Society, but it was considered advisable to send warning notices to all members practising in the vicinity.

A satisfactory reply was received from Rochester in answer to the representations made as to the defective clauses in the conditions, in consequence of which the Committee's disapproval was withdrawn.

The conditions for a school at Selby Oak were not considered sufficiently bad to disapprove, but notices were sent to members pointing out where they were unsatisfactory.

Some Suggestions.

The Committee has been greatly assisted by the useful information and suggestions which have been sent by members from time to time. In this connection the following may be specially referred to:—

Mr. Bellamy, of Yeovil, wrote that he considered action should be taken where deposits for conditions were not returnable unless *bona-fide* designs were submitted. He considered that competitors should have the option of returning conditions within a stated time should they decide not to compete, and that the deposits should then be returned to them.

Mr. Bateman, of Birmingham, wrote stating that the assessor for the competition for new municipal offices was about to be appointed and suggesting that a list of regulations for the conduct of competitions should be sent, &c.

Mr. C. Sharp wrote pointing out that the promoters of the Bexhill School competition were not holding a public exhibition of the designs. The Society's action in this case was rendered abortive by the designs being returned to their respective authors on the day that a letter of protest was addressed to the promoters.

Mr. Oatley, of Bristol, having been asked to assess the Swindon schools, wrote for the Society's opinion of the competition. Upon being informed that it had been disapproved, he declined to act.

Requests were received that enquiries should be made into what was considered a bad award in the competition for a free library at West Bromwich. The assessor was interviewed and his statements were regarded by the Committee as satisfactory.

Enquiries have been received constantly from members and non-members for information upon current competitions and other matters.

Although the widespread influence and knowledge of the Society is an accomplished fact, the membership remains small. Seven new names have been added to the list, but there have been a few resignations, so that the Society is practically where it was last year in this respect.

The funds of the Society are in a more satisfactory condition than they have ever been. This is due to the ready response made to the appeal for donations towards the reduction of the deficit, and to the reduced amount of the working expenses of the past year.

NOTES ON COMPETITIONS.

Proposed new Public Elementary School, Ossett.

"The Ossett Education Committee invite competitive plans and designs from architects for a new public elementary school to be erected in Southdale Road, Ossett." This is the heading of the conditions of competition which were received by applicants a few days ago. Having read the conditions there are some no doubt who will refer again to this announcement to ascertain if they were not mistaken in their impression that the word "architects" is used. They will find it there in good round type. Will architects enter for this competition? No; unless enquiry throws a more favourable light upon the ambiguous clause which refers to remuneration, for any person who does so can only be regarded as one who trades under a professional nomenclature without the requisite qualifications for so doing. This is the clause: "The Committee offer a premium of £50, and the architect whose plans are placed first shall be employed to carry out the work. The premium will merge in the commission of 4 per cent. on the amount of accepted contract, and shall include a complete set of quantities to the contractors. The architect will be precluded from accepting any trade discounts or commissions." The ambiguity lies in the statement as to quantities; no further reference is made to them in the conditions. Is the cost of their preparation to be included in the 4 per cent., or only the value of the lithographed copy supplied to the contractors? Is the word "contractors" meant to denote the firm whose tender is accepted for the work, or all contractors who apply for quantities? Inference tends to the view that the cost of quantities is to be included in the 4 per cent., for the meanness which would rob commission of a fifth of its value is also capable of still further parsimony. The same mean spirit is everywhere apparent. In the first place, the designs have to be delivered by the 14th of April. This allows only six weeks from the time of receiving the conditions in which to prepare plans for a school to accommodate 750. No date is given for the receipt of competitors' enquiries, nor is anything said about the matter. The cost allowed is absolutely inadequate. This is given at £9 10s. per child, and is to include furniture, gates, boundary walls, drainage, water and gas supply pipes and fittings, teachers' room, cloak-rooms, lavatories, waterclosets, heating and ventilation, painting, colouring, concreting of playgrounds, architect's fees, clerk of works' fees, and all matters of full completion. The architect is given no opportunity of economizing in

materials, for bricks are to be double-pressed; glazed bricks for latrines and the dados of classrooms and central halls are to be of the best quality; the sanitary arrangements are to be of the highest excellence, &c. Unless the cost of building is 20 per cent. lower in Ossett than it is in other parts of England, there will be trouble when the tenders are opened. The Committee intend to appoint a fully-qualified professional adviser to assist them in the selection of the architect to be employed to carry out the work. What is a professional adviser, and from what profession will he be drawn? What fee is it proposed to pay him? The Committee would do well to engage at once the services of a fully-qualified architect expert in school planning to advise them upon the revision of their conditions, if they would save themselves from disaster. The only satisfactory features in this competition are that no perspectives are required and that the conditions can be obtained without a deposit.

Hackney Library.

The drawings submitted in the competition for a new public library at Hackney will be on exhibition at the Hackney baths from Monday till Saturday next week, March 12th to 17th, inclusive, between 2 and 8.30 p.m.

Church at Southampton.

Mr. G. E. Smith, of Victoria Road, Southsea, has been awarded the first premium in a competition for a Wesleyan church to be built at Freemantle, Southampton.

Deptford Coroner's Court and Mortuary.

The Deptford Borough Council have accepted, in competition, the design of Mr. Horace T. Bonner, A.R.I.B.A., of 13 and 14, King Street, Cheapside, E.C., for their proposed coroner's court, mortuary and disinfecting station to be built at Watson Street, New Cross Road, S.E.

Southwark Public Library.

In the replies to intending competitors' questions it is stated that "the Committee have decided to be advised by a competent architect in the selection of designs." This is no guarantee that the lay opinion will not outweigh the professional view, and the decision of the Committee should be considered with the fact that it was always intended to include an architectural assistant on the assessing committee. No doubt this assistant is regarded as competent by the borough surveyor, who is also to be one of the assessing committee; it looks uncommonly as if this is the competent architect referred to. Intending competitors should make sure of the facts before concluding that the assessing difficulty has been overcome.

The Society of Architects' new Scholarship and Travelling Studentship.

The regulations and conditions for the new scholarship and the new travelling studentship of the Society of Architects have just been issued. Candidates for the scholarship must not be more than nineteen years of age at the date of the competitive examination, which will be for an essay on architectural history, and a freehand drawing, to be held in London on May 10th next, entries for which must be made before May 1st on a form to be obtained from the secretary of the Society of Architects at Staple Inn Buildings, Holborn, W.C. No entrance fee is required. The scholarship is of the value of £10, and is tenable for three years, subject to the council being satisfied from year to year with the progress made by the holder.

Candidates for the travelling studentship must be on the Register of Students, the maximum age limit being twenty-eight. The competition drawings, upon which the studentship will be determined, must be delivered at the Society's offices not later than May 1st next. The studentship is of the value of £25, and carries with it the silver medal of the Society. It will be awarded annually, the holder being required

to undertake between June 1st and October 1st a sketching tour of not less than three weeks' duration. The studentship may only be held once by the same person. The subject set for this year is a small country house of such accommodation as can be comprised in 60,000 cubic feet, at 1s. per foot (£3,000) measured from the bottom of the footings to half-way up the roofs, excluding dormers and chimneys. A complete set of working drawings to $\frac{1}{4}$ in. scale is required, with $\frac{1}{2}$ in. details of hall and staircase, and portion of front elevation.

The following is a list of competitions open:—

DATE OF DELIVERY.	COMPETITION.
Mar. 12	SCHOOL AT GREENOCK.—Premiums of £42 and £31 10s. for designs placed second and third. Particulars from Mr. A. F. Niven, Municipal Buildings, Greenock.
" 17	LIBRARY AT PEEL (I.M.).—To cost £500. Single premium of £10. Limited to architects in the Isle of Man. Particulars from Mr. George Cannell, Town Clerk, Douglas.
" 20	FREE LIBRARY AT BANGOR.—Premiums of £25 and £15. £1 1s. deposit for conditions. Particulars from Mr. W. H. Worral, Municipal Offices, Bangor, North Wales.
" 24	FREE LIBRARY AT SWADLINCOTE (limited to architects practising within 30 miles of Swadlincote).—Premiums of £25, £15 and £10. Particulars from Mr. W. A. Musson, Clerk, Council Offices, Swadlincote.
" 31	BIRMINGHAM COUNCIL HOUSE EXTENSION (Sketch Plans).—£1 1s. deposit for conditions. Particulars from Birmingham Town Clerk, Council House.
" 31	DWELLINGS AT MILAN EXHIBITION.—Premiums £240 and £80. Particulars from the Exhibition Committee, Milan, Italy.
April 2	PUBLIC LIBRARY AT SOUTHWARK (to cost £7,000).—Premiums of £50, £30 and £20. £1 1s. deposit for conditions. Particulars from Mr. J. A. Johnson, Town Clerk, Town Hall, Walworth Road, S.E.
" 14	SCHOOL AT OSSETT.—Premium of £50 (to merge). Particulars from the Secretary at the Education Office, Ossett.
" 15	PEACE PALACE AT THE HAGUE.—Particulars from the office of the Carnegie Foundation, Noordeinde 33, The Hague.
May 31	NATIONAL CONGRESS HALL FOR BRAZIL.—Premiums of 15,000, 10,000 and 5,000 milreis (equivalent to about £1,685, £1,125 and £562 respectively). 5,000 milreis also for designs not pre-empted but desirable to be acquired. The conditions of the competition can be seen at the offices of the Commercial Intelligence Branch of the Board of Trade at 73, Basinghall Street, E.C.
No date	ISOLATION HOSPITAL AT STONE.—Limited to architects in the district. Particulars from Mr. J. J. Chapman, clerk to the Stone Joint Hospital Board, Stone, Staffs.

PAYMENT OF DISTRICT SURVEYORS BY SALARIES.

THE adjourned report of the Building Act Committee on this subject was discussed at last week's meeting of the London County Council. Captain Hemphill (chairman of the committee) said that the proposed new scheme for the payment of district surveyors by salaries instead of by fees would tend to improve the service and would effect considerable economy, it being estimated that the saving would amount to about £10,000 a year. Mr. Smith objected to the proposal on the ground that no defects had been discovered in the present system. Mr. Phillimore said that if they were to obtain really satisfactory work they must do away with the system at present in vogue under which men gave only a part of their time to the work. Mr. Howell J. Williams declared that the adoption of the proposal would lead to the formation of a new department of the Council, which would entail the appointment of many highly-paid officers and would in the end lead to enormous increased expenditure. Sir R. M. Beachcroft could see no possible reason for the proposed

change. He did not believe that when the district surveyors became the collectors of fees for the Council they would collect anything like the sum of £52,000 a year, which had been the amount of the fees collected for several years past. Lord Welby said that the Finance Committee did not look with very great favour on the scheme now before the Council, fearing that its adoption might involve a charge on the rates. He moved that the recommendation be referred back to the committee. Mr. Radford, M.P., seconded the amendment, believing that the scheme would involve the Council in a large financial loss. After further discussion the amendment was, upon a division, carried by 59 votes to 44. The recommendation was therefore referred back to the committee.

OLD ARCHITECTURAL ASSOCIATION DAY STUDENTS' CLUB.

A SPECIAL general meeting of the members of this club (the late A.A. Old Day Students' Club) was held on Thursday, February 22nd, at the Florence Restaurant (Mr. A. N. Peckham in the chair), to consider what steps should be taken in reference to the recent action of the council of the Architectural Association in passing resolutions:—

- (1) That the words "Architectural Association" or any abbreviation thereof shall not be used by the Old Day Students' Club in any way.
- (2) That no reference to the Club shall be made in any official publications of the Association in future.
- (3) That no meetings in connection with the Day School Students' Club shall be held on the Architectural Association premises.

Twenty-nine members were present. The hon. secretary (Mr. Wilfred I. Travers) read the correspondence which had passed between the committee of the Club and the council of the Architectural Association, and outlined the policy which the committee proposed to adopt in the future by encouraging students to join the Club on leaving in preference to seeking recruits among the newer students, and by extending the privilege of membership to those past students of the school who quitted the profession of architecture; thus retaining the true position of the Club as an old boys' club.

Resolutions were passed:—

- (1) That the name of the Club be changed to the "Old Architectural Association Day Students' Club

(in proposing which the hon. secretary pointed out that it would make quite clear the difference in the position of this Club and the newly-formed A.A. Musical and Athletic Clubs in regard to the Architectural Association).

- (2) That rule 5 be rescinded, and that the hon. secretary be instructed to communicate with those gentlemen who have ceased to be members under this rule, with a view, should they desire it, of re-instatement.

- (3) That in rules 15 and 16 the word "eight" be altered to "nine" so that there shall now be nine members of the committee in addition to the hon. secretary and the treasurer.

(It was pointed out that the opportunity had been taken to clear up a mistake made in an amendment of this rule at the last annual general meeting, and that this motion had nothing to do with the real cause of the meeting.)

- (4) That the committee be instructed to make all necessary verbal alterations in order to carry out these resolutions.

- (5) That the council of the Architectural Association be notified by letter of the proceedings of this meeting, and that the committee of the Club be now instructed to write such letter and to forward it to the council for their meeting on Friday, March 9th.

ROYAL ACADEMY EXHIBITION, 1906.

THE sending-in day for architectural works is Friday, March 30th, from 7 a.m. to 10 p.m. as hitherto. Will architects let us have their drawings as early as possible. We shall be glad to deliver them free of charge after making reproductions of such as we desire.

MR. GOSCOMBE JOHN ON SCULPTURE.

IN the first of his lectures on modern sculpture at the Royal Academy last week Mr. W. Goscombe John, A.R.A., said that Bacon was the first great English sculptor. Flaxman's fame would probably rest more on his outlines than on anything else, and the work of another man of the period, Banks's "Falling Titan," was curiously like that of Rodin.

The Great French School.

There had been three great periods of sculpture in the world—the Greek, the Renaissance and the French. It was Rude who headed the third period, and in its own way nothing surpassed his relief of the "Mar-seillaise." Carpeaux, the gifted pupil of Rude, was the first of the distinguished band of modern sculptors who had shed lustre on France, among them being Barye, Falguière, Frémiet, Mercié and Rodin. Since the Assyrian sculptures there had been no animals to compare with those of Barye. Falguière, essentially a modern, had a facility and a rapidity of vision unequalled among his contemporaries. His influence was great in the schools, and it was his teaching more than any other that had produced the wonderful modelling now common among the younger French sculptors. There was Dalou, too, whose work never suggested the model and was full of a sense of the open air. Rodin was a fighter against much that was conventional in sculpture. It was a matter for regret that his work had been the subject of so many polemics, for, whereas one side declared his sculpture to be finer than ancient art, his opponents described him as a trickster. "But remember," said Mr. John, "Rodin is a great artistic personality of whom we should all be proud. The author of the 'St. Jean' needs no eulogy; he has written his name in the annals of sculpture."

In Italy the glory of the sculptor seemed to have departed, although as carvers the Italians had no equals; while in Germany no great sculptor had appeared since Rauch. Russia, however, had two men of note in Antokolsky and Prince Troubetskoi. Few men to-day were producing more suggestive and delightful work than St. Gaudens, America's most distinguished sculptor.

Among English sculptors Mr. John referred, of course, to no living men, but he paid a tribute to the memory of Onslow Ford and Bates and Armstead, and spoke of Stevens as "a truly great artist—a splendid anachronism."

Sir William Richmond's Lecture.

On Thursday Sir William Richmond delivered the first of his Academy lectures on "The Evolution of Sculpture—Egypt and Greece." The Sphinx, he said, was the oldest piece of sculpture known, and, in his opinion, one of the noblest achievements of art. Phidias himself could hardly have excelled it. The tendency of Egyptian art was essentially realistic. How it acquired this tendency we did not know, but there must have been a long immature period. It had been asserted that the Egyptian statues in hard marble had been carved with flint tools, and it was possible that was so. There was an Egyptian head of an officer in the British Museum which was a lesson in sculpture. It was almost Holbeinesque, and one of the greatest efforts of portraiture in the world. As an illustration of the excellence of old Egyptian work the lecturer told a story of the opening of one of the tombs in which in the sand on the floor were still to be seen the footmarks of those who carried in the body. So exactly had the stones been fitted that not a particle of sand had drifted in during all those years to disturb the traces. It was before the days of trade unionism, said Sir William sarcastically.

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Correspondents are particularly requested to be as brief as possible.

The querist's name and address must always be given, not necessarily for publication.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

Masonwork.

COATBRIDGE.—J. H. writes: "Where can I get information about ramp-twist mason-work?"

From "Stairbuilding and Handrailing," by William & Alexander Mowat, price 12s. 6d. post free from our offices.

Books.

SOUTH WALES.—CONSTANT READER writes: "I am working for the P.A.S.I. examination, and would like to know of reliable but not costly works on the following subjects:—(1) Quantities; (2) house drainage and plumbers' work; (3) mensuration; (4) dilapidations, and (5) surveying and levelling."

(1) Davis's "Quantities and Quantity Taking," price 3s. 6d.; (2) "Sanitary Fittings and Plumbing," by G. L. Sutcliffe, price 5s., and Coleman's "Sanitary House Drainage," price 6s.; (3) Millis's "Technical Arithmetic and Geometry," price 3s. 6d.; (4) Fletcher's "Dilapidations," price 6s. 6d.; (5) Walmisley's "Land Surveying and Levelling," price 6s. nett. These books will be sent post free from our offices for the prices named.

LONG EATON.—E. writes: "Please enumerate the two best books on architectural perspective and land surveying, levelling, &c., respectively."

Middleton's "Perspective," price 2s. 6d., and Walmisley's "Land Surveying and Levelling," price 6s. nett.

SKIPTON.—ALPHA writes: "Which is the best book on valuations for mortgage and probate?"

Fletcher's "Valuations and Compensations," price 6s. 6d.

COVENTRY.—INSPECTOR writes: "What are the best books on steel construction building and reinforced concrete work?"

Freitog's "Architectural Engineering," price 15s.; Adams's "Practical Designing of Structural Ironwork," price 8s. 6d.; and Marsh's "Reinforced Concrete," 31s. 6d.

NOTTINGHAM.—G. W. C. writes: "Which is the best book on the construction and arrangement of chapels for Methodists?"

Perhaps some reader can provide the information.

TUNBRIDGE WELLS.—T. B. B. writes: "Which is the best text-book to study for the syllabus of the Board of Education's examinations in elementary practical mathematics?"

Millis's "Technical Arithmetic and Geometry," price 3s. 6d. post free from our offices.

Buildings to Measure around Stockport; Cheadle Church.

STOCKPORT.—A. E. M. W. writes: "(1) Kindly inform me of any buildings around Stockport suitable for the two sets of measured drawings for the R.I.B.A. intermediate examination. (2) What style is Cheadle Church, and would the porch be sufficient to measure and draw?"

(1) Thirteenth-century work will be found at Prestbury. Baguley Hall, Combermere Abbey, the churches at Warburton, Symm, Norton and the churches of SS. Mary and

Nicholas at Nantwich contain examples of fourteenth-century work. Fifteenth-century work will be found in the churches of Bowden, Northenden and Gawsorth. This neighbourhood abounds in fine mansions such as Bramhall, Marple Hall, Baguley Hall, Holford Hall, Moreton Hall, Harden Hall and Adlington. There are also many old timber and plaster inns in this district, such as the "Swan and Lion" at Congleton and the inn at Brereton. (2) The style of Cheadle Church can best be judged from an examination of the mouldings and other features. The Pugin students who have passed through Cheadle have not thought it worth while to mention its church, so you would probably do better to devote your attention to one of the buildings mentioned above.

H. Y. M.

Overhanging Wall.

LONDON.—E. S. writes: "I now give further particulars in regard to my enquiry on p. 91 of your issue for February 14th. There are no T marks on the plan, but the wall in the garden has piers or counterforts on my side, and also on my neighbour's. The wall divides the two main buildings, not the back additions. If you think I am a part owner, please say to whom I should write to enforce my neighbour doing his part."

The fact that there are piers on both sides of your garden boundary wall—in the absence of better evidence—would prove that the wall is of a "party" character, and should therefore be maintained at the joint expense of the lessees on either side. This presumption as to ownership and liability to repair can of course be rebutted if it can be proved that one owner only has repaired the wall on a former occasion. If you do not wish to deal personally with your neighbour, cannot you appeal to your landlord? (I gather both your house and that adjoining are leasehold and under the same freeholder.) His agent would probably be the right person to enforce a repair of this kind.

F. S. I.

Acetylene Gas for Country-house Lighting.

HARROGATE.—X. Y. Z. writes: "In fitting up a country house with a moderate-sized installation of acetylene gas, which of the many systems advertized by various firms do you recommend? What are the advantages of the particular system advocated and the name of the firm who could fit it up? Should composition lead pipes be used? Can you refer me to the date of any article recently in your journal dealing with the subject?"

It would be invidious for us to make any distinction between the many excellent acetylene generators on the market. You must investigate them for yourself, and choose the simplest for cleaning. Most apparatus are now safe. Iron pipes should be used. For information on acetylene lighting see "Specification No. 8," price 3s. 3d. post free from our offices. A recent enquiry in our columns will be found answered on p. 66 of the issue for January 31st.

Strawberry-coloured Bricks.

B. writes: "Who is the maker of strawberry-coloured bricks as supplied in the Hampstead district?"

This is altogether too vague a question to be answered. Has our correspondent seen red bricks for the first time? or does he think strawberries are only of one colour and one tint?

L.C.C. District Surveyors.

COVENTRY.—INSPECTOR writes: "It is my intention to sit at the examination for building surveyors held by the R.I.B.A., but I have been unable to obtain copies of past examination papers; consequently I am in some doubt as to the extent of preparation necessary. Could you enlighten me and advise me as to the best books to study? For your guidance

I must say that I have been a building inspector for this and another corporation for 5½ years, and I have certificates in the honours grade of masonry, brickwork, carpentry and building construction, also the certificate of the Royal Sanitary Institute."

Write to the secretary of the Royal Institute of British Architects, 9, Conduit Street, London W.

Drawings of Vaulting.

MANCHESTER.—MIDLAND writes: "Have you ever published drawings of any of the vaulting in either Salisbury Cathedral, Bath Abbey or Manchester Cathedral? If not, do you know any book containing illustrations of same?"

No, we have not published such illustrations. Perhaps some reader can provide the information.

R.I.B.A.

New Fellows and Associates.

A SPECIAL general meeting of the Royal Institute of British Architects was held on Monday evening at 9, Conduit Street, W., to formally elect Sir Lawrence Alma-Tadema, R.A., F.S.A., Hon. F.R.I.B.A., as the recipient of the Royal Gold Medal this year.

A business meeting was afterwards held, when the following were elected:—

[Of London where not otherwise stated]

As Fellows:

Matthew Garbutt, E. W. Marshall, G. Ransome (Cape Town), H. A. Satchell, Harry Sirr and Arthur Sykes.

As Associates:

A. W. Addison (Cambridge), A. D. Aitken (Airdrie, N.B.), J. H. de C. Ballardie, J. Boyle (Bolton and St. Anne-on-Sea), J. E. Braithwaite (Leeds), S. Bridges, A. E. Bullock, M. Bunney, John Cocker, T. T. Cumming (Reading), E. J. Dixon, B. Drummond, F. Dyer (Manchester), T. S. Fraser (Cardross, N.B.), W. Curtis Green, E. L. Hampshire, G. Hanson (Halifax and Bradford), C. H. Holden, A. Hunter (Colwyn Bay), A. H. Lamont (Edinburgh), L. W. C. Lorden (Hythe), W. K. McDermott, W. P. Marr (Kingsbridge), D. Mitchell, H. A. Moon, G. Morland (Croydon), H. S. Morran (Auckland, N.Z.), A. R. Myers (Edinburgh), A. C. Notley, D. M. O'Connor, A. J. Peyto, S. C. Ramsey, W. H. Riley (Leicester), H. Ryle, D. A. Shaw, J. H. Shearer (Exeter), P. M. Stratton, J. R. Sykes, P. Turner (Bradford), M. O. Type (Birmingham) R. F. Wheatly (Bromley), E. C. M. Willmott, L. S. Wood, H. E. Woodsend (Nottingham).

BUILDING IN NEW YORK.

THE following figures show the extent of building work in the city of New York for the past thirty-five years:—

	No. plans filed.	Estimated cost of structures.
1870	2,351	£6,933,799
1875	1,406	3,645,374
1880	2,252	5,823,067
1885	3,370	9,183,648
1886	4,097	11,675,930
1887	4,385	13,367,996
1888	3,076	9,428,495
1889	2,621	13,758,406
1890	3,507	14,935,274
1891	2,821	11,214,524
1892	2,967	11,821,523
1893	2,272	11,032,590
1894	2,592	10,284,115
1895	3,838	16,822,206
1896	3,149	14,377,951
1897	3,516	16,733,768
1898	3,626	14,558,802
1899	4,894	25,442,251
1900	1,969	11,446,671
1901	2,512	23,779,564
1902	1,703	17,268,880
1903	1,757	16,283,882
1904	3,040	19,349,968
1905	4,805	32,560,353



SCALE OF FEET
0 10 20 30 40 50 60



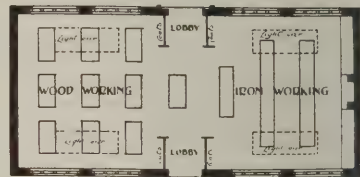
SECTION C-C



SECTION D-D



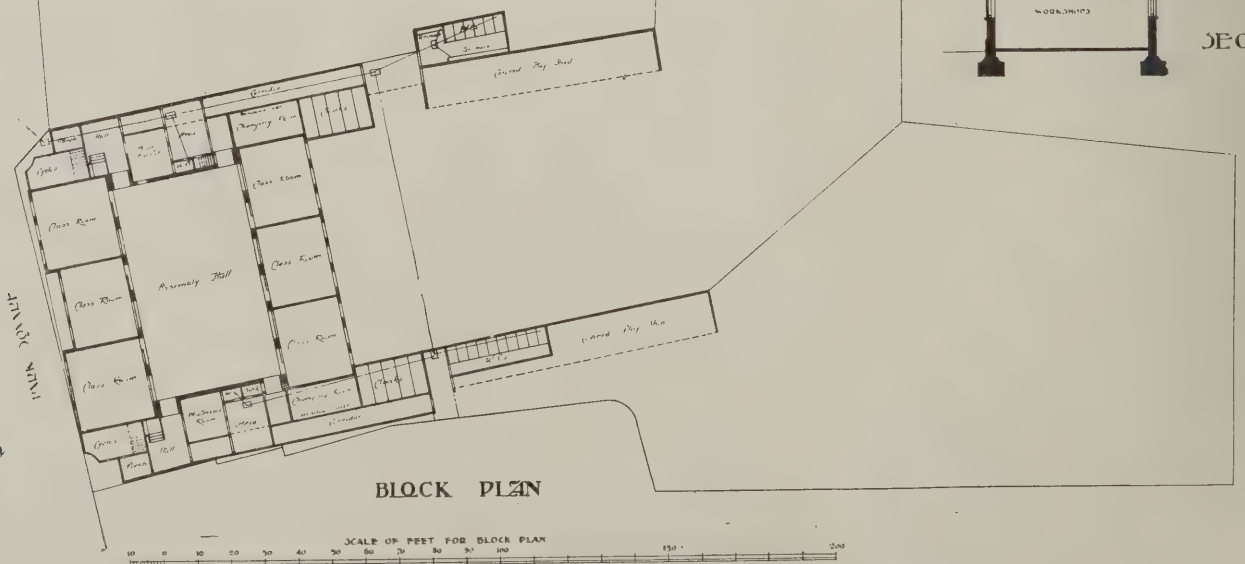
CHURCH STREET



PLAN OF WORKSHOP



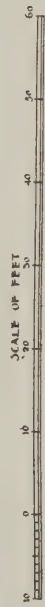
SECTION



BLOCK PLAN

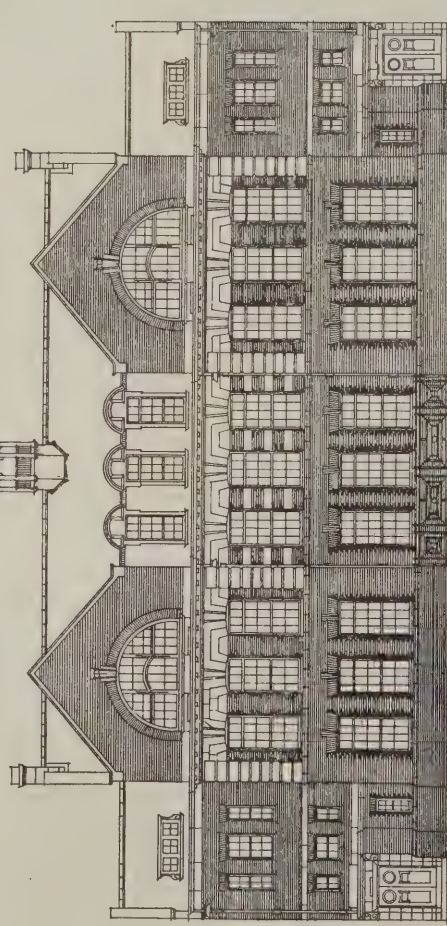
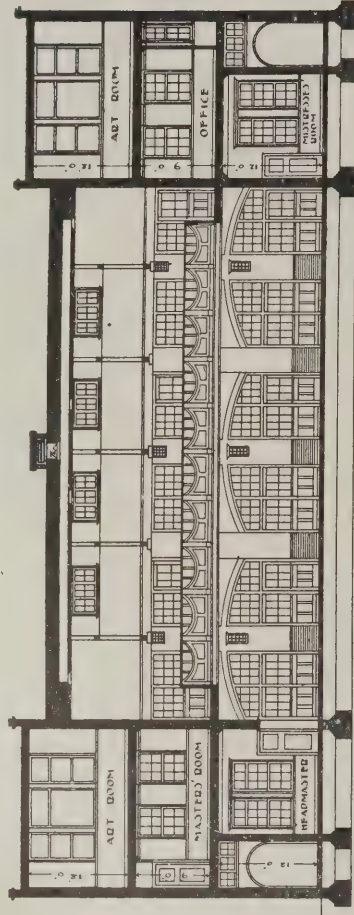
SCALE OF FEET FOR BLOCK PLAN
0 10 20 30 40 50 60 70 80 90 100 150 200

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ELEVATION TO CHURCH STREET

SECTION A-A



ELEVATION TO PARK SQUARE

*Note: Windows on the original floor
are all lighted from the outside
in section B-B*



SECTION B-B

SECOND FLOOR PLAN

ALT ROOM
19' 0" x 19' 0"

STAIRS
DOWN

COOKERY CLASS ROOM
25' 0" x 18' 9"

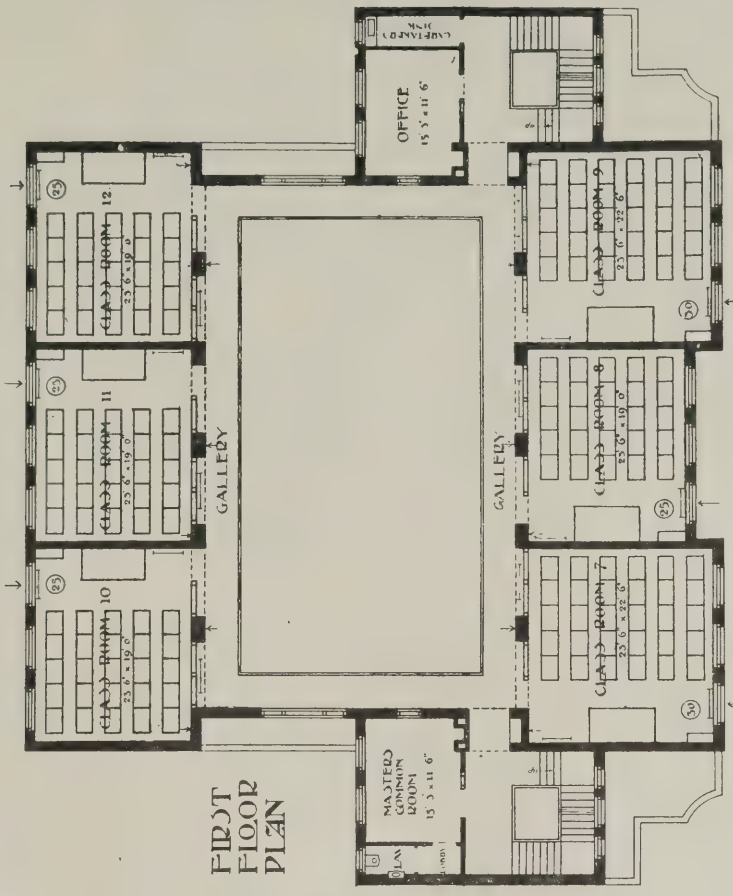
PHYSICAL LABORATORY
25' 6" x 16' 6"

CHEMICAL LABORATORY
25' 0" x 16' 9"

DRESSING ROOM

DRESSING ROOM

ALT ROOM
19' 0" x 19' 0"



SELECTED DESIGN. SPALDING AND SPALDING, ARCHITECTS.

LIBRARY
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EUSTON SECONDARY SCHOOL AND TECHNICAL INSTITUTION.

IN this school (the design for which, by Messrs. Spalding & Spalding, F.R.I.B.A., at 15, Queen Street, Cheapside, E.C., has just been accepted in competition) accommodation is provided for 150 girls and 150 boys. It was desired that the two entrances should be from Park Square, and this has been arranged. The plan adopted is that of the "central hall" type. The twelve classrooms are ranged around the assembly hall on two floors, and are approached direct therefrom. This assembly hall is 64ft. long by 37ft. 6ins. wide, and will accommodate 300 students. The classrooms are all lighted from the left, and all have either a north or south aspect. On the first floor two art-rooms are provided, both having a north light. Chemical and physical laboratories are also provided on this floor, as well as a cookery classroom approached from the girls' staircase. Accommodation is provided for the headmaster, masters and mistresses, also an office for the administrative work of the school. These rooms are centrally placed so as to ensure the easy supervision of the whole building. Two workshops are provided as a detached building in the playground, one for ironwork and the other for woodwork. The cloakrooms and changing rooms are well cut off from the main building, though easily accessible, and are well lighted and cross-ventilated in each case. Bicycle rooms are placed near both the boys' and the girls' entrances, also covered playsheds in the playgrounds. The building will be heated on the low-pressure hot-water system and adequately ventilated by means of extract flues connected with the flèche on the roof. Externally the walls will be faced with local bricks and stone dressings, and the roof covered with slates. The cost of the building will be about £7,000.

WHO WAS THE ARCHITECT OF THE HOUSES OF PARLIAMENT?

THE "Burlington Magazine" for March contains an article by Mr. Robert Dell with the above title, which will startle those who do not remember the controversy in 1867-8 as to the assistance given by Augustus Welby Pugin to Sir Charles Barry in the designing of the Houses of Parliament. Mr. Dell recently had all Pugin's papers placed at his disposal, and was struck by the extraordinary resemblance to the Houses of Parliament in some original designs drawn by Pugin in 1832-4 (*i.e.*, before the old Houses of Parliament were burned down) and by certain entries in Pugin's diaries.

"The hint given by the drawings led me," says Mr. Dell, "to make a careful enquiry into the matter. The conclusion at which I arrived was that Pugin gave such help to Sir Charles Barry, the ostensible architect of the Houses of Parliament, as to entitle him to be considered the joint-architect. Indeed, it seems to me that whatever artistic merit the building possesses is mainly due to Pugin. The plan and general construction were undoubtedly Sir Charles Barry's, though even in the general design he must have owed much to the early drawings of Pugin already mentioned; but I believe that Pugin not only drew the elevations which were sent in to the competition by Mr. Barry, as he then was, but was in fact their actual designer; that when, after Mr. Barry's appointment as architect, considerable alterations were made, Pugin made the designs for nearly every detailed part of the building; and that practically all the details of the building as it now stands—everything, that is, beyond the shell—are really Pugin's. In fact, the case, in my opinion, is that of the familiar ghost who still walks, one regrets to say, in architectural circles."

Notes and News.

For not providing a Dampcourse in three houses a Bridgend builder named James was recently fined £5 on each house, and costs.

The Annual Dinner of the Nottingham Architectural Society was held on February 23rd, Mr. A. W. Brewill, president, in the chair.

A new Edinburgh Building.—It is proposed to demolish the Douglas Hotel, Edinburgh, and to erect at the corner of Princes Street and South St. Andrew Street extensive premises for Messrs. Forsyth, outfitters.

The Otis Elevator Co., Ltd., have secured the contract for six electric passenger elevators on the City and South London Railway Co.'s extension to Euston, namely, four elevators at the King's Cross and St. Pancras Station and two at Euston Station.

Inspecting a Lightning Conductor.—Two steeplejacks have made an inspection of the lightning conductor on the church of St. Martin's-in-the-Fields, a precaution which has been taken every ten years since the building was struck and practically destroyed in 1842.

The Resistance of Bends.—In his recent presidential address to the Institute of Sanitary Engineers Prof. E. G. Coker, M.A., D.Sc., F.R.S.E., dealt with the measurement and flow of water, more especially in pipes. Referring to bends, he said that the bend of least resistance was one having a mean radius of about $2\frac{1}{2}$ times the diameter of the pipe, and that the resistance of the bend was about $3\frac{1}{2}$ times that of a straight pipe of the same length.

The Change in Mechanics' Institutes.—Speaking at the recent meeting of the Newcastle and District Clerks of Works' and Builders' Foremen's Association, Mr. J. Wightman Douglas, architect, said that for many years mechanics' institutes were the means of spreading technical information among the artisan classes of this country, and it was to be regretted that many of those institutions had become merely centres of amusement and recreation. It now devolved upon technical colleges and societies like theirs to carry on the task of improving skilled labour. It was necessary to persuade the workman to take an active and intelligent interest in his work.

Patent Victoria Stone.—At the recent eighteenth ordinary general meeting of the shareholders of the Patent Victoria Stone Co., Ltd., held in London, the chairman (Mr. J. J. Griffiths, J.P.) said that during the past year they had not had such large contracts for flagging, but in the aggregate the orders were approximately the same as in the previous years. There had been an increased demand for patent Victoria stone for architectural purposes, and the continuance of this demand tended very much to strengthen the position of the company. The stone had now been on the market for upwards of thirty-six years, and the original process of silication had been rigidly adhered to. Dr. J. W. L. Glaisher, F.R.S., in proposing the re-election of Mr. Griffiths as a director of the company, said this was originally Mr. Griffiths's own business, and he was the first to introduce the use of siftings of the kind they now used. When Mr. Griffiths formed the concern into a company, in 1888, he certainly did not over-capitalize it. For eighteen years the company had never paid less than 10 per cent., and in the successful years, when trade was at its best, they were able to pay a bonus of $2\frac{1}{2}$ per cent. besides accumulating a reserve fund of £20,000, while the stock which they saw in the balance-sheet was valued at £64,000, so that the state of the company, after eighteen years' trading, was exceedingly prosperous.

"Reason as a Basis of Art."—A book with this title, by Mr. C. F. A. Voysey, is announced by Elkin Matthews, of Vigo Street, W., price 1s. nett.

The new Roof of Charing Cross Station will be glazed by Messrs. Mellows & Co., Ltd., on their patent "Eclipse" system. It is hoped that the temporary repairs to the roof will be sufficiently advanced to allow traffic to be resumed on March 19th.

Fall of Vaulting at Winchester Cathedral.—A portion of the spandrel of the vaulting to the north-east of the retro-choir of Winchester Cathedral, closely adjoining Bishop Waynflete's chantry, fell recently. Other portions of the adjacent vaulting are in danger, but they are being watched.

An Industrial Exhibition at Southend-on-Sea is to be held in the Kursaal from May 12th to 30th next. The sections include one for building requisites, surveying, sanitary engineering, heating, lighting and ventilation. Full particulars can be obtained from the secretary of the exhibition, Mr. P. T. J. Bacon, at the Kursaal, Southend-on-Sea.

The Provident Institution of Builders' Foremen and Clerks of Works.—At the recent annual dinner of this Institution, held at the Holborn Restaurant, Mr. John Beer, corresponding secretary, said that when he assumed office the Institution was able to pay its pensioners 12s. 6d. a week; since then the amount had been raised to 15s., and he hoped ere long it would be £1, with 10s. for poor widows. In connection with the dinner subscriptions were announced to the amount of £502 7s. 6d.—the highest total yet obtained at any annual dinner of the Institution.

Ulster Society of Architects.—A general meeting of this Society was held at Belfast on February 23rd, Mr. J. J. McDonnell, J.P., president, in the chair. Mr. W. J. Gilliland, F.R.I.B.A., reported on the progress made by those having charge of the Enrolment of Architects' Bill, and gave a *résumé* of the evidence given by him before the Institute sub-committee. Correspondence was read relative to the by-law proposed to be made by the Belfast and District Water Commissioners fixing the capacity of cisterns; also as to the employment of an engineer for architectural work in connection with asylum buildings. The president made reference to the R.I.B.A. Council's action upon the Easement of Light Bill, which it was hoped would be dealt with in the present session of Parliament.

Salonica was the subject of a lecture by Prof. Charles Gourlay, B.Sc., A.R.I.B.A., before a recent meeting of the Glasgow Technical College Architectural Craftsmen's Society. After referring to its history, Professor Gourlay dealt with its ancient walls, white tower and sculptured Roman arch. Then in considerable detail he described the Early Christian and Byzantine churches, now mosques, which still remain in a remarkably well preserved state in this modern Turkish town—the church of St. George, with its circular nave and beautiful mosaic decoration on the interior of its dome, which is the greatest and best work in Byzantine mosaic now in existence: the mosque of Eski Djouma, formerly a three-aisled basilican church; the church of St. Demetrius, one of the best preserved and most finely proportioned of five-aisled basilicas of the Early Christian period; the church of Sta. Sophia, with its interesting plan and dome at the crossing, which is decorated internally with a very beautiful mosaic; and lastly, the later examples, St. Elias with its triapsal plan, St. Bardias having the typical Greek cross plan, the Holy Apostles with its one central and four smaller domes (showing in its pristine form what ultimately became a universal feature of the Russian churches), and St. Pantelemon, a small but interesting church now restored.

The cost of rebuilding Blackfriars Bridge, Parliamentary sanction for which is now being sought, is estimated at between £200,000 and £250,000.

The Second International Congress on School Hygiene will be held in London from August 5th to 10th next year. The offices of the Congress are at the Royal Sanitary Institute, Margaret Street, W.

The new Carlton Hotel, Johannesburg.—The locks for this hotel (some particulars of which appeared in our issue for last week) were made and supplied by Messrs. Colledge & Bridgen, of Midland Lock Works, Wolverhampton.

Builders' Current Price List of Specialities.—In this feature, which we published for the first time last week, a printer's error occurred in respect to "Kulm" fire-resisting partition slabs. No price should have been stated; this error will have been obvious to readers who know how economical "Kulm" partition slabs are, while at the same time official tests have proved their remarkably high fire-resistance.

Concrete.—In view of the interest now taken in all matters appertaining to concrete and cement, a new illustrated magazine called "Concrete and Constructional Engineering" is to be published once every two months from 57, Moorgate Street, London, E.C., price 1s. nett. The first number has just made its appearance. It gathers from the British and foreign press a good deal of useful information and contains a few original articles.

A Subterranean Passage has been discovered in the course of the demolition of some old houses in Craig's Court, Whitehall. It is nearly 30ft. long, and runs north to south to within a short distance of the Army Pay Office. (Tradition says that a subterranean passage existed from No. 2, Craig's Court to the Royal Palaces at Whitehall, and Nell Gwynne resided at one time at 2, Craig's Court.) An interesting carved water tank 200 years old was also discovered.

A Building School.—A day preparatory trade school for boys intending to enter the building trade has been opened at Leeds. It is situated at Woodhouse. Mr. James Neill, F.S.I., will supervise the classes. He is also the head of the building department at the Leeds Institute, where there are 780 building students. The Woodhouse Trade School will be open five days a week, from 9 to 12 in the morning and 2 to 4.30 in the afternoon. Two or three leading builders have already expressed their willingness to accept apprentices from the school.

New Address.—Messrs. Johnson, Clapham & Morris, of Manchester, manufacturers of steel concrete wire lattice, have opened London offices at Queen Anne's Chambers, Tothill Street, Westminster, S.W. Johnson's wire lattice, it will be remembered, was used to great advantage in the Savoy Hotel extensions. It has the merit of very great strength, and is made of almost any length, so that it can be continued over many floor-spans, thus rendering the whole reinforced-concrete construction monolithic, and giving additional strength and safety, with great economy in the amount of metal.

A new Free Library at Fenton, Staffs., is to be opened to-day. The total cost of building, furniture and fixtures (about £5,300) has been defrayed by Mr. Andrew Carnegie. The building is of Accrington red bricks and white Hollington stone, the roof being covered with local blue brindled tiles. Floors are fireproof and are laid with ceramic mosaic in the hall, landing, &c., and the floors of all public rooms laid with pitch-pine blocks. Walls are plastered with "Adamant" with a tile dado 5ft. high around the general reading-room, hall, staircase and lavatories. The architect was Mr. F. R. Lawson, of Fenton, and the general contractor Mr. John Bagnall, also of Fenton.

A new Central Mortuary at Birmingham is to be built on a piece of land adjoining the Estates Department, off Newton Street, and abutting on the back of the chief fire-station. The new building, which is to cost £2,723, will provide accommodation for thirteen bodies. Provision will be made for post-mortem examinations, &c.

Furniture Details.—A book of interest to all who make, design or sell furniture has just been published by Mr. A. H. Botwright, of 14, City Road, London, E.C., price 3s. 6d. nett. It is entitled "Useful Details," and comprises authentic details in all the principal furniture styles. It has been compiled by the editor of the "Furniture Record."

Mr. Bryce's Conjecture.—In the course of his lecture on "History in its relation to Architecture," delivered at Carpenters' Hall last Thursday, the Right Hon. James Bryce, M.P., alluded incidentally to India. He said that it was a melancholy reflection that the English were not leaving in India much that was of architectural importance. If by some catastrophe we were to quit India and leave her to her own devices for 500 years, what traces, he wondered, would remain of English occupation. He thought the embankments, the railways, the cuttings and the tunnels would be the chief remains.

NEW LONDON BUILDINGS.

AT yesterday's meeting of the London County Council the Building Act Committee reported the following applications under the London Building Act, 1894, their recommendations as to consent or refusal being appended in *italics*:—

Buildings between Nos. 65 and 69, South Side, Clapham Common, Clapham, on the application of Horner & Lucas. (*Consent.*)

Projecting pilasters to Nos. 231, 233, 235 and 237, Mare Street, Hackney, on the application of C. G. Smith, on behalf of W. Smith. (*Consent.*)

Buildings on the northern side of Uxbridge Road, westward of Providence Place, on the application of J. H. Richardson, on behalf of the Home Counties Land Co., Ltd. (*Consent.*)

Retention of a one-storey shop in front of No. 5, Brownhill Road, Catford, on the application of Norfolk & Prior, on behalf of J. Alder. (*Consent.*)

Extension of the period within which the erection of a porch in front of a proposed church on the south-eastern side of Torridon Road, Lewisham, was required to be completed, on the application of W. D. Church & Son. (*Consent.*)

Bathroom additions and a covered way on the south-west side of Grove Road, St. Marylebone, eastward of the Regent's Canal, on the application of J. P. Waddington, on behalf of the St. Marylebone Borough Council. (*Consent.*)

Houses on the north-western side of De Laune Street, Kennington, on the application of Briant & Son. (*Consent.*)

Projecting sign in front of No. 1, Burwood Mews, Burwood Place, Edgware Road, Paddington, on the application of Allen & Mannoch, Ltd., on behalf of the London and Parisian Motor Co., Ltd. (*Consent.*)

Bringing forward the frontages of No. 1, Hamilton Place, abutting upon Piccadilly, on the application of W. H. Romaine-Walker & Besant. (*Consent.*)

Deviation from the plans approved on April 18th, 1905, for the erection of two iron and glass shelters to the Royal Institute of Painters in Water Colours and Princes Restaurant, on the south side of Piccadilly, so far as relates to the affixing of the name of the premises to both sides of the shelter in front of Princes Restaurant, on the application of W. Emden. (*Consent.*)

Five blocks of cottages and shops, Franciscan Road, Tottenham, on the application of R. Robertson, on behalf of the Housing of the Working Classes Committee of the Council. (*Consent.*)

Retention of a porch in front of Spencer House, No. 27, Wimbledon Park Road, Wandsworth, on the application of Boyton, Sons & Trevor. (*Consent.*)

Warehouse building on the north side of Tenter Street, Moorfields, at less than the prescribed distance from the centre of the roadway of the street, on the application of Gregg & Detmar, on behalf of Raphael, Tuck & Son. (*Refusal.*)

Retention of an iron and glass covered way at the entrance to No. 3, Douro Place, Victoria Road, Kensington, on the application of Miss F. A. Lee. (*Consent.*)

Projecting chimney stack at No. 13, Golden Square, to abut upon Lower James Street, on the application of W. Woodward, on behalf of Rye & Eyre. (*Consent.*)

Building at the rear of No. 243, Uxbridge Road, Hammersmith, at less than the prescribed distance from the centre of the roadway of a mews leading out of the east

side of Askew Crescent, on the application of Prickett & Ellis, on behalf of Miss S. Axton. (*Consent.*)

Buildings abutting upon the western side of Godfrey Street, the southern side of Godfrey Hill, and the eastern side of Lower Wood Street, Woolwich, on the application of G. A. Wilkinson & Son. (*Consent.*)

Wood and glass showcase at No. 221, Regent Street, to abut upon Argyle Place, on the application of F. Sage & Co., Ltd., on behalf of T. & J. Perry. (*Refusal.*)

One-storey addition in front of No. 4, Hyde Park Gardens Mews, Paddington, on the application of G. Trollope & Sons and Collis & Sons, Ltd., on behalf of J. G. Griffiths. (*Refusal.*)

New street for carriage traffic out of the east side of Ravensbourne Park, Catford, on the application of Norfolk & Prior. (*Consent.*)

Building on the western side of Beaumont Road, Wandsworth, on the application of A. J. Hardwick. (*Consent.*)

Building at the rear of No. 9, Fawley Road, Hampstead, to abut upon Honeybourne Road, on the application of C. G. Durrant, on behalf of Dr. G. Elam. (*Refusal.*)

Raising of projecting one-storey shops in front of Nos. 168 and 170, Edgware Road, St. Marylebone, on the application of J. W. Stevens, on behalf of E. S. Burns. (*Refusal.*)

Retention of a building at the rear of No. 35, Thornhill Road, Islington, with a forecourt boundary at less than the prescribed distance from the centre of the roadway of the southern arm of Barnsbury Square, on the application of F. J. Eedle & Meyers, on behalf of T. Heath. (*Consent.*)

Five new streets for carriage traffic on the Sanders estate, on the south-east side of Coldharbour Lane, Brixton, on the application of R. Ellis & Son, on behalf of R. A. Sanders. (*Refusal.*)

Modification of the provisions of that section with regard to open spaces about buildings, so far as relates to a building erected on the north-east side of Hall Road, Peckham, abutting upon Hichison Road, on the application of C. Farley. (*Consent.*)

Two-storey factory building over a part of the space at the rear of Nos. 47 and 49, Norman Road, Bow, on the application of A. P. Stokes, on behalf of C. J. Russell. (*Consent.*)

Buildings on a part of the space at the rear of No. 6, Nelson Square, Blackfriars Road, Southwark, on the application of R. C. Murray, on behalf of Sidney Straker & Squire. (*Consent.*)

Conversion of Nos. 6 and 7, George Street, Hanover Square, into a domestic building, on the application of C. H. Worley, on behalf of T. Stevens. (*Refusal.*)

Building on the site of Nos. 13, 15 and 17, Dod Street, Limehouse, on the application of H. Herman, Ltd. (*Consent.*)

Views and Reviews.

Modern Buildings.

The first volume of this new publication has just been published, and judging from this it appears to be an important and very useful addition to the text-books on building construction. It has been designed to provide instruction in the very latest developments of building construction. The editor, Mr. G. A. T. Middleton, who has been a frequent contributor to our columns, remarks upon the want of a book dealing with planning and construction, which go hand in hand in practice correlatively. Mr. Middleton has the assistance of a staff of contributors, and as there will be six volumes the work will be a large one—which, indeed, the subject warrants. This first volume deals with general office practice and draughtsmanship in the first part, the planning of cottages and country houses in the second part, and with ordinary constructional details in the third part. There are numerous coloured plates, which are a valuable feature, for only by such means is it possible to show the method of preparing working drawings. In connection with the part devoted to construction in this volume there are many useful drawings, which are most clearly prepared and show numerous practical details not ordinarily found in text-books, such as bonding in all sorts of special circumstances, scaffolding, shoring, needling and underpinning, roofs of peculiar shape, &c. We shall have occasion to refer from time to time to the other volumes of this work as they appear.

"Modern Buildings: Their Planning, Construction and Equipment." Volume I. Edited by G. A. T. Middleton, A.R.I.B.A. London: The Caxton Publishing Co., price 10s. 6d. nett per volume.

Obituary.

Mr. Zephaniah King, F.R.I.B.A., senior partner in the firm of Messrs Zephaniah King & Son, architects, Westminster, died on February 24th, at Harrow, aged 71.

THE PORT OF BRISTOL.

A New Town.

THE port of Bristol is approached by a tortuous channel about seven miles long up the tidal River Avon from its mouth in the Severn Channel. The mercantile population has long desired a development of the districts lying nearer the mouth of the river, but until recent years these have remained more or less untouched. With the opening of the first Avonmouth Dock some years ago a small township was created here, but local facilities of access and transport were so backward that things remained in a stationary condition until recently, when a renewed interest was taken in the subject of the transference of shipping business to the mouth of the river, due to some extent to the interest displayed in the matter by Messrs. Elder, Dempster & Co., who made Avonmouth the port of call for their American and African trading steamers. The Bristol Corporation, a very conservative body, were at last stimulated to action, and after having exhaustively considered the reports of eminent engineers upon the various alternative methods of improving the port, such as the dockization of the river itself and the formation of docks on the north or the south bank of the river, finally decided upon a scheme for creating large dock accommodation at Avonmouth; and at the same time took steps to improve the existing facilities for

access and communication between the two centres, causing this district to be included in the municipal area—now much enlarged by the absorption of several outlying districts.

The alluvial land at Avonmouth, with the rising ground of Shirehampton, forming altogether a district of about four square miles in extent, and known as the Kingsweston Estate, is owned practically in its entirety by Mr. Philip Napier Miles, J.P., lord of the manor of Kingsweston, on whose property the future township of Avonmouth will be almost entirely built.

Mr. Miles sold 200 acres of his land adjoining the foreshore to the Bristol Corporation, on which they are now completing the large dock which has been for the past two or three years in course of construction, and which will probably be opened in less than two years' time. The railway companies whose line serves the present dock are now doubling the line, and a direct connection to London is projected, which will involve the creation of an important terminus here.

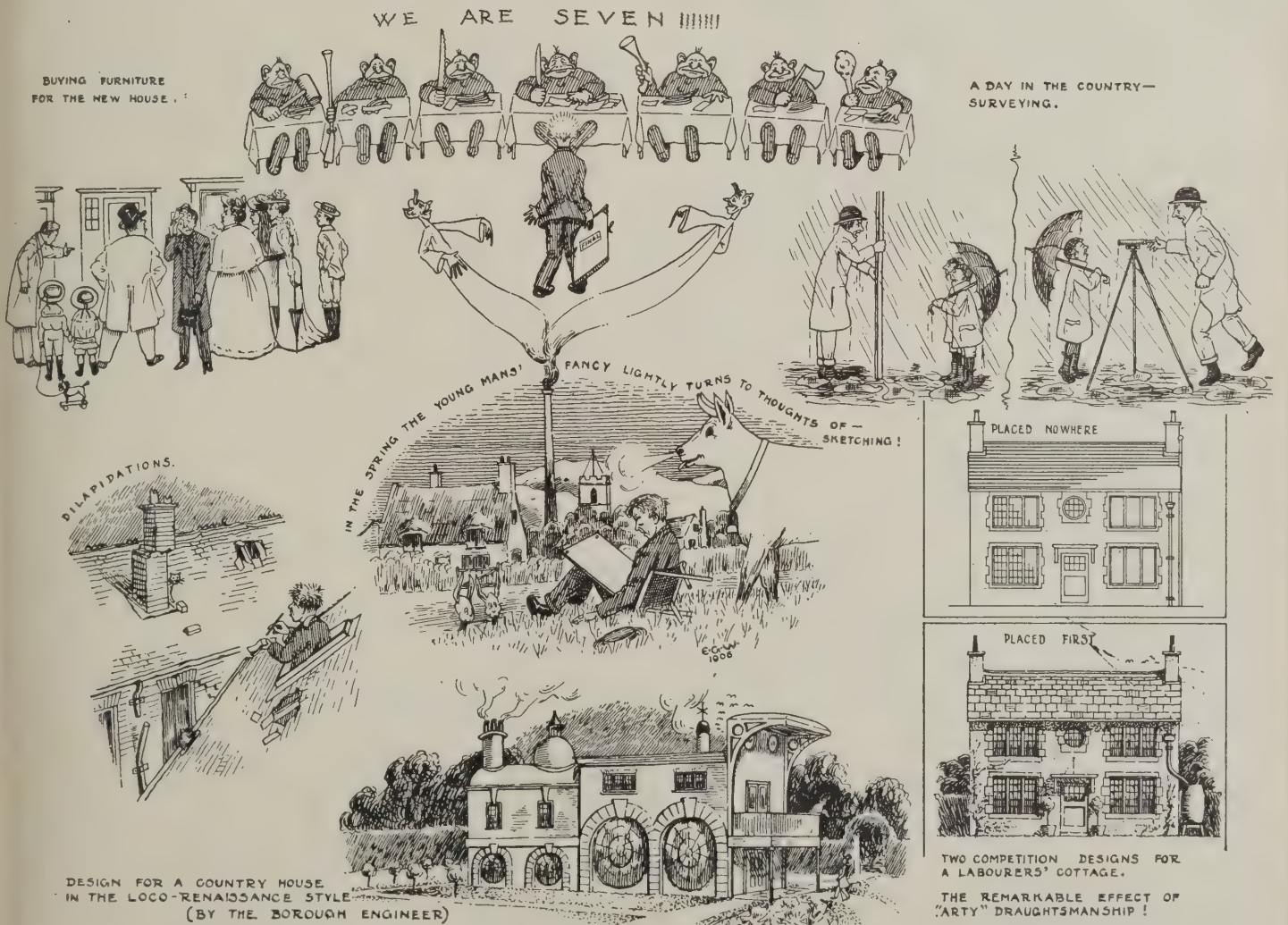
Mr. Napier Miles has laid out a series of excellent roads, furnished with public sewers, whilst complete plans exist for their extension hereafter. A light railway for the distribution of goods as well as for passenger traffic has also been inaugurated, which will be linked with the existing railway at either end, thus bringing the projected manufacturing and warehousing area into direct touch with the railway communication.

It is Mr. Miles's intention that the new

township, which it is confidently anticipated will shortly undergo a large development, shall be controlled on architectural lines, so that it shall possess that unity and dignity of character which is necessarily lacking in the majority of commercial centres, where conflicting interests as well as the absence of any central authority in matters of taste render it impossible to procure anything approaching unity of effect in the architecture of the public thoroughfares.

To this end he has appointed Mr. Frederick Bligh Bond, of Star Life Building, Bristol, consulting architect for all work done on the estate, and it will be Mr. Bond's duty to confer with all intending building owners with a view to the regulation of the external character of their projected buildings, in order to ensure harmony and a certain degree of conformity with the destined character of the place.

Building work has been going on now with increased activity for the past three years, and a large number of artisans' dwellings and shops have been erected, together with a few buildings of superior character, these latter including the Kingsweston Estate Offices (illustrated in THE BUILDERS' JOURNAL for December 27th last) and the Shirehampton Parish Hall and Carnegie Library, both built from the designs of Mr. Bligh Bond; and the "Miles' Arms" at Avonmouth, built from plans prepared by Messrs. Paul & James, architects, of Bristol, the elevations having been furnished by Mr. Bond.



THE STUDENTS' SPRING DAY-DREAMS.

DRAWN BY E. G. W.

Complete List of Contracts Open.

News of Contracts Open are not repeated after they have been published once in these columns, so that readers will find particulars in our last issue of other contracts that still remain open.

Unless expressly stated to the contrary all deposits required for bills of quantities, &c., are returned on receipt of *bona-fide* tenders.

The words "Fair Wages Clause" inserted in certain paragraphs signify that persons tendering must conform to a fair-wages clause in the contract, which requires them to pay the rates of wages current in the district.

BUILDING.

Mar. 8. Grays.—*Shed for the steam roller in Stanley Road, for the Urban D. Council.* Tenders, endorsed "Steam Roller Shed," to be delivered to Hatten & Asplin, clerks of the Council, High Street, Grays, by noon on Mar. 8.

Mar. 8. Treharris.—*Levelling, excavating and laying-out of land fronting Thomas Street and Mary Street for football and cricket ground.* Plans and quantities may be seen at the office of R. Edwards, Pantanas Estate Office, Treharris, to whom tenders must be sent by Mar. 8.

Mar. 8. Letterkenny, Ireland.—*Teacher's residence, for the Select Vestry of Conwall Parish Church.* Plans and specifications to be seen at the office of John M'Intyre, architect, Letterkenny. Tenders to be sent to Major Downe, Letterkenny, by Mar. 8.

Mar. 8. Abenbury.—*Additions at the Council School to accommodate thirty-two children, for the Education Committee.* Specifications and plans can be inspected at the office of the county architect and surveyor, Walter D. Wiles, 42A, High Street, Wrexham. Tenders, endorsed "Tender for Abenbury School," to be delivered to Evans & Roberts, sects., Education Offices, Ruthin, by Mar. 8.

Mar. 8. Dipton.—*Primitive Methodist church and schools.* Builders desirous of tendering are requested to send their names to Davidson & Phillipson, architects, Pearl Buildings, Newcastle-on-Tyne, by Mar. 8.

Mar. 8. Chard.—*Factory annexe, for Messrs. Boden & Co.* Application to be made to Symes & Madge, architects and surveyors, Somerset House, Chard, on or before Mar. 8. Quantities and full particulars will be supplied on deposit of cheque value £3 3s.

Mar. 9. Sedburgh.—*Residence, for B. Wilson.* Plans may be seen and quantities and specifications obtained from John F. Curwen, F.S.A., F.R.I.B.A., architect and sanitary engineer, 26, Highgate, Kendal, to whom tenders must be sent by noon on Mar. 9.

Mar. 9. Weymouth.—*Enlarging the fire-station and executing alterations at the rear of same for the purposes of a picket house, in accordance with plans and specification to be seen at the offices of the Borough Surveyor and Engineer, Clarence Buildings, Weymouth.* Sealed tenders, endorsed "Alterations to Fire-station," to be delivered at the Town Clerk's Office, Weymouth, by 10 a.m. on Mar. 9.

Mar. 10. Berrington.—*Re-building the wall round the teacher's garden, for the Managers of Berrington School.* It is partly a retaining wall, and must in any case be brickwork up to the ground-level of the garden, above this 2 ft. either of gin. brickwork or of iron railing. Tenders may be for either or both of these alterations, and must specify proposed quality and dimensions of all parts, concrete foundation, brickwork, and in the case of iron railing the method of attachment to top of brick wall. The old material may be used, but not on face of wall; the top three courses to be built in cement. Tenders, marked outside, "Tender for Wall," to be sent to James Cavan, Eaton Mascot Hall, Shrewsbury, by Mar. 10.

Mar. 10. Breinton.—*Alterations and additions to Breinton manor-house.* Drawings may be seen and quantities, form of tender and other particulars obtained at the offices of Groome & Bettington, architects and surveyors, Palace Chambers, Hereford, upon payment of £2 2s. Tenders must be upon the forms supplied and be delivered at the offices of the Architects, enclosed in a sealed cover marked "Tender for Alterations, &c., Breinton Manor House," by noon on Mar. 10.

Mar. 10. Cilcennin.—*Alterations and repairs to the school, for the Cardigan County Education Committee.* Plans and specifications or copies of the same can be seen either at the school building, in charge of the headmaster, or at the office of G. Dickens-Lewis, county architect, 12, Terrace Road, Aberystwyth. Tenders, sealed and endorsed "Cilcennin School Repairs," are to be delivered at the office of B. C. Jones, clerk to the District Education Committee, Aberayron, by noon on Mar. 10.

Mar. 10. Ciliau Park.—*Alterations and repairs to the school, for the Cardigan County Education Committee.* Plans and specifications or copies of the same can be seen either at the school building, in charge of the headmaster, or at the office of G. Dickens-Lewis, county architect, 12, Terrace Road, Aberystwyth. Tenders, sealed and endorsed "Ciliau Park School Repairs," are to be delivered at the office of B. C. Jones, clerk to the District Education Committee, Aberayron, by noon on Mar. 10.

Mar. 10. Dihewid.—*Alterations and repairs to the school, for the Cardigan County Education Committee.* Plans and specifications or copies of the same can be seen either at the school building, in charge of the headmaster, or at the office of G. Dickens-Lewis, county architect, 12, Terrace Road, Aberystwyth. Tenders, sealed and endorsed "Dihewid School Repairs," are to be delivered at the office of B. C. Jones, clerk to the District Education Committee, Aberayron, by midday on Mar. 10.

Mar. 10. Rhydpennau.—*Alterations and repairs at the school, for the Cardigan County Education Committee.* Plans and specifications or copies of the same can be seen either at the school building, in charge of the headmaster, or at the office of G. Dickens-Lewis, county architect, 12, Terrace Road, Aberystwyth. Tenders, sealed and endorsed "Rhydpennau School Repairs," are to be delivered at the office of R. J. Roberts, clerk to the District Education Committee, Cambrian Chambers, Aberystwyth, by noon on Mar. 10.

Mar. 10. Goginan.—*Alterations and repairs to the school, for the Cardigan County Education Committee.* Plans and specifications or copies of the same can be seen at the school building, in charge of the headmaster, or at the office of G. Dickens-Lewis, county architect, 12, Terrace Road, Aberystwyth. Tenders, sealed and endorsed "Goginan School Repairs," are to be delivered at the office of R. J. Roberts, clerk to the District Education Committee, Cambrian Chambers, Aberystwyth, by noon on Mar. 10.

Mar. 10. New Bolsover.—*Infants' school, for the Derbyshire County Council.* Applications for bills of quantities, accompanied by a deposit of £1 1s., must be made to H. Tatham Sudbury, architect, Estate Offices, Ilkeston, by Mar. 10.

Mar. 10. Boston.—*Reconstruction and reseating of gallery, and for new rostrum in the Centenary Wesleyan Chapel, for the Trustees.* Quantities may be obtained upon application to Gelder & Kitchen, architects, Hull. The plans will be on view at Messrs. Beaulah's office, Bargate, Boston. Sealed tenders, endorsed, to be delivered to the Rev. J. W. Keyworth, Buxton Villa, Boston, by 5 p.m. on Mar. 10.

Mar. 10. Cork.—*New wing to the Convent of the African Missioners at Blackrock Road, Cork, and for building a new laundry and other works, for the Very Rev. Joseph Zimmerman, Superior, in accordance with plans and specification prepared for same, and which may be inspected at the office of James F. M'Mullen, architect, 30, South Mall, Cork, with whom sealed tenders are to be lodged by Mar. 10.*

Mar. 10. London, S.W.—*Completion of transepts, choir vestries and choir-room of a London church, S.W. district.* A selection will be made from the names received by the committee, and the selected firms will then be invited to tender. Bills of quantities are being prepared by Fowler & Hugman, 9, Adam Street, Adelphi, W.C. For further particulars apply to the architects, Rowland Plunbe & Harvey, F.R.I.B.A., 13, Fitzroy Square, London, W., to whom all applications to tender must be addressed and delivered by Mar. 10.

Mar. 12. Salford.—*Office and waiting-room near Trafford Bridge, for the Tramways Committee.* Further particulars and form of tender may be obtained on application at the Tramway Offices, 32, Blackfriars Street, Salford, where plans may be seen. Tenders, endorsed "Receiving Office, Trafford Bridge," and addressed to the Chairman, Tramways Committee, to be delivered to L. C. Evans, town clerk, Town Hall, Salford, by 3 p.m. on Mar. 12.

Mar. 12. Aberdare.—*Forty dwelling-houses, together with streets sewers and surface water-drains, on part of Forchamman Farm, Cwmaman, for the Cwmaman Coal Co., Ltd.* Plans and specifications may be seen at the offices of Morgan & Elford, architects, 1, Jeffrey Street, Mountain Ash, or 42, Canon Street, Aberdare, to whom endorsed tenders are to be sent by Mar. 12.

Mar. 13. Tattingstone.—*Structural alterations and repairs at the Workhouse, for the Guardians of the Samford Union.* Plans and specifications can be seen at the Workhouse or at the office of H. J. Wright, architect, 4, Museum Street, Ipswich. Tenders to be delivered to Arnold J. Haward, clerk, 34, Princes Street, Ipswich, by Mar. 13.

Mar. 13. Over.—*New infant school in High Street.* Plans and specifications can be seen at the office of H. Beswick, county architect, Newgate Street, Chester, and quantities obtained on deposit of £1 1s. Sealed tenders, endorsed "Tender for New Infant School," to be delivered to John H. Cooke, clerk to the Education Committee, Winsford, Cheshire, by 10 a.m. on Mar. 13.

Mar. 14. Chippenham.—*Infant school at Wood Lane, and alterations and additions to the Westmead Schools, Wood Lane.* Copies of the bills of quantities will be supplied on application (accompanied by a deposit of £1 1s.) to Silcock & Reay, architects, 47, Milsom Street, Bath, where the drawings, specifications and conditions may also be seen. Sealed tenders, endorsed "Tenders for the New Infant School, Chippenham, and Alterations and Additions to the Westmead Schools, Chippenham," to be addressed to W. Pullinger, Director of Education, Education Department, County Offices, Trowbridge, by noon on Mar. 14.

Mar. 15. Newport.—*Mission-house and children's home, for the Clewer Sisters of the Community of St. John Baptist.* Bills of quantities may be obtained upon deposit of £2 2s. and drawings inspected at the offices of W. Bucknall, architect, 123, Knights Hill Road, West Norwood, London, S.E., and Henry J. Griggs, architect, 381, Metropolitan Bank Chambers, Newport, Mon.

Tenders to be sent to J. Moxon, solicitor, Newport, by noon on Mar. 15. The Committee do not bind themselves to accept the lowest or any tender.

Mar. 15. Stourbridge.—*Alterations and additions to the Stream Farm, Wordsley, including new living room, bedroom, bath-room and dairy, for the Guardians.* Plans and specifications may be obtained on application at the Guardians' Office, 12, Hagley Street, Stourbridge. Tenders to reach George Francis James, clerk to the Guardians, Union Office, 12, Hagley Street, Stourbridge, by Mar. 15.

Mar. 15. Wimbledon.—*Extension of the slipper baths, Latimer Road, for the Corporation.* Plans and specifications may be inspected and bills of quantities obtained on deposit of £2 2s. at the Borough Surveyor's Office, Town Hall. Sealed tenders, addressed to the "Chairman, Baths Committee," and endorsed "Tender for Baths Extension," must be delivered to C. H. Cooper, M.I.C.E., engineer and surveyor, Town Hall, Wimbledon, by noon on Mar. 15.

Mar. 16. Nottingham.—*Sanatorium for females suffering from phthisis at Bagthorpe Workhouse.* Particulars and quantities may be obtained on application to Arthur Marshall, A.R.I.B.A., architect, King Street, and on payment of £3 3s. Tenders must be delivered to G. Muncaster Howard, clerk to the Board, Poor Law Offices, Shakespear Street, Nottingham, by Mar. 16.

Mar. 16. Merthyr Tydfil.—*Boys' school at Georgetown, for the Education Committee.* Drawings and specification may be seen and copies of bill of quantities obtained at the office of the Committee's architect, J. Llewellyn Smith, Central Chambers, High Street, Merthyr Tydfil, on deposit of £2 2s. Sealed tenders, endorsed "Georgetown Boys School," to be sent to E. Stephens, clerk to the Committee, Town Hall, Merthyr Tydfil, by 5 p.m. on Mar. 16.

Mar. 17. Beckenham.—*Second portion of the Church of St. Michael and All Angels, to ultimately accommodate 700 persons.* Those wishing to tender should apply to the architect, A. H. Hoole, 36, Great James Street, Bedford Row, W.C., on or before Mar. 17, after which date bills of quantities and forms of tender will be sent on payment of £1 1s.

Mar. 20. Bangor (co. Down).—*Concrete foundations for a telescopic gasholder, at the Gasworks, Bangor, Ireland.* Copy of plans and specification may be obtained from the Clerk to the District Council, on payment of 10s., not returnable. Tenders will be received by James Milliken, clerk to the Council, Town Hall, Bangor, co. Down, up to noon on Mar. 20.

Mar. 21. Chipping Ongar.—*School buildings at the Children's Homes at Chipping Ongar, for the Hackney Guardians.* The specification, conditions of contract and plans (as prepared by W. A. Finch, architect, of 76, Finsbury Pavement, E.C.) may be seen at the Clerk's Office by persons desirous of tendering, and bills of quantities (as prepared by G. T. G. Wright, quantity surveyor, of 3, Great Winchester Street, E.C.) and form of tender will be furnished upon deposit of the sum of £5. Sealed tenders, endorsed "Erection of School Buildings, Chipping Ongar," must be delivered at the Clerk's Office, Hackney Union, Homerton, N.W., by 2 p.m. on Mar. 21.

Mar. 21. East Barnet.—*Additions and alterations to the Margaret Road County Council School.* Drawings, specification, agreement, &c., may be seen at the County Surveyor's Office, Hatfield, between 10 and 4 (Saturdays from 10 to 12). A copy of the schedule of works and prices (quantities) and a form of tender can be obtained at the County Surveyor's Office upon payment of £2 2s. Sealed tenders, endorsed "Tender for Additions and Alterations to Margaret Road C.C. School, East Barnet," must be delivered to Urban A. Smith, county surveyor, County Surveyor's Office, Hatfield, by 5 p.m. on Mar. 21.

Mar. 22. Old Trafford.—*Public elementary school at Northumberland Road, for the Education Committee.* Plans may be seen and bill of quantities obtained on application to the architect, Ernest Woodhouse, 88, Mosley Street, Manchester, on payment of £2 2s. Tenders, endorsed "Northumberland Road Council School," to be addressed to the Chairman of the Sites and Buildings Sub-committee, Council Offices, Old Trafford, and delivered by noon on Mar. 22.

Mar. 31. Grange, Ireland.—*Renovation of Grange National School.* Plans and specification to be had from Rev. J. Connell, B.A., Donaghedy, Strabane, to whom tenders are to be sent by Mar. 31.

No date. Rochdale.—*Bridge to be constructed in ferro-concrete, with other incidental works, such bridge to be about 26ft. span, and to carry a road 14yds. wide, over the Rochdale Canal at Firgrove.* Contractors must hold the licence of L. G. Mouchel, of 38, Victoria Street, Westminster, S.W., to execute such work on the Hennebique system of ferro-concrete. Forms of tender, specification and bill of quantities may be obtained on deposit of £5 at the office of the Borough Surveyor, Town Hall, Rochdale.

ENGINEERING.

Mar. 8. Hamilton.—*Filters and tank* and other relative works at Stoneymeadow, for the District Committee of the Middle Ward of the county of Lanark. Plans may be seen and copies of the specification and schedule obtained at the office of the engineers, J. & A. Leslie & Reid, C.E., 72a, George Street, Edinburgh, on payment of £1. Tenders, endorsed "Tender for Contract No. 71," must be lodged with W. E. Whyte, district clerk, District Offices, Hamilton, by Mar. 8.

Mar. 9. Oswaldtwistle.—*New 12-ton compound steam road-roller*, for the Urban D. Council. For further particulars apply to the Surveyor to the Council, Town Hall, Oswaldtwistle. Tenders, endorsed "Tender for Steam Road-Roller," must be sent to B. T. Westwell, clerk to the Council, Town Hall, Oswaldtwistle, Lancashire, by Mar. 9.

Mar. 9. Newry.—*Repairs and keeping in good condition* the steam boilers in connection with the Workhouse, for one year from April 1. All new materials required to be supplied by the contractor. Sealed tenders must be lodged with W. R. Bell, clerk of the Union, Clerk's Office, Workhouse, Newry, by 5 p.m. on Mar. 9.

Mar. 12. Alnwick.—*Duplicating the covered service reservoir* at Sturton Grange, to hold 35,000 gallons extra, for the Rural D. Council. Plans and specifications may be seen at the office of the clerk, H. W. Walton, Alnwick, to whom sealed tenders, endorsed "Reservoir," are to be delivered by 7.30 p.m. on Mar. 12.

Mar. 13. Nuneaton.—*Service reservoir*, capacity 500,000 gallons, in Hennebique's ferro-concrete construction, for the Urban D. Council. Plans and specification may be seen and form of tender obtained on application at the Council Offices, Nuneaton. Tenders, endorsed "Tender for Reservoir," must be delivered to E. C. Cook, waterworks engineer, Council Offices, Nuneaton, by noon on Mar. 13.

Mar. 13. Stockport.—*Side-planing machine*, for the Gas Committee. Full particulars may be had on application to the engineer, S. Meunier Gasworks, Stockport. Tenders to be addressed to the Chairman of the Gas Committee, care of Town Clerk, Stockport, endorsed "Planing Machine," and delivered by Mar. 13.

Mar. 15. Pretoria.—*Refuse destructor*, capable of treating 60 tons of refuse per diem, for the Municipality. Tender forms, specification of the destructor, dimensions and levels of the site upon which it will be erected may be obtained on application to the Town Engineer, Pretoria, or at the office of Mosenthal, Sons & Co., 72, Basinghall Street, London, E.C. Fair wages clause. Tenders, enclosed in sealed envelopes, and endorsed "Tenders for Supply and Erection of Refuse Destructor at Pretoria," must reach the Town Clerk, Pretoria, not later than noon on April 6, or Mosenthal, Sons & Co., 72, Basinghall Street, E.C., by Mar. 15.

Mar. 20. London, S.W.—*Seven electrically-operated car trawlers*, for the London County Council. Specification, drawings, form of tender, and other particulars, may be obtained at the County Hall, Spring Gardens, S.W., upon payment to the Cashier of the Council of the sum of £2 for each specification. Each tender is to be delivered at the County Hall in a sealed cover, marked "Tender for Electrically-operated Traversers, L.C.C. Tramways," and addressed to the Clerk of the London County Council, Spring Gardens, S.W., by Mar. 20.

Mar. 20. Greenock.—*Refuse destructor plant*, for the Corporation. The general conditions, specification, drawings and form of tender may be obtained from the Burgh Electrical Engineer, Greenock, on deposit of £2 ss. Extra copies of specification may be obtained on payment of 5s. each, which will not be returned. Tenders, endorsed "Contract No. 19, Refuse Destructor Plant," must be delivered to C. MacCulloch, town clerk, Municipal Buildings, Greenock, by midday on Mar. 20.

Mar. 24. Hythe.—*Well sinking* at Bluehouse, in the parish of Saltwood, and lining same with brickwork and cast-iron cylinders, for the Corporation. Plans and sections may be seen and specification, form of tender and schedule of quantities obtained on application to Chris. Jones, borough engineer Bank Buildings, Hythe, Kent, upon payment of a deposit of £2 ss. Sealed tenders, endorsed "Tender for Well Sinking," to be delivered to Geo. S. Wilks, town clerk, Town Clerk's Office, High Street, Hythe, Kent, by Mar. 24.

April 25. Valparaiso.—*Harbour works*. The date for opening tenders for the Valparaiso harbour works has been postponed from April 2 until April 25 next. Plans and particulars may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall Street, E.C.

May 7. Sydney, N.S.W.—*Electric-lighting plant*: (a) Boilers, automatic stokers, pipe-work, &c., (b) turbo-alternator, sub-station machinery, switchboards, &c., for the Municipal Council. Specifications, plans and form of tender may be obtained on application to T. Rooke at the offices of Preece & Cardew, 8, Queen Anne's Gate, Westminster. A deposit of £5 ss. will be required on application, and a cash deposit or marked cheque for the sum of £1,000 will be required when the tender is sent in. Sealed tenders, endorsed "Tender for Electric Lighting Plant," are to be addressed to the Town Clerk, Town Hall, Sydney, and must be delivered by 4 p.m. on May 7.

IRON AND STEEL.

Mar. 8. Hamilton.—*Cast-iron pipes*, for the District Committee of the Middle Ward of the county of Lanark, as follows:—80 tons of 12in., 6in., and 4in. dry sand cast-iron pipes and relative special castings. Copies of the specification and schedule may be obtained at the office of the engineers, J. & A. Leslie & Reid, C.E., 72a, George Street, Edinburgh, on payment of £1. Tenders, endorsed "Tender for Contract No. 72," must be lodged with W. E. Whyte, district clerk, District Offices, Hamilton, by Mar. 8.

Mar. 14. London, E.C.—*Steel posts, &c.*, for fencing, galvanized eye-bolts and strand-wire, for fencing, for the East Indian Railway Co. For each specification a fee of £1 is charged, which cannot under any circumstances be returned. Tenders, marked "Tender for Steel Posts, &c., or as the case may be," must be sent to C. W. Young, Secy., Nicholas Lane, E.C., by noon on Mar. 14.

PAINTING AND PLUMBING.

Mar. 9. Newry.—*Repairs and keeping in good condition* for one year, from April 1, the gas pipes and brackets, mangles, drying closets, vats, grates, stench traps, pumps, cisterns, ranges, stoves, waterclosets, bath tubs, weighbridges, metal sashes, quadrants, ventilators, cocs s and all lead and metal pipes, lead valleys, gutters, spouting, and all manner of plumbing work whatsoever, in connection with the workhouse and fever hospital. The upkeep of the telephone connection between the workhouse and fever hospital will be included in this contract. All new materials required to be supplied by the contractor. Sealed tenders must be lodged with W. R. Bell, clerk of the Union, Clerk's Office, Workhouse, Newry, by 5 p.m. on Mar. 9.

Mar. 14. London, S.E.—*External painting and repairs at the Norwood Schools*, for the Lambeth Board of Guardians. Specification and form of tender will be supplied on personal application and on payment of £2 in respect thereof. Tenders on the printed form, sealed and endorsed "Tender for Painting, &c., Schools," to be sent to the Guardians' Offices, Brook Street, Kennington Road, S.E., by 10 a.m. on Mar. 14. They will be opened at noon the same day, when all persons tendering or their agents must be in attendance.

ROADS AND CARTAGE.

Mar. 8. Carmarthen.—*Street works* as follows:—Levelling, metalling, paving, kerbing, channelling and making-up of Barnfield Terrace. Plans and specifications may be seen and forms of tenders obtained at the Surveyor's Office, John Street. Tenders, endorsed "Street Works," are to be delivered to R. M. Thomas, town clerk, Town Clerk's Office, Carmarthen, by Mar. 8.

Mar. 8. London, N.E.—*Kerbing, channelling, paving, making-up, &c.*, of a portion of Baker's Hill, Clapton, for the Hackney Borough Council. General conditions of contract and the specification and plan and sections may be inspected, and copies of the bill of quantities and form of tender obtained, on application to Norman Scorgie, M.I.C.E., borough engineer and surveyor, and on payment of £1 rs. Tenders, sealed and endorsed "Baker's Hill," must be delivered at the Town Hall, Hackney, N.E., by 5 p.m. on Mar. 8. Fair wages clause.

Mar. 9. Aitcham.—*Cartage of stone and materials* upon the roads within the district for the year ending Mar. 31, 1907. Form of tender, containing full particulars, can be obtained from the surveyor, T. Fortune, Pontesbury, or from the Clerk, at the Council Offices. Tenders to be delivered to Joseph Everest, clerk, District Council Offices, St. John's Hill, Shrewsbury, by 4 p.m. on Mar. 9.

Mar. 10. Droitwich.—*Rowley rag* or other granite, for the Corporation, for the year ending Mar. 31, 1907. Forms of tender and all particulars may be obtained from H. Hulse, borough surveyor, to whom samples of the materials to be supplied must be sent not later than Friday, Mar. 9. Sealed tenders, on the Council's form of tender, endorsed "Stone," to be sent to S. J. Tombs, town clerk, Town Hall, Droitwich, by noon on Mar. 10.

Mar. 10. Stafford.—*Carting stone, &c.*, for the repair of the highways, from the various stations and canal wharves in the district, for the Rural D. Council. Printed forms of tender, containing full particulars, may be obtained from F. G. Herbert, surveyor, 9, Park Crescent, Wolverhampton Road, Stafford. All tenders must be on the printed forms supplied, and properly filled up and endorsed "Tender for Team Labour," and sent to William Morgan, clerk to the Council, 4, Martin Street, Stafford, by Mar. 10.

Mar. 12. Rye.—*Cartage, horse hire and steam rolling* for the year ending Mar. 31, 1907. Forms of tenders on application to H. J. Elliott, district surveyor, Winchelsea, Sussex. Tenders to W. Dawes, highways clerk, Watchbell Chambers, Rye, Sussex, by Mar. 12.

Mar. 12. Chichester.—*Hand-picked surface field flints* and best quality pit gravel, at per cubic yard, for the Westhamptnett Rural D. Council. Tenders, to be made only on forms containing conditions of contract to be obtained from W. D. Rasell, acting clerk, 5, South Street, Chichester, must be endorsed "Tender for supply and delivery of material," and sent to the Council Offices, 5, South Street, Chichester, by Mar. 12.

Mar. 12. Plomesgate.—*Granite*, broken to 1½in. gauge, and Kent ragstone, broken to 2in. gauge, to be delivered free in the following approximate quantities before July 31 next, for the Rural D. Council:—Granite: Aldeburgh station (G.E. Rly.) 100 tons, Framlingham station (G.E. Rly.) 950 tons, Marlesford station (G.E. Rly.) 70 tons, Parham station (G.E. Rly.) 50 tons, Saxmundham station (G.E. Rly.) 235 tons, Snape station (G.E. Rly.) 175 tons, Wickham Market station (G.E. Rly.) 300 tons, Kenton station (Mid-Suffolk Light Rly.) 40 tons. Kent Ragstone, in barges at: Orford Quay 375 yds., Iken Cliff, River Alde, 125 yds., Butley Mill Wharf, River Alde, 100 yds. Tenders, with samples, to be sent to T. W. Read, clerk, Wickham Market, Suffolk by Mar. 12.

Mar. 12. Broadstairs.—*Granite, kerb and channel* in the following quantities:—1,200ft. run of 6in. by 12in. granite edge kerb (straight), 100ft. run of 6in. by 12in. (circular), 600ft. run of 12in. by 6in. granite channel (straight), and 50ft. 12in. by 6in. (circular), for the Urban D. Council. Further particulars and form of tender may be obtained on application to H. Hurd, C.E., town surveyor, Broadstairs. Sealed tenders, endorsed "Tender for Granite Kerb and Channel," to be sent to L. A. Skinner, clerk to the Council, Council Offices, Broadstairs, by noon on Mar. 12.

Mar. 12. Lichfield.—*Granite and slag*, for the Rural D. Council, for twelve months. Further particulars and forms of tender may be obtained upon application to C. O. Rawstron, district surveyor, Lichfield. Sealed tenders, endorsed "Tender for Granite," together with samples, must be delivered free of charge at the Clerk's Offices, Lichfield, on or before Mar. 12.

Mar. 12. Morley.—*Private street works* as follows:—Pawson Street—paving and flagging, Beech Grove—

kerbing, paving and flagging, Oak Road—kerbing (portion), Oak Road—paving and flagging, Cardigan Avenue—kerbing, Park Road—sewering and kerbing. Plans and specifications may be seen and bills of quantities obtained on application at the Borough Surveyor's, Town Hall, Morley. Tenders, sealed and endorsed "Private Street Works," to be delivered at the Town Clerk's Office, Town Hall, Morley, by noon on Mar. 12.

Mar. 12. Wimborne.—*Quarrying, sifting, breaking and yarding gravel*, to pass a 2in. ring gauge (rings will be supplied by the surveyor) and for team work connected therewith, in the parishes comprised in the district of the Wimborne and Cranborne Rural D. Council. Forms of tenders and other particulars can be had at once on application at the office of the Clerk to the Council. Sealed tenders to be sent to Montague Luff, clerk to the Council, Church Street, Wimborne, by Mar. 12.

Mar. 13. Maldon.—*Supply of the following materials*, for the Rural D. Council, for the year ending Mar. 1907:—Broken granite, broken flints, picked stones, gravel, carting and hire of steam rollers. Forms of tender, conditions and particulars to be obtained of Edgar J. Ennals, surveyor, 6, Market Hill, Maldon, Essex, where tenders, duly filled, must be delivered, sealed and endorsed "Tender for —," by Mar. 13.

Mar. 13. Crewe.—*Labour and materials* for the making of the back passage leading from Hewitt Street to Nantwich Road, in accordance with plans, sections and specifications which may be seen and all other necessary information obtained upon application to G. Eaton-Shore, borough surveyor, Earle Street, Crewe. A deposit of £1 will be required. Sealed tenders and schedule of prices upon printed forms to be obtained from the Borough Surveyor, must be endorsed "Tender for Back Passage making" and delivered to Frederick Cooke, town clerk, Municipal Offices, Crewe, by 9 a.m. on Mar. 13.

Mar. 13. Cleethorpes.—*Making-up of the following streets*, for the Urban D. Council:—Segmers Street; Haigh Street; Bradford Street; rear of Yarra and Albert Roads; rear of 28 to 44, St. Peter's Road. Plans, sections and specifications may be seen and bills of quantities and forms of tenders obtained (on payment of £1) on application to E. Rushton, surveyor, Council House, Cleethorpes. Sealed tenders (on forms supplied by the Council only), addressed to the Chairman of the Highways Committee, and endorsed "Tender for Road Works," to be sent to the Council House by Mar. 13.

Mar. 13. Long Crendon.—*1,255 tons of the best machine-broken granite*, and 41 tons of granite chippings, to be delivered carriage free at the stations mentioned in the form of tender before Oct. 1st next. Forms of tender and other particulars can be obtained from the Council's surveyor, E. Parry, Long Crendon, Thame. Tenders, endorsed "Tender for Materials," must be sent to William Parker, clerk to the Council, 2, High Street, Thame, before Mar. 13.

Mar. 13. London, W.C.—*Paving with asphalt of the following carriageways*:—Broad Street (from Endell Street to Shaftesbury Avenue), Gt. Queen Street (from Drury Lane to Kingsway), Upper Bedford Place. Forms of contract may be seen and forms of tender and other particulars may be obtained at the Town Clerk's Office, 197, High Holborn, W.C. Sealed tenders, endorsed "Tender for Asphalt Pavement," to Lionel Walford, town clerk, Council Offices, 197, High Holborn, W.C., by noon on Mar. 13.

Mar. 13. London, W.—*Construction of roads and sewers*, for the Trustees of the Fitzhager Estate, Ealing, W. Plans and specifications prepared by the trustees' surveyors, Hall-Jones & Cummings, may be seen at their office, 41, Broadway, Ealing, W. where forms of tender may be obtained on payment of £1 rs. Sealed tenders, upon the forms provided, to be delivered to the surveyors by noon on Mar. 13.

Mar. 14. Sherborne.—*Materials, manual and team labour* for the ensuing three years, commencing April 1st, for the Dorset County Council. Schedules, specifications and tender forms to be obtained from W. J. Fletcher, county surveyor, Wimborne or the Assistant Main Road Surveyors: North district—H. J. Taylor and Thomas Taylor, Sturminster Newton; South district—A. Squire, Shire Hall, Dorchester; East district—W. W. Fookes, Wareham, and R. T. S. Seymour, Wimborne; West district—G. R. Marsh, Bridport. No tender can be considered unless submitted on the printed form supplied. Tenders to be sent in to the Clerk to the County Council, Sherborne, endorsed "Main Road Tender," by Mar. 14.

Mar. 14. Tutbury.—*Road materials and cartage*, for the Rural D. Council. Printed forms of tender, containing full particulars, may be obtained from H. S. Tebbitt, surveyor, Rolleston, Burton-upon-Trent, and all tenders must be on the printed forms supplied and properly filled up and sent to C. F. Chamberlain, clerk to the Council, Council's Offices, Union Offices, Burton-upon-Trent, by 10 a.m. on Mar. 14.

Mar. 14. Uckfield.—*Road material*, for the Rural D. Council, as follows:—Unbroken hand-picked flints, unbroken Portlade Coombe rock dug flints, broken Kentish rag stone and broken Sevenoaks stone. Further particulars and forms of tender can be obtained on application to the Clerk. Tenders must be delivered to F. Holman, clerk to the Council, 86, High Street, Lewes. Samples must be sent, carriage paid, to the Workhouse, at Uckfield, on Mar. 16.

Mar. 14. Wincanton.—*Materials and labour* in repairing the main and district roads for one year, from Mar. 31, for the Highway Board. Further information and form of tender can be had from Knapman, Wincanton, and E. Padfield, Cole. Tender to be sent to Frederick W. Lancaster, clerk, Highway Board Offices, Wincanton, by 11 a.m. on Mar. 14.

Mar. 15. Eastbourne.—*Flints, stone and beach, and for cartage*, for the Rural D. Council. Tenders to be sent, on the forms provided by the Council, to the Chairman of the Rural D. Council, and marked "Tender for —," by noon on Mar. 15.

(Continued on p. xiv.)

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large stock it would be difficult to find such a thing as a third-quality board. They hold the reputation of being manufacturers of the highest class of mouldings, these being particularly clean and sharp.

Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

DURING THE WEEK ending March 2nd twenty-two failures in the building and timber trades in England and Wales were gazetted.

J. P. WOOLCOCK, builder, Penryn. R.O. Feb. 20th.

BARRETT, SON & DAVIS, builders and contractors, Dorchester. R.O. Feb. 21st.

E. YOUNG, builder, Eastleigh (late Twyford). R.O. Feb. 21st.

J. & T. GOODIER, plumbers, Withington, Manchester. P.E., O.R.'s, Manchester, March 16th, at 10.

W. L. DIX, painter and glazier, Mundesley. P.E., Shirehall, Norwich, March 14th, at 11.

S. BRANFORD, painter and plumber, &c., Claverley. Adj. Feb. 21st.

H. WAGG, plumber, Yeovil. P.E., Yeovil Town Hall, March 8th, at 12.30.

G. BLACKMOOR & CO., brick manufacturers, Pelsall. P.E., Walsall C.C., March 13th, at 11.30.

W. R. & J. H. WALKER, builders and contractors, Smethwick. Adj. Feb. 20th.

H. CLAYSON, builder, Claygate. P.E., Kingston C.C., April 3rd, at 2.30.

J. CHARLES, bricklayer (late builder), Hull. Adj. Feb. 21st.

C. H. DUNN, builder, Leeds. P.E., Leeds C.C., March 26th, at 11.

J. E. SLATTERY, painter and decorator, Leeds. P.E., Leeds C.C., March 20th, at 11.

E. HARRISON, builder and contractor, Whittington Moor, Chesterfield. Gross liabilities £594; assets £46.

N. WATSON, builder, Bishop Auckland. Deficiency £135.

P. H. PRICE, builder, Portsmouth. First meeting, O.R.'s, Portsmouth, March 8th, at 3. P.E., Portsmouth C.C., March 26th, at 11.

A. POWELL, builders' merchant, Catford. First meeting, 132, York Road, S.E., March 9th, at 12.30. P.E., Greenwich C.C., March 20th at 1.

R. HARDMAN, painter and decorator, Tyldesley. First meeting, 132, Exchange Street, Bolton, March 9th, at 3. P.E., Bolton C.C., March 28th, at 3.

L. W. W. NEIL, quantity surveyor, Southampton and London, W.C. P.E., London Bankruptcy Court, April 6th, at 11.30.

T. W. FLOWMAN, carpenter and builder, Ipswich. First meeting, O.R.'s, Ipswich, March 16th, at 2.15. P.E., Shirehall, Ipswich, March 16th, at 10.30.

F. T. EMUSS, builder, Droitwich. First meeting, 45, Copenhagen Street, Worcester, March 10th, at 10.30. P.E., Worcester Guildhall, March 20th, at 2.

N. NELSON & SON, builders, Aberystwyth. P.E., Town Hall, Aberystwyth, March 9th, at 10.30. First meeting, same, at 2.15.

V. PARKER & T. S. T. TREGALLAS, contractors, London, S.W. Estimated liabilities £13,000; assets estimated at £10,000.



SCREEN, CONFESSIONAL AND ORGAN CASE AT ST. ETHELDREDA'S, ELY PLACE, LONDON. THE LATE J. F. BENTLEY, ARCHITECT.

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Tenders.

Addressed postcards on which lists of tenders may be stated will be sent free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Fetter Lane, E.C. Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Canwell (Staffs).—For further alterations and additions to The Hall, for Mr. Philip S. Foster. Mr. C. M. C. Armstrong, architect, 5, High Street, Warwick:—
G. Hodges, Burton-on-Trent £2,649
W. & J. Webb, Birmingham 2,521
W. J. Whittall & Son,* Birmingham 2,371
* Accepted.

Coventry.—For the erection of a Wesleyan Sunday School, for the Trustees. Mr. W. J. Smith, surveyor, Coventry Road, Market Harborough:—
Hufford, Market Harborough £1,223
Goode 1,187
Randall 1,173
Garlick 1,155
Kelley 1,140
Hickman, Harborough 1,140
Isaac 1,131
Brown, Harborough 1,095
Stidworthy* 1,003
* Accepted. [Rest of Coventry.]

Carmarthen.—For the erection of a post-office at Carmarthen, for H.M. Office of Works, &c.:—

	Cr.
R. Davies	£8,550
A. J. Colborne	6,970
Hayward & Wooster*	6,287
D. Davies & Sons	5,765

* Accepted.

Custon.—For the erection of the Duke of York's Royal Military School at Custon, near Dover, for the Commissioners of H.M. Works and Public Buildings:—

T. L. Fearon	£154,395
R. & G. Bresley	134,500
Perry & Co.	134,500
W. F. Blay	133,500
F. Gough & Co.	132,000
F. & H. F. Higgs	130,000
G. Browning	129,800
J. Mowlem & Co.	129,590
J. & M. Patrick	129,000
D. Davies & Sons	128,910
Higgs & Hill	128,400
T. H. Kinglee & Sons	127,593
W. King & Son	127,474
W. Pattinson & Sons	126,558
Holloway Brothers, London	126,300
J. Shelbourne & Co.	124,200
F. Miskin, Ltd.	119,884
T. J. Hawkins & Co.	118,350
G. E. Wallis & Sons	118,240
W. Moss & Sons	117,300
J. E. Johnson & Son	117,250
G. H. Denne & Son	116,400
W. Willett	115,500
J. J. Wise	115,000
C. G. Hill	114,990
Martin, Wells & Co.	114,000
T. J. Denne	112,900
C. Wall, Ltd.	111,515
A. Hudson & Co.	107,789

Harrow.—For the erection of a cottage hospital at Harrow:—

A. S. Heffer	£4,997
H. Woodbridge	4,970
Oldrey & Son	4,900
Don Brothers	4,850
L. H. Roberts	4,726
Waterman	4,534
Miskin & Son	4,336
McCormick & Son	4,234
J. Smith & Son*	4,193

* Accepted.

Llanalehaiarn (Wales).—Accepted for additions and improvements to Trevor Congregational Chapel. Mr. R. L. Jones, architect, Carnarvon:—
G. Jones, Morfa Nevin, near Pwllheli £1,490

Darwen.—For the erection of a Carnegie free library, for the Corporation. Messrs. Haywood & Harrison, architects, Accrington and Lytham. Quantities by the architects:—

Higson & Sons, Blackburn	£12,150
S. Wilson, St. Annes-on-Sea	11,963
J. Whittaker & Son, Blackburn	11,947
Platt & Castle, Ramsbottom	11,938
J. C. & F. Woods, Bolton	11,680
H. Ramsbottom, Accrington	11,560
S. Butterworth & Sons, Blackpool	11,522
T. Lightbown, Darwen	11,405
T. Cottam, Preston	10,999
Lloyd & Millward, Darwen	10,826
R. Shorrocks, Darwen	10,730

* Accepted subject to reduction.

Llansamlet.—For the erection of a Calvinistic Methodist chapel and vestry at Birchgrove, for the Trustees of the Welsh Calvinistic Methodists Birch-

grove, Swansea. Mr. Rees Llewellyn, architect, Birchgrove House, Birchgrove:—

Lloyd Brothers	£4,850
Thomas & Jones	3,750
Waring, Cole & Waring	3,673
W. Morgan	3,650
D. W. Rosser	3,630
Price Brothers,* Cardiff	2,995

* Accepted.

London, S.E.—For the erection of factory premises at Mountford Place, Kennington, S.E., for Messrs. Hayward Brothers. Mr. A. W. Tribe, architect, 120, Clapham Road, London:—

J. Hoare & Son	£15,679
T. Hooper & Son	15,580
G. Britain	15,570
Hibberd Brothers	15,500
W. Vanstone	15,123
Higgs & Hill	14,984
F. & H. F. Higgs	14,931
Holliday & Greenwood	14,749
Rice & Son	14,680
W. Hammond	14,575
J. Parsons	14,493
Turtle & Appleton	14,470
L. Whitehead & Co.	14,450
Holloway Brothers	14,490
W. Smith & Son,* Eldon Works, Vauxhall	13,985

* Accepted.

London, W.—For the erection of married couples' quarters and alterations at the Workhouse, Fulham Palace Road, S.W., for the Guardians of Fulham Parish (revised tenders). Mr. A. Saxon Snell, architect:—

Barker & Co., Kensington	£1,579
F. G. Lawrence, Kingston-on-Thames	1,564
Cowley & Drake, Willesden	1,507
Taylor & Co.,* Hammersmith	1,467

* Accepted.

London, W.C.—For the erection and completion of shops and flats upon the site of Nos. 183 and 185, King's Cross Road and Nos. 31 and 32, Field Street, St. Pancras, W.C., for Dan Lionel Cohen. Mr. E. J. Harrison, architect:—

	A.	B.
Percy Brothers	£3,227	0 0
F. & H. F. Higgs	3,200	0 0
J. & W. Drake	3,147	0 0
Howell J. Williams, Ltd.	3,079	0 0
W. J. Fryer	3,059	0 0
Fatman & Fotheringham	3,053	0 0
Gladding & Co.	3,032	0 0
C. Wall, Ltd.	3,028	0 0
King & Sons	3,025	0 0
Holliday	2,998	19 0
F. & G. Foster	2,957	0 0
W. Irwin	3,007	0 0

A. Credit for old materials. B. Alternative plastering.

London, W.—For the renovation of and additions to Welsh C.M. Chapel, Hammersmith. Mr. L. Wynne Williams, architect, Connaught Road, Liverpool:—

W. Falkner	£4,255
J. W. Falkner & Son	4,083
L. H. & R. Roberts	3,946
G. Parker	3,888
J. Dorey & Co.	3,748
J. P. Williams	3,657
S. N. Soole & Son*	3,600

* Accepted.

Orpington (Kent).—For the erection of two houses for Mr. J. Greenwood and Mr. C. P. Jarman. Mr. John W. Rhodes, architect, Mitre Court Chambers, Mitre Court, Temple, London, E.C. No quantities:—

Rice	£2,138
Spiers & Son	2,076
Somerford & Son	1,932
Lowe	1,806
Podger	1,655
Blay	1,415

Shortlands.—For the erection of three shops at Shortlands, Kent. Mr. Arthur Cole, architect, Mogok, Thurlestone Road, West Norwood:—

J. Peattie, London, W.	£2,077
W. Irwin, Islington, N.	1,597
J. Pratt & Sons, Sydenham, S.E.	1,570
E. Antill & Sons, London, S.E.	1,527
A. J. & C. Hocking, London, W.C.	1,474
James & Andrews, Beckenham	1,460
W. Ellis & Co., London, E.C.	1,400
C. E. Kenworthy, Caterham, Surrey	1,390
J. Wilford, Snodland	1,360
J. Hollingsworth, Penge, S.E.	1,360
J. Abbot, Walthamstow	1,300
S. R. Spinner, New Malden, Surrey	1,245
Mattock & Parsons,* Gray's Inn Road, W.C.	1,225
F. C. Gorham, Whyteleafe, Surrey	1,150

* Accepted.

Smethwick.—Accepted for the erection of a centre for defective children, for the Education Committee:—
B. Whitehouse & Sons, Birmingham £2,267

Warrington.—Accepted for the erection of the Bolton Council School, for the Education Committee:—
H. Fairclough £11,418

Coming Events.

Wednesday, March 7.

NORTHERN ARCHITECTURAL ASSOCIATION.—Annual Meeting at 7.30 p.m.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Mr. R. S. Lorimer on "Scotch Gardens and Garden Architecture," at 8 p.m.

ROYAL ARCHAEOLOGICAL INSTITUTE.—Mr. Ambrose P. Boyson on "Low-set Openings in Scandinavian Churches," at 4 p.m.

Thursday, March 8.

ROYAL ACADEMY.—Sir William Richmond, R.A., on "The Evolution of Sculpture—Egypt and Greece."

MANCHESTER SOCIETY OF ARCHITECTS.—Discussion on Students' Drawings at 6.45 p.m.

WORSHIPFUL COMPANY OF CARPENTERS.—Mr. G. Gerald Stoney on "Steam Turbines—Land and Marine," at 8 p.m.

Friday, March 9.

ARCHITECTS' BENEVOLENT SOCIETY.—Annual General Meeting at 5 p.m.

ARCHITECTURAL ASSOCIATION.—Mr. Gilbert H. Lovegrove on "The A.A. Camera and Cycling Club Excursions," at 7.30 p.m.

INSTITUTION OF CIVIL ENGINEERS.—Mr. R. Freeman on "The Design of a Two-hinged Spandrel-braced Steel Arch," at 8 p.m. (Students' Meeting.)

GLASGOW TECHNICAL COLLEGE ARCHITECTURAL CRAFTSMEN'S SOCIETY.—Mr. John L. McKinnon on "Masonry in Lighthouse Architecture," at 8 p.m.

Saturday, March 10.

JUNIOR INSTITUTION OF ENGINEERS.—Reception at the Westminster Palace Hotel.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Visits to Edinburgh Castle and the City Chambers.

ARCHITECTURAL ASSOCIATION.—Visit to Royal London Friendly Society's Building and Tollard Royal Hotel, Southampton Row, W.C. Members to meet at the building at 2 p.m.

Wednesday, March 14.

QUANTITY SURVEYORS' ASSOCIATION.—Annual Dinner, Criterion Restaurant.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Mr. J. G. Gillespie on "A Study of the English Renaissance," at 8 p.m. (Associates' Paper.)

Thursday, March 15.

BIRMINGHAM BUILDERS' EXCHANGE.—Mr. Peter B. Ball on "Talks on Canadian Cities," at 6 p.m.

SOCIETY OF ARCHITECTS.—Mr. F. S. Strange on "The Painted Rood Screens of East Anglia," at 8 p.m.

Friday, March 16.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—General Meeting at 8 p.m.

INSTITUTION OF MECHANICAL ENGINEERS.—Ordinary Meeting at 8 p.m.

Saturday, March 17.

ST. BARTHOLOMEW-THE-GREAT, WEST SMITHFIELD.—Lecture on the History and Architecture of the Church.

Monday, March 19.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.—Mr. Sydney Perks on "Flats," at 8 p.m.

Tuesday, March 20.

ARCHITECTURAL ASSOCIATION OF IRELAND.—Meeting at 8 p.m.

ARCHITECTURAL ASSOCIATION CAMERA AND CYCLING CLUB.—Demonstration on "Lantern Slides," at 7.30 p.m.

Friday, March 23.

ARCHITECTURAL ASSOCIATION.—Mr. A. W. Soames, M.P., on "The London Club House of Last Century," at 7.30 p.m.

Saturday, March 24.

ROYAL SANITARY INSTITUTE.—Discussion on "Cremation," at 11 a.m. Provincial meeting, Town Hall, Leicester.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Visits to new offices of the North British and Mercantile Insurance Co., and the new premises of the Professional and Civil Service Supply Association, Ltd.

Monday, March 26.

SURVEYORS' INSTITUTION.—Ordinary General Meeting at 8 p.m.

Wednesday, March 28.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Mr. J. Roxburgh Sharran on "Steel Building Construction: A Comparison of British and American Methods," at 8 p.m.

Thursday, March 29.

BIRMINGHAM BUILDERS' EXCHANGE.—Mr. W. Francis Goodrich on "The Goldfields of the City," at 6 p.m.

New Companies.

L. W. SEYERS, LTD., to acquire the business of L. W. Seyers, carried on at Newport, Mon., and to carry on the business of enamel slate manufacturers, manufacturers of and dealers in builders' materials, &c. Capital: £1,000.

CARADOC SLATE QUARRIES, LTD., to acquire any slate or other quarries, mines, mining rights or land in the United Kingdom and elsewhere, to adopt an agreement with the Menai Straits Co., Ltd. Capital: £25,000.

BRITISH FRAM CONSTRUCTION CO., LTD., Mountain Ash, to carry on the business of patent fireproof partition constructors, manufacturers of and dealers in bricks, tiles, terra-cotta, pipes, earthenware, sanitary ware, cement, lime, and builders' requisites, &c. Capital: £3,000.

Ramsgate.—For the restoration of St. George's Church:—

	Ketton stone.	Douling stone.	Credit for old slates.
Paramor, Margate	£3,350	£2,878	0 0
Martin, Ramsgate	2,912	2,745	0 0
Denne, Deal	2,790	2,892	0 0
J. J. Wise, Deal	2,326	2,700	0 0
Grumman, Ramsgate	2,229	2,499	0 0
Hayward & Paramor	2,139	2,439	0 0
Collins & Godfrey, Tewkesbury	2,147	2,040	0 0
W. J. Adcock,* Dover	2,398	1,887	14 0

* Accepted.

† Porch not included.

Current Market Prices

FORAGE.

	per qr.	£ s. d.	£ s. d.
Beans	per qr.	1 13 0	1 14 0
Clover, best	per load	3 12 0	4 2 6
Hay, good	do.	3 5 0	3 12 6
Sainfoin mixture	do.	3 5 0	3 15 0
Straw	do.	1 8 0	1 14 0

MISCELLANEOUS.

Brio's Stocks, d/d to job	per 1,000	1 14 0	—
100. Flettons on rail	do.	1 4 0	—
Do. Pressed Wire Cuts, d/d to job	do.	1 16 0	—
Do. Blue brindled wire cuts	do.	1 1 0	—
Do. do. wire cuts	do.	1 5 0	—
Do. do. pressed facings	do.	1 17 6	—
Coke Breeze, into carts at gasworks	per load	0 2 0	—
Do. d/d to job	do.	0 4 0	—
Castor Oil, French	per cwt.	1 1 10	1 2 0
Colza Oil, English	do.	1 5 3	—
Copperas	per ton	2 0 0	—
Lard Oil	per cwt.	2 15 0	2 17 0
Lead, white, ground, carbonate	per ton	16 0 0	—
Do. red	do.	15 0 0	0 19 0
Linseed Oil, barrels	per cwt.	1 0 6	—
Petroleum, American	per gal.	0 0 6	0 0 6½
Do. Russian	do.	0 0 5½	0 0 5½
Pitch	per barrel	0 8 0	—
Shellac, orange	per cwt.	9 10 0	9 11 0
Soda, crystals	per ton	3 2 6	3 5 0
Tallow, Town	per cwt.	1 6 0	1 7 0
Tar, Stockholm	per barrel	1 5 0	—
Turpentine	per cwt.	2 7 0	—

METALS.

Standard Copper	per ton	79 5 0	79 10 0
Do. Strong sheets	do.	92 10 0	—
Lead, Soft Foreign	do.	16 0 0	16 5 0
Do. English	do.	16 5 0	16 10 0
Do. pipes	do.	19 0 0	19 5 0
Do. sheets	do.	18 10 0	—
Galvanised Corrugated sheets	do.	12 7 6	12 15 0
Spelter G.O.	do.	25 0 0	25 10 0
Angles, Scotland	do.	6 15 0	—
Bars do.	do.	7 15 0	—
Marked bars, Staffs	do.	9 0 0	—
Common bars do.	do.	7 5 0	7 7 6
Angles, M'boro.	do.	6 10 0	6 15 0
Coists do.	do.	6 5 0	6 10 0
Angles, Midlands	do.	6 15 0	7 0 0
Coists do.	do.	7 0 0	7 5 0
Hard plates, Midlands	do.	7 15 0	8 0 0
Angles, Foreign, c.i.f. Thames	do.	6 2 6	6 7 6
ees do. do.	do.	6 7 6	6 10 0
Coists do. do.	do.	5 10 0	5 12 6
Channels do. do.	do.	5 12 6	5 15 0
Tails, Wire	do.	9 0 0	9 2 6
in, Foreign	do.	164 10 0	165 0 0
do. English incoits	do.	165 0 0	166 0 0
ino, sheets, Silesian	do.	27 5 0	—
do. do. Vielle Montaigne	do.	27 10 0	—

TIMBER.

Sort Woods.

Mr. Dantzic and Memel	per load	2 15 0	5 0 0
ine, Quebec, Yellow	do.	4 2 6	7 10 0
Do. Pitch, American	do.	2 19 0	5 0 0
aths, log, Dantzic	per cu. fath.	4 0 0	6 0 0
Deals, St. Petersburg, Yellow, 1st, 3x9	per std.	15 0 0	—
Do. do. do. 1st, 3x9	do.	13 5 0	—
Do. do. do. 2nd, 3x9	do.	10 5 0	10 10 0
Do. do. do. 3rd, 3x9	do.	9 5 0	—
Do. do. do. 3rd, 2½x7	do.	9 5 0	—
Do. do. White, 3rd, 2½x9	do.	8 15 0	—
Do. Archangel, White, 1st, 3x9	do.	12 15 0	—
Do. do. 2nd, 3x9	do.	10 15 0	11 0 0
Do. do. 2nd, 3x11	do.	11 5 0	12 10 0
Do. do. Yellow, Unsorted, 3x9	do.	7 10 0	—

Deals, St. John, Spruce, 1st, 2nd & 3rd, 3x9	per std.	£ s. d.	£ s. d.
Do. Soroka, Yellow, 3rd, 3x9	do.	11 10 0	—
Do. Räfsö, Yellow, 4th, 3x7	do.	8 10 0	—
Do. do. do. 4th, 3x7	do.	8 10 0	—
Do. do. do. 4th, 2½x7	do.	9 0 0	—
Do. Gefle, Yellow, 2½x7	do.	8 15 0	—
Do. Gothenburg, Yellow, 3rd, 2½x7	do.	9 10 0	—
Do. Ingramport, White, Unsorted, 2½x7	do.	8 5 0	—
Do. Montreal, Red Pine, 1st, 3x11	do.	13 10 0	—
Do. do. do. 1st, 3x9	do.	15 0 0	—
Do. do. do. 1st, 3x7	do.	11 5 0	—
Do. do. do. 2nd, 3x7	do.	9 5 0	9 10 0
Do. do. do. 2nd, 3x11	do.	11 0 0	—
Do. do. do. 2nd, 1x11	do.	10 0 0	—
Do. Quebec, Spruce, 3rd, 3x9	do.	9 15 0	—
Battens, Horneborg, Yellow, Unsorted, 3x5½	do.	8 10 0	—
Do. do. do. 3x5	do.	8 5 0	—
Do. Räfsö, Yellow, 4th, 3x4½	do.	7 15 0	—
Do. do. do. 4th, 3x4	do.	8 0 0	—
Do. do. do. 4th, 2x4	do.	8 10 0	—
Do. St. Petersburg, Yellow, 3rd, 2½x6½	do.	8 5 0	—
Do. do. do. 3rd, 2x7	do.	9 0 0	—
Do. do. do. 3rd, 2x6	do.	8 5 0	—
Do. do. do. 3rd, 2x5	do.	8 0 0	—
Do. do. do. 3rd, 2x4	do.	8 15 0	—
Do. do. do. Unsorted, 1x7	do.	9 5 0	—
Do. do. White, 3rd, 2½x6	do.	7 15 0	—
Do. do. do. 3rd, 2x6	do.	7 15 0	—

Battens, St. Petersburg, White, 3rd, 2x5	per std.	£ s. d.	£ s. d.
Do. do. do. 3rd, 1x6	do.	8 0 0	—
Do. do. do. 3rd, 1x5	do.	7 10 0	7 15 0
Do. do. do. 3rd, 1x4	do.	7 5 0	—
Do. do. do. 3rd, 1½x6	do.	7 15 0	—
Do. Wartsala, Yellow, 1st & 2nd, 2x4	do.	8 5 0	9 0 0
Do. do. do. 2x4½	do.	8 0 0	—
Do. Abo, White Unsorted, 2x4	do.	8 0 0	—
Do. Hernösand, White, Unsorted, 2x4	do.	8 0 0	—
Do. Kubikenborg, White, Unsorted, 2x4	do.	8 5 0	—
Do. Kalmar, Yellow, Unsorted, 2x4	do.	8 10 0	—
Do. Archangel, White, Unsorted, 1½x8	do.	8 15 0	—
Do. Sandarne, White, 1st & 2nd, 1x11	do.	12 0 0	—
Do. Ingramport, White, Unsorted, 2½x6½	do.	7 5 0	—
Do. do. do. 2x4	do.	8 0 0	—
Flooring Boards, Sandarne, Yellow, 2nd, 1x6½	per square	0 10 9	—
Do. do. do. do. 2nd, 1x6	do.	0 10 9	—
Do. do. do. do. 3rd, 1x5	do.	0 9 9	—
Do. do. do. do. 3rd, 1x5	do.	0 9 0	—
Do. do. Skutskar, Yellow, 2nd, 1x4½	do.	0 9 0	—
Do. do. Kubikenborg, Yellow, 2nd, 1x4	do.	0 9 9	—
Do. do. Johannedal, White, Dry, Unsorted, 1x7	do.	8 9 0	—



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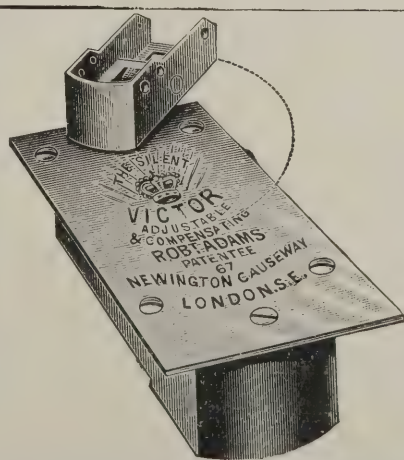
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Telephone: 829 Central.

(Continued from p. 135.)

Mar. 16. Preston.—*Street works* required in levelling, paving, flagging, channelling, &c., Tulketh Crescent and Wyre Street, for the Corporation. Plans, sections and specifications may be seen, and schedule of quantities and forms of tender obtained at the office of the Borough Surveyor, Town Hall, Preston, to whom sealed tenders, endorsed "Tender for Paving, &c.," must be delivered not later than noon on Mar. 16. Fair wages clause.

Mar. 16. Thaxted.—*Paving and gravelling, &c.*, of the playgrounds of the Thaxted Council School, for the Education Committee. Plan and specification, prepared by the county architect, Frank Whitmore, may be inspected at the school, Thaxted, between 9 and 4, any day except Saturdays and Sundays. A separate price must be given for the portion of work "tar-paved," and another price for the other portions of the playground. Sealed tenders, endorsed "Tenders, Thaxted School," must reach Stephen Giffard, clerk to the Sub-Committee, Great Dunmow, by Mar. 16.

Mar. 17. Palmer's Green.—*Making-up* of Eaton Park Avondale and Stondard Roads, at Palmer's Green for the Southgate Urban D. Council. Plans may be seen on application to the Council's Surveyor, Charles G. Lawson, from whom copies of the specification and forms of tender may be obtained on depositing £2. Tenders, endorsed "Private Streets," must reach W. M. Ellenor, clerk of the Council, Council Offices, Palmer's Green, N., by noon on Mar. 17.

Mar. 19. Stockton-on-Tees.—*Private street improvement works* required to be done in the paving, flagging, and kerbing of Norfolk Street (North End). Plans and specifications may be seen and quantities and forms of tender obtained from M. H. Sykes, borough engineer, Town Hall. Tenders, endorsed "Private Street Improvements," to be sent to Arthur B. Crossby, town clerk, Borough Hall, Stockton-on-Tees, by 10 a.m. on Mar. 19.

Mar. 20. Tending.—*Supply of the following quantities of flints* broken to 2in. gauge:—1,000 cub. yds. at Beaumont Quay, 500 cub. yds. at Clacton Beach, 1,750 cub. yds. at Mistley Quay, 100 cub. yds. at Great Oakley, 600 cub. yds. at Kirby Quay, 500 cub. yds. at Landmerrere, 500 cub. yds. at St. Osyth, 400 cub. yds. at The Flag, St. Osyth, 400 cub. yds. at Wrabness Hard, 200 cub. yds. at Harwich. Tenders are also invited for the supply of 400 tons of granite, broken to go through a 1½in. ring, to be delivered at Mistley. Tenders to be sent to J. Bell, highway surveyor, Great Bentley, Colchester, by Mar. 20.

Mar. 21. Hoo.—*Supply of the following materials*, for the Rural D. Council:—1,000 yds. of broken Kentish ragstone by barge or rail; also 350 yds. of broken Guernsey or Cornish granite or Cherbourg quartzite by barge or rail. The whole of such materials must be free from rubbish or haddock, and the granite and quartzite broken so as to pass through a 2in. ring and the ragstone through a 2½in. ring. Printed forms of tender may be obtained of Richard Phillott Smyth at Strood. Tenders to be sealed, endorsed "Tender for Ragstone, &c.," as the case may be, and addressed to Richard Phillott Smyth, clerk, Strood, by Mar. 21.

Mar. 25. Abertridwr.—*Construction of streets* at Abertridwr, near Caerphilly. Plans and specification may be seen and bills of quantities obtainable from G. A. Lunde, surveyor, 53, Queen Street, Cardiff, to whom tenders, sealed and endorsed "Streets," are to be delivered by Mar. 25.

SANITARY.

Mar. 11. Cleethorpes.—*Underground male and female conveniences* in Sea Road. Plans and sections and bills of quantities and forms of tender may be obtained on payment of £2. Sealed tenders (on forms supplied by the Council only) to be addressed to the Chairman of the Sanitary and Building Committee, and endorsed "Tender for Conveniences," to be sent to the Council House, Cleethorpes, by Mar. 11.

Mar. 12. Halifax.—*Works in connection with the sewage-disposal works*, for the Highways Committee of the Halifax Corporation:—Contract No. 3: The construction of bacteria beds and delivery and effluent channels. Contract No. 4: The supply and delivery of penstocks, sluice valves, and special castings for the above. Plans and specifications may be seen and forms of tender obtained on application to James Lord, M.I.C.E., borough engineer, Town Hall, Halifax, on deposit of £1. Tenders, endorsed "Bacteria Beds—Contract No. 3 or 4," as the case may be, must be sent to Keighley Walton, town clerk, Halifax, by Mar. 12. The persons whose tenders are accepted will be required to observe the fair contracts clauses adopted by the Corporation.

Mar. 12. Darvel.—*Sewerage and sewage purification works*, for the Town Council. The works comprise the providing and laying of about 1,250 yds. of 18in. 50 yds. of 15in., 750 yds. of 12in., and 305 yds. of 9in. fireclay pipe sewers, with all necessary manholes and flushing chambers, and the construction of sewage purification works about 1 mile to the westwards of Darvel, and other contingent works. Drawings may be seen at the office of P. Campbell Hart, C.E., 134, St. Vincent Street, Glasgow, from whom copies of specification and duplicate copies of schedule of quantities may be obtained on payment of £1. Sealed tenders, endorsed "Tender for Darvel Sewerage," to be lodged with Andrew Cameron, town clerk, Darvel, by noon on Mar. 12.

Mar. 12. Market Harborough.—*Sewage outfall works*, for the parish of Fleckney, consisting of concrete tanks, continuous filters, storm beds, carriers, distribution chambers, and about 800 lin. yds. of 9in. and 12in. stone-ware drains, for the Rural D. Council. Drawings may be inspected at the offices of the engineers, Everard, Son & Pick, 6, Millstone Lane, Leicester, from whom conditions, specification, quantities and form of tender may be obtained upon payment of £2. Sealed tenders, upon the form supplied, endorsed "Tender for Fleckney Sewage Works," to be sent to Charles Burgoin, clerk to the Council, Market Harborough, by 10 a.m. on Mar. 12.

Mar. 13. Colchester.—*600 tons of the best hand-picked Buxton or Derbyshire stone lime* for sewage precipitating purposes, for the Urban D. Council. The lime

to be delivered in good condition to the Hythe Station, Colchester, at the rate of about 2 tons per week. Specifications and forms of tender can be obtained upon application at the Borough Surveyor's Office. Sealed tenders, endorsed "Tender for Lime," to be delivered to Herbert Goodyear, A.M.I.C.E., borough engineer and surveyor, Town Hall, Colchester, by Mar. 13.

Mar. 14. Newport, Isle of Wight.—*Scavenging* at Bembridge, Bonchurch, Brading, Carisbrooke, Freshwater, Totland and Yarmouth, for the Rural D. Council. Copies of the contract can be obtained on payment of 1s., the charge for copying. Tenders in sealed envelopes, marked on the outside "Scavenging," Bembridge, Bonchurch, Brading, Carisbrooke, Freshwater, Totland or Yarmouth, respectively, to be delivered to H. Eldridge Stratton, clerk, Rural D. Council Offices, Pyle Street, Newport, I.W., by 5 p.m. on Mar. 14.

Mar. 15. Merthyr Tydfil.—*Effluent conduit.* Laying down and completing a 3ft. 6in. circular steel plate tube, about 380 yds. in length, and the contingent works for conveying and discharging the effluent stream from the Troedyrhiw Farm Lands. Plans and specification of the work may be seen and forms of tender obtained upon application to Thomas F. Harvey, borough engineer, Town Hall, Merthyr Tydfil. Sealed tenders, endorsed "Effluent Conduit," to be sent to W. R. Harris, Town Hall, Merthyr Tydfil, by Mar. 15.

Mar. 27. Barnet.—*For the following works* in connection with the Arkley sewerage, for the Barnet Urban D. Council:—2,627 yds. of 12in. stoneware pipe sewer, 800 yds. of 6in. stoneware pipe sewer, 208 yds. of 6in. stoneware pipe sewer, together with manholes, ventilating shafts, &c. Drawings and specifications can be seen on application to the Council's Surveyor, W. H. Mansbridge, 40, High Street, Barnet, any weekday between 9 and 4. Copies may be had on loan for three days upon the deposit of £1 1s. Tenders on the form provided, together with the schedule of prices properly filled in, to be properly sealed and endorsed "Arkley Sewer," and sent to H. W. Poole, clerk, Council Offices, 40, High Street, Barnet, Herts, by Mar. 27.

TIMBER.

April 3. London, S.W.—*Oregon pine.* The Crown Agents for the Colonies, acting on behalf of the administration of the Central South African Railways, invite tenders for the supply of about 97,000 cub. ft. of Oregon pine, known on the Liverpool market as "select quality." Forms of tender, with specifications and conditions of contract, may be obtained on application at the office of the Crown Agents for the Colonies, Whitehall Gardens, London, S.W., between 10 and 4 (Saturdays 10 to 1), on payment of a deposit of £1 per copy. Tenders to be delivered in sealed envelopes addressed to the Crown Agents for the Colonies, endorsed "Tender for Oregon Pine C.S.A. R.," by noon on April 3.

MISCELLANEOUS.

Mar. 8. Birmingham.—*Supply of the following stores*, for the Corporation Gasworks in Birmingham and Swan Village, and the Wednesbury Branch Offices, during the year ending Mar. 31, 1907:—Iron tubes and fittings; cast-iron pipes; iron and steel bars, sheets, &c.; iron chains, &c.; steel bars; rake rods and heads; files; steel castings; hammers and auger heads; steel scoops; steel forgings; steel ferrules; conveyor pans and wheels; steel and brass springs; iron castings; firebars; ascension pipes, lamp columns, &c.; malleable iron castings; wrought-iron water pans; iron castings, machined or fitted; rollers and wheels; worm and travelling wheels, piston rings and rods; iron borings; retort fittings; Grice's retort fittings; Walker's retort fittings; inclined retort fittings; shovels, forks, &c.; iron barrows, &c.; galvanized buckets and flue pipe; bolts and nuts; retort screws and cross bars; turned bolts and nuts; meter stays, pipe books, lamp brackets, &c.; nails; tin plates; tin-plate works, lamps, &c.; tin lead and compo tube; brass and gunmetal castings; copper tubes, sheets and bars; gunmetal fittings; brass tubes, sheets, &c.; wood screws, machine screws, &c.; padlocks; rivets, wire and gauze; pulley blocks; ironmongery; valves, brass and gunmetal; iron gas valves and cocks; fittings and special valves; wood turnery, &c.; paint (various); paint; house's cement; brushes; red and white lead; glass; wire ropes; English timber; foreign timber, &c.; railway sleepers; cement; lime; bricks (brown); slates; paving stones, &c.; lime for purifying; tools, &c. Conditions and forms of tender, price 5s. each, may be obtained from the City Gas Offices. Tenders must be sent to G. Hampton Barber, secy., City Gas Offices, Council House, Birmingham, by Mar. 8.

Mar. 9. Cardiff.—*Building materials and ironmongery*, oils and paints, and glass and glazing for the Workhouse. Standard samples of building materials and ironmongery may be seen at the Cardiff Workhouse. Forms of tender, to be obtained from the Clerk, must be returned under cover, endorsed "Tender for supply of —," to A. J. Harris, clerk, Queen's Chambers, Cardiff, by 5 p.m. on Mar. 9.

Mar. 9. Dublin.—*Arc lamp carbons*, for the Corporation electricity undertaking. Specification, with terms and conditions, and form of tender may be obtained from the City Engineer, City Hall, Dublin, on payment of 1s. for each form. Tenders, sealed and marked "Tenders for Carbons," must be sent to Henry Campbell, town clerk, Town Clerk's Office, City Hall, Dublin, by noon on Mar. 9.

Mar. 10. Trim.—*Various*, consisting of plumbing, &c., repairs, glazing workhouse windows, job carpentry work, at per day, for the Guardians. Tender forms to be had at Workhouse. Tenders will be received by Vincent J. Sheridan, clerk of the Union, Trim, Ireland, up to noon on Mar. 10.

Mar. 10. Maidstone.—*Supply of the following stores*, for the Bridges and Roads Committee of the County Council:—Shovels, forks, scavenging brooms, scoops, scrapers and other tools and materials. Particulars and forms of tender may be obtained on application to the County Surveyor, West Borough Chambers, Maidstone. Sealed tenders, endorsed "Tender for Tools," to be sent

to W. B. Prosser, clerk to the County Council, Sessions House, Maidstone, by noon on Mar. 10.

Mar. 10. Willington.—*Various*, for the Urban D. Council:—(a) For carting, particulars of which will be furnished on application to J. H. Gardner, surveyor, Willington. (b) Repairs, &c., of street lamps—the contractor is to do the necessary repairs to 116 street lamps in the district, inclusive of glazing in 21oz. glass; one coat of paint to outside and inside of lamps and frames and lamp posts, maintaining burners in perfect order, supplying, if necessary, new Peebles' patent needle burners, lever taps, twiggings-pips, &c.; in case new service pipes are required, state price per foot for same inclusive of fixing and cutting ground. (c) Paving, on causeways and crossings per square yard, channelling, no more than four bricks wide, per yard, lineal; kerbing per yard lineal; fixing metal gully traps, including labour time and cement. (d) Road stones—particulars and forms of tender will be supplied on application to the surveyor. (e) Scavenging—tenders from persons who are willing to undertake the whole or part of the work of scavenging within the scavenging areas formed by the Council. Printed conditions with form of tender, and further particulars, may be had on application to J. H. Gardner, surveyor, Willington. Sealed tenders, marked a, b, c, d or e (as the case may be), to be sent in to John George Wilson, clerk to the Council, 5, North Bailey, Willington, by Mar. 10.

Mar. 10. Colchester.—*Supply of the following materials*, for the Roads and Drainage Committee of the Urban D. Council, for twelve months:—York kerbing, granite kerbing, granite cubes, broken granite, broken Kentish ragstone, Kentish sifted red flints, Portland cement, glazed stoneware sewer pipes, from 2½ins. to 4ins., with junctions, bends traps, taper pipes and gulleys. These to be of the best of their respective kinds, and supplied from time to time and in such quantities as may be required, but no less a quantity than one railway truck, vessel or barge load will be ordered at any one time. Specifications and forms of tender can be obtained from the Borough Surveyor's Office. Tenders (only upon forms supplied), endorsed "Tenders for the supply of —," to be sent to H. Goodyear, borough engineer and surveyor, Town Hall, Colchester, by Mar. 10.

Mar. 10. Eastbourne.—*Supply of the following stores*, for the Town Council:—Portland cement, cast-iron goods, wrought-iron goods, tools, &c.; ironmongery (miscellaneous), oils and colours, disinfectants, timber; granite, stone, &c.; brick, pipes, junctions, &c. (stone-ware); brooms, brushes, &c. Specifications may be seen and forms of tender obtainable at the Borough Surveyor's Office, Town Hall, Eastbourne. All tenders must be received by A. Ernest Prescott, borough surveyor, Town Hall Eastbourne, by Mar. 10.

Mar. 10. Haslingden.—*Supply of the following stores*, for the Town Council:—Limestone, Welsh granite, Balder, channels, kerbs, setts, flags, landings, Ashlar stone, bricks, sanitary pipes, waste-water closets, iron castings, spades, shovels, picks, scavenging brushes, workmen's tools, excreta tubs, Portland cement, disinfectants (fluid and powder); the carting of stone from the various stations within the district, and the hiring of horses and carts per hour. Further particulars and forms of tender from J. Singleton Green, borough surveyor. Sealed tenders to Walter Musgrove, town clerk, Municipal Offices, Haslingden, by noon on Mar. 10.

Mar. 10. Swindon.—*Supply of the following materials* for twelve months, for the Corporation. Stone, kerbing, paving and channel; timber, pipes and bricks, cement and lime, oils, paints, glass, &c.; ironmongery, blacksmith's iron, &c.; iron castings and lamps, disinfectants, hauling, cast-iron pipes, &c.; wrought iron tubes, fittings, &c.; general stores (for electricity and tramways department). Forms of tender for all except the last item and other particulars can be obtained on written application to H. J. Hamp, borough surveyor, and intending contractors, must state which forms they require. Forms of tender and all particulars respecting the last item can be obtained on written application to the electrical engineer, J. G. Griffin, Electricity Works, Swindon. Patterns and samples may be inspected at the Corporation's depot, Cromwell Street, Swindon. Sealed tenders to reach Robt. Hilton, town clerk, Town Hall, Swindon, by noon on Mar. 10.

Mar. 12. Barnes.—*Supply of the following materials*, for the Urban D. Council, for twelve months ending April 1, 1907:—Broken Guernsey granite; broken flints and Thames ballast; horses and carts on hire; smith's work; ironmongery, &c.; removal of refuse by barges; Portland cement; forage and litter; granite kerb and channel; paving slabs; oils, paints, &c. Particulars and forms of tender may be obtained of the Engineer and Surveyor, Council House, Mortlake, S.W., where tenders, sealed and endorsed "Tender for Granite," "Tender for Flints," &c., must be sent by noon on Mar. 12.

Mar. 12. Stourbridge.—*Supply of the following materials*, for the Urban D. Council:—Rowley rag stone, Rowley kerb and setts, blast furnace cinder, blue bricks, kerb, &c., brushes, glazed earthenware pipes, cement, road shovels, picks, gully grates and frames, manhole covers, horse provender, coal and slack, baths requisites. Forms of tender will be supplied upon application to the Surveyor. Tenders sealed, endorsed and addressed to Frederick Woodward, surveyor, Town Hall, Stourbridge, by 10 a.m. on Mar. 12.

Mar. 12. Colne.—*Supply of the following materials* for the Highways and Streets Committee of the Corporation, for the twelve months ending Mar. 31, 1907:—Cement, granite macadam, limestone macadam, lime ironwork (street grates, manhole and lamp-hole covers) pitch, creosote oil, brushes, earthenware pipes and gulleys, and also for team labour, repair of highways and the leading of limestone. Specifications and form of tender may be obtained on application at the office of the Borough Surveyor, T. H. Hartley. Fair wages clause inserted. Sealed and endorsed tenders, addressed to the Chairman of the Highways and Streets Committee, must be delivered at the office of the Borough Surveyor by Mar. 12.

Mar. 12. Erith.—Supply of the following materials, for the Urban D. Council, for the year ending Mar. 31, 1907:—Broken Guernsey granite; tees scoriae setts, Guernsey granite setts and Scotch granite setts; pit flints; ballast; sand; gravel; bricks; Kentish ragstone tar paving; Norwegian granite kerb; drain pipes and bends; Portland cement; bass brooms, and brooms for road-sweeping machines; shovels and picks; manhole covers and gully grates; ironmongery, &c. Form of contract may be seen and forms of tender obtained at the offices of the Council. Tenders in the form supplied, and accompanied by a sample of each of the materials quoted for, must be delivered at the offices of the Council, Erith, by 5 p.m. on Mar. 12.

Mar. 12. Gainsborough.—Supply of the following materials, for the Urban D. Council, during the year ending Mar. 31, 1907:—Broken granite, syenite, or whinstone macadam, and 4in. cube granite, syenite or whinstone setts; broken and block slag; slag chippings and dust; Yorkshire setts, kerbs, channels, and flags; concrete flags; Portland cement; stoneware and earthenware pipes, gullies, &c.; cast-iron pipes. Specification and forms of tender may be obtained by written application addressed to the Engineer and Surveyor, Council Offices, Gainsborough. Sealed tenders endorsed "Tender for —," accompanied by samples of the materials to be supplied, to be delivered at the office of Decimus M. Robbs, clerk to the Council, 6, Lord Street, Gainsborough, by Mar. 12.

Mar. 12. Edinburgh.—Supply of the following materials, for the Corporation Electricity Supply Department for the year from May 16, 1906:—Arc lamp carbons; cast-iron pavement boxes and cast-iron pipes; electricity meters; house service fuse boxes; bitumen. Specifications and forms of tender can be obtained at the Engineer's Office, 5, Dewar Place, Edinburgh, on payment of a deposit of £1 is, for each specification. Sealed tenders, endorsed with the title of the specification, must be sent to the Town Clerk, City Chambers, Edinburgh, not later than Mar. 12.

Mar. 12. Leeds.—Supply of the following stores, &c., for the Tramways Committee of the City Council during the year ending Mar. 31, 1907:—Bolts and nuts; brushes; electrical sundries; engineers' furnishings (drills, pliers and other tools); files; glass; iron and steel; iron and steel castings; ironmongery; malleable iron castings; oils, &c.; paints and varnishes, plumbers' material; tool steel. Conditions of contract and tender forms may be obtained on application to J. B. Hamilton, general manager, Tramways Office, City Square, Leeds. Sealed tenders, marked "Tramways—Tender for General Stores," to R. E. Fox, town clerk, Tramways General Office, City Square, Leeds, not later than Mar. 12.

Mar. 12. London, W.—Supply of the following works and materials, for the Borough Council, for one year commencing April 1, 1906:—Horses, harness and drivers for street watering; night washing and sweeping machines; carting rubbish and one-horse carts; timber; broken granite; lime and bricks; footway kerb Yorkshire paving; Thames ballast and sand; glazed stoneware sewer pipes; pit flints, gravel and hoggins; tools and ironmongery; ironwork for sewers and iron castings; plumbers' work and materials; wood blocks for repairs; engineers' requirements, oils, &c. Tenders to be made upon and strictly in accordance with the printed forms of tender. Further particulars and forms of tender may be obtained on application at the Town Hall from 10 until 4 daily (Saturdays excepted). All tenders, sealed and endorsed "Tender for —," to be delivered to J. Wilson, town clerk, Town Hall, Marylebone Lane, Oxford Street, W., by 11 a.m. on Mar. 12.

Mar. 13. Grangetown.—Supply of the following materials, for the Eston Urban D. Council, for twelve months ending Mar. 31, 1907:—Highway material, whinstone and slag; team work; disinfectants; brooms and brushes; picks, pick points, shovels, &c.; oils, &c. Further information and forms of tender may be obtained on application to C. McDermid, district surveyor, Council Offices, Grangetown, S.O., Yorks. Sealed tenders (which must be on the forms provided), properly endorsed, together with samples, are to be delivered at the Council Offices by Mar. 13.

Mar. 13. London, E.C.—Supply of the following materials and stores, for the Council of the Metropolitan Borough of Shoreditch, for one year from April 1, 1906, to March 31, 1907 (inclusive):—Highways Works Department: Paving, repairing and relaying the footway and carriageway pavements within the borough, and the supply of materials; supplying and laying patent or manufacturing stone, or other paving material; asphalt; broken granite; plumbers' work; smiths' work; drain pipes, junctions, bends, &c.; drain rods, pails, ropes, &c.; timber; sewer ironwork and street posts; gas-fittings, &c., for the public lighting of the borough; lime cement, &c.; general cartage; street name plates, notice boards, writers' work, &c.; ballast, hoggins, shingle and sand. Scavenging and other Departments: Iron, ironmongery. Electricity Works Department: (a) Electric cables and sundries; (b) gas pipe and fittings; (c) engineers' stores. Forms of tender for all the above-mentioned articles can be obtained on application to the Town Clerk. Tenders must be sent to H. Mansfield Robinson, town clerk, Shoreditch Town Hall, Old Street, E.C., by 3 p.m. on Mar. 13.

Mar. 13. Eccles.—Supply of the following materials for the year ending Mar. 31, 1907, for the Corporation:—Setts (Lankey paving, crossing, flag rock, grit, no granite; flags: best and second barns; flags: concrete; flags: manhole, lampeye and gully; kerbs: rough, straight and circular; channel stones: straight and circular; broken rubble; granite macadam and chippings; prepared pit limestone; limestone cube chippings; gravel; pit or river; castings: pitch, creosote and tar; Simpson's patent street gulleys; stoneware passage gulleys; stoneware pipes, bends and junctions; mortar. Forms of tender and particulars may be obtained upon application to Thomas S. Picton, C.E., borough surveyor. Sealed tenders, which must be enclosed in an official envelope endorsed "Tender for Highway Materials," must be forwarded to Edwin Parkes, town clerk, Town Hall, Eccles, by noon on Mar. 13.

Mar. 13. Preston.—Supply of the following materials, for the Corporation:—Cast-iron pipes of various sizes; special castings for same; also manhole covers, step-irons, street gulleys and other irregular castings; lamp pillars, as per sample; sluice valves, double faced, various sizes; best salt-glazed socketed pipes, in 2ft. lengths, of various sizes, from 4in. to 24in. internal diameter; bends, junctions, syphons, yard sinks, taper pipes, &c.; brooms; refilling street-sweeping machine with circular brush; oil, white lead, paint and putty; 21 oz. glass, cut to pattern. Specification, form of tender, and all other information may be obtained on application at the offices of the Borough Surveyor, Town Hall, Preston, to whom sealed tenders, addressed to "The Chairman of the Finance Committee" and endorsed "Tender for Stores," must be sent by noon on Mar. 13. Fair wages clause.

Mar. 13. London, W.C.—Supply of the following materials, for the Holborn Borough Council, for a period of twelve months from April 1 next:—Disinfectants; stone; gravel, sand and ballast; cartage of materials; hire of road-rollers; iron castings; gasfitters' and engineers' work; lime, cement and bricks; drain-pipes; brooms; builders' work; smiths' work, and the supply of tools, implements, &c. Forms of the several contracts may be seen and forms of tender and other particulars obtained at the Town Clerk's Office, 197, High Holborn, W.C. Separate sealed tenders for all or any of the above-mentioned works and materials, endorsed "Tender for —," together with the names and addresses and callings of two proposed sureties, must be delivered to Lionel Walford, town clerk, Council Offices, 197, High Holborn, W.C., by noon on Mar. 13.

Mar. 13. Belfast.—Supply of the following stores, for the Works Committee for one year:—Earthenware sewer pipes; timber; hardwood; iron castings; plumber's work; nails, &c.; iron and steel; paints and oils; glazing; mill furnishings; shovels, spades, grapes; scavenging brushes; glazed bricks; artificial flags; lime; pitch, felt, tar, and cement. Forms of tender and particulars may be had in the Superintendent of Works' Office, Townhall Street. Sealed tenders on official forms only, endorsed "Tender for —," to Samuel Black, town clerk, Belfast, by 10 a.m. on Mar. 13.

Mar. 13. London, E.—Supply of the following stores, for the Poplar and Stepney Sick Asylum District, for the use of the asylum at Devon's Road, Bromley, London, E., and also for the branch asylum at Blackwall, E., from April 1 next for twelve months:—Brushmaker, earthenware, ironmongery, electrical stores, timber, building material and plumbers' material. Printed forms of tender, which alone can be received, and which will contain an estimate of the quantities required and the directions to be observed by the parties tendering, may be obtained at the Clerk's Office at the asylum daily, between 10 and 4 (Saturdays 10 and 1), or will be sent by post upon receipt of a stamped addressed foolscap envelope, and the same must be returned to Walter R. Foskett, clerk to the Managers, Clerks' Offices, Bromley-by-Bow, E., by 10 a.m. on Mar. 13.

Mar. 14. Newcastle-on-Tyne.—Supply of the following materials, &c., for the Town Improvement and Streets Committee during the twelve months ending Mar. 31, 1907, viz.:—Sanitary pipes; cement; oils and paints; clot lime; lime-mortar; road stones; Calithness flags; freestone flags; artificial flags; granite paving stones; granite kerb stones; pitch, tar and creosote oil; iron, steel and horse-shoe nails; shovels; disinfectants; gully grates, ventilator covers, &c.; scavenging brooms, &c.; privy pans; timber; lead washings; bricks. Forms of tender may be obtained on application at the City Engineer's Office, Town Hall. Sealed tenders, addressed to the "Chairman of the Town Improvement and Streets Committee," and endorsed "Tender for Stores," must be left at the Committee Clerk's Office, Town Hall, by Mar. 14.

Mar. 14. Aylesbury.—Supply of the following materials and stores, for the Urban D. Council, for the year ending Mar. 31, 1907:—Road metalling; 1½in. machine-broken granite and ¾in. chippings; heavy hard hand-picked flints; coarse gravel and fine hoggins. Building materials: glazed stoneware pipes, traps and gulleys; Portland cement; blue lime; ground lime; stock bricks; Leighton sand; fine slag. Disinfectants. Ironwork: street lamp columns and cradles; copper street lanterns; manhole and lamp-hole covers and gully grates; cast-iron ventilating columns; air-inlet gratings for drains. Tools, stores, &c.: Incandescent mantles; steel picks and shovels; sharpening and repairing ditto. Labour: manual labour for various trades and team labour. Specifications and forms of tender may be obtained on application to W. H. Taylor, surveyor to the Council, Town Hall, Aylesbury. Sealed tenders on the prescribed form, and endorsed "Tender for —," must be delivered to Percy A. Wright, clerk, Town Hall, Aylesbury, by 4 p.m. on Mar. 14.

Mar. 14. Colchester.—Supply of the following materials, for the Electricity Supply Committee of the Corporation, during the year ending Mar. 31, 1907:—Ironmongery; oils; oilman's sundries; castings. Patterns and samples must be seen at the Electricity Works, Osborne Street. Forms of tender and conditions of contract may be obtained at Borough Electrical Engineer's Office. Sealed tenders, marked respectively with the particulars to which they relate, to be sent to the Chairman of the Electricity Supply Committee, Town Hall, Colchester, by 10 a.m. on Mar. 14.

Mar. 15. Croydon.—Supply of the following materials, for the Rural D. Council:—Broken Guernsey granite; dug and hand-picked flints and fine gravel; cartage of flints, granite and gravel; hire of horses and carts for scavenging and highways purposes; hire of horses and carts for general carting; tar paving; kerbing, pitching and channelling; tools, brooms, manhole covers and gully grates, &c.; Portland cement; lime; stoneware pipes, gulleys, &c. Forms of tender, specifications, and conditions of contract can be obtained on application to E. J. Gowen, clerk, District Council Offices, Town Hall, Croydon, and samples of the tools, &c., can be seen at the

Vestry Hall, Mitcham, and any other particulars can be obtained by applying to the Surveyor, Town Hall, Croydon, or Vestry Hall, Mitcham. Sealed tenders, endorsed "Tender for —," must be delivered at the Clerk's Offices, Town Hall, Croydon, before noon on Mar. 15.

Mar. 15. Walsall.—Supply of the following materials, for the Rural D. Council, from April 1, 1906, to Mar. 31, 1907:—Broken furnace slag; broken granite; machine and paraffin oils; castings; bricks; cement; disinfectants; stoneware pipes, &c. Forms of tender may be obtained at the District Surveyor's Office. Tenders, endorsed "Supply of Materials" to be sent in, along with samples carriage paid, to W. P. Young, district surveyor, Council Offices, Rushall, Walsall, by Mar. 15.

Mar. 15. Reading.—Supply of the following stores for the Corporation, for twelve months ending Mar. 31, 1907:—Granite and other stone for macadam; Norwegian granite kerb and channel; paving setts; wood blocks for street paving; gravel and Thames ballast; cement and glazed stoneware drain pipes; lamp standards, lanterns and ladder irons; cast-iron gulleys and gratings, sewer manhole frames and covers; bass, rotary and other brooms and brushes; petroleum and other oils, paint, &c.; tools and ironmongery, &c. Forms of tender on application at the Borough Engineer's Office, Town Hall, Reading. Separate sealed tenders on the forms supplied for each class of goods, suitably endorsed according to the class of goods, &c., to John Bowen, A.M.I.C.E., borough engineer and surveyor, Town Hall, Reading, by noon on Mar. 15.

Mar. 15. London, W.—Supply of the following materials, for the Guardians of the parish of Fulham, for twelve months:—Oils and colours; brushes; earthenware; ironmongery. Forms of tender, containing full particulars and conditions, with estimates of quantities required, may be obtained on application at the Guardians' Offices, Fulham Palace Road W., or by forwarding a stamped addressed foolscap envelope. Samples and patterns of the goods can be inspected at the same place between 10 and 12 and 2 and 4 daily. Tenders, properly endorsed and accompanied by samples (where required), must be delivered to E. J. Mott, clerk to the Guardians, Guardians' Offices, Fulham Palace Road, Hammersmith, W., by 10 a.m. on Mar. 15.

Mar. 17. Burnley.—Supply of the following materials, for the Corporation:—Setts (local), flags, kerb, channel, bricks (red), gravel, granite macadam, cement, pitch, creosote, earthenware pipes, ironwork (street grates, &c.), lime, limestone, &c. Specifications and forms of tender may be obtained on application at the Borough Surveyor's Office, Town Hall, Burnley. Sealed and endorsed tenders, addressed to "The Chairman of the Highways and Sewage Committee," must be left at the Town Clerk's Office, Town Hall, Burnley, by Mar. 17.

Mar. 17. Wimbeldon.—For the following works, materials, &c., during year ending Mar. 31, 1907:—Borough Surveyor's Department: Broken granite, granite kerbs and quadrants, granite cubes and pitchings, flints and fine binding gravel, concrete, gravel and sand, iron castings, street gulleys and drain pipes, Portland cement, lime, tools, ironmongery, paints, colours and varnish, timber in bulk, timber in small quantities and wheelwrights' timber. Forms of specification and tender, with conditions of contract, may be obtained on application to the Borough Surveyor, Town Hall, Wimbeldon. Electricity Department: Engine-room stores, cables, joint boxes and jointing material, transformers, meters, lubricating oils, incandescent electric lamps, carbons and accessories, castings, and firebricks and fireclay. Forms of specification and tender, with conditions of contract, may be obtained, and samples inspected, on application to the Chief Electrical Engineer, Electric Light Works, Durnsford Road, Wimbeldon. Sealed tenders, endorsed "Tender for —," to A. Steele Sheldon, town clerk, Town Clerk's Office, Wimbeldon, by Mar. 17.

Mar. 17. Burnley.—For the supply of the following materials, for the Highways and Sewage Committee:—Setts (local); flags; kerb; channel; bricks (red); gravel; granite macadam; cement; pitch; creosote; earthenware pipes; ironwork (street grates, &c.); lime; limestone. Specifications and forms of tender may be obtained on application at the Borough Surveyor's Office, Town Hall, Burnley. Sealed and endorsed tenders, addressed to "The Chairman of the Highways and Sewage Committee," must be left at the Town Clerk's Office, Town Hall, Burnley, by Mar. 17.

Mar. 20. Wembley.—Supply of the following materials, for the Urban D. Council, for the year ending Mar. 31, 1907:—Engine and boiler requisites; street-lighting requisites; roadmen's tools, brooms, &c.; also for about 1,200 tons of broken granite, 300 tons of gravel, 300 tons of hoggins and 600 tons of slag. Forms of tender and schedules can be obtained from the Clerk, Public Offices, Wembley, by forwarding a stamped addressed foolscap envelope. Tenders must be enclosed in the envelopes supplied and delivered to W. Bagshaw, clerk to the Council, Public Offices, Wembley, by noon on Mar. 20.

April 10. Cape Town.—Cupboard locks. For the supply of 3in. 4-lever brass cut cupboard locks, L. hand, with two keys each, no key to open two locks. A sample of the class of lock required may be inspected on application to the Controller of Stores, General Post Office, Cape Town, or the Agent-General for the Cape Colony, 100, Victoria Street, London, S.W. All tenders must forward a sample lock, which should be addressed to the Controller of Stores, G.P.O., Cape Town. The locks are to be supplied in quantities of at least 200 at a time, and must be equal in every respect to the sample lock, including the position of keyhole. The contract is to commence on the 1st July 1906, and to terminate on the 30th June, 1909, but either of the contracting parties will be at liberty to terminate the same on giving two months' notice, in writing, to that effect. Tenders addressed, "Tenders for Locks," will be received at the Controller and Auditor General's Office, Parliament Street, Cape Town, until noon on April 10.

New Council Schools at Gloucester, in Calton Road, were opened last Wednesday. The buildings consist of three blocks, and comprise mixed school, infants' school and cookery and laundry centre, with separate playgrounds for boys, girls and infants. The mixed school provides accommodation for 500 pupils in ten classrooms arranged round a central hall 61ft. by 32ft., with separate entrances, cloakrooms and lavatories for boys and girls, and rooms for head and assistant teachers and school store on each side. The infants' school accommodates 310 children in

six classrooms, also grouped round a central hall 56ft. by 25ft., with cloakroom and lavatories, &c. The cookery and laundry block has distinct accommodation for each department, both containing general schoolroom, cloakroom and lavatory. The builders' work has been carried out by Messrs. J. Byard & Sons, contractors, of Gloucester, from designs by Mr. Walter B. Wood, A.R.I.B.A., of Gloucester. The entire cost of the building, with furniture and fittings, will probably amount to about £14,000.

Duke of York's Royal Military School.—The architect of the new school at Dover—the old one at Chelsea being given up—is Sir Henry Tanner, I.S.O., F.R.I.B.A., principal architect to H.M. Office of Works. The building contractors are Messrs. A. Hudson & Co., of Westminster.

London Master-Builders' Association.—Mr. J. W. Lorden (of Messrs. W. H. Lorden & Sons) is the new president of this Association; Mr. F. L. Dove (of Messrs. Dove Brothers, Ltd.) senior vice-president; and Mr. W. Lawrance (of Messrs. E. Lawrance & Sons), junior vice-president. Executive council:—Mr. G. Appleton (of Messrs. Turtle & Appleton), Mr. F. Bywaters (of Messrs. Bywaters & Sons, Ltd.), Mr. E. J. Hill (of Messrs. Higgs & Hill, Ltd.), Mr. Leonard Horner (of Messrs. Ashby & Horner), Mr. F. G. Minter, Mr. F. P. Rider (of Messrs. T. Rider & Son), Mr. H. J. Shelbourne (of Messrs. J. Shelbourne & Co.), and Mr. Howell J. Williams (of Messrs. Howell J. Williams, Ltd.).

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GREAT NORTHERN, BROMPTON AND PICCADILLY, AND THE EUSTON,
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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

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Much for Little. PEEL must be a happy place, where labour is done for love and building materials grow by the roadside. In these days of striving after the simple life it is encouraging to know that there is a spot in the kingdom which has attained it. The Town Commissioners by their conditions of competition seem confident that they can get a library and a caretaker's residence and a front boundary-wall and railings, all for £500; so confident, indeed, that if any estimate is more than 5 per cent. "astray" the competitor will be liable to forfeit his remuneration. The premium offered is £10 and the selected design is to become the absolute property of the Commissioners. Should the successful competitor be employed to carry out the work, 5 per cent. will be paid for plans, specification and superintendence, but the £10 will merge in the commission and will not be in addition to it. All plans are to be accompanied by a very fully written

description of the work. Each competitor may send in one or more designs. There is no mention of a professional assessor. If ever the happy day arrives when architects work together in unity as members of a cohesive body, such a competition as this would be impossible; it would die in the bud, like a seedling, for lack of nourishment. As things are, it matters not whether the field of practice offers grapes or thistles there are always fools enough to gather the latter regardless of ultimate discomfort.

How to discover Flaws in Tie-rods.

OUR readers will recollect Sir Benjamin Baker's statement that his reason for recommending the demolition of the roof at Charing Cross station after the collapse that occurred was the impossibility of detecting by any practical test an interior flaw in a tie-rod. Although a defect might be discovered by a laboratory experiment, this would be very difficult, and quite impossible of adoption in the case of an existing roof. The suggestion, however, occurred to us that it might be possible to detect flaws in metal structural members by electrical means, and we put the suggestion before a well-known electrical engineer, Mr. Harold Hastings, A.M.I.C.E., M.I.E.E., of Messrs. Callender, the noted large cable makers and electrical contractors, and he expressed the opinion that it is not only possible to discover flaws electrically, but that it is comparatively easy and practicable. He states in a letter to us that "the bar should be cleaned at the ends and in the centre, the exact centre being obtained by fairly accurate measurement. A current is then passed between the centre and each end alternately, so that the conductivity of one half of the bar can be tested against the other. If there is any great variation it will show immediately that a flaw exists in the half of the tie-bar which gives the greatest resistance. This half should then be cleaned in short sections of equal length, and all the short sections compared. It will soon be seen which gives the greatest resistance, and this will be the one in which the flaw is located. Again, by comparing tie-bars of equal length and section, it will be easy to see whether any of them are excessively corroded throughout their length as compared with the rest. Moreover, the apparatus required is very simple. As a matter of fact, it is a standard set used for localising faults on mains. It consists of a set of 60 ampère-hour accumulators, four being placed together in a box (total weight about 40 lbs.), and having a handle suitable for carrying purposes. In another box is placed a double-pole change-over switch of very small dimensions, an ammeter, a rheostat, and a galvanometer. For the purpose of testing ties, three gun-metal clamps should be added to the outfit, so that a thoroughly sound connection can

be made upon the clean space prepared on the tie-bar. The object in having a rheostat in circuit is to enable the current to be adjusted to a suitable amount for different thicknesses of bars. It is quite possible to calculate the exact useful section of the tie-bar, provided that a sample of the material is available. The sample should be turned up in a lathe to a known diameter, and a convenient length of it tested. This can then be used as a unit to compare with the tie-bars." We need hardly point out the great utility of such a method of testing. There are many structures about the country in which there is the possibility of flaws existing, and it is important for the safety of the public to be assured.

Foreign Lead.

WE continually hear of examples of foreign competition in connection with commodities used in the building trades. The latest instance of foreign manufactures driving out English goods is afforded in connection with white lead. At the ordinary general meeting of Walkers, Parker & Co. it was stated that "the total quantity of white lead imported last year was 15,173 tons, of which Germany and Holland contributed 10,527, Belgium 4,060, France 336, United States of America 200, and other countries 50 tons. In addition, Germany exported 2,000 tons to Canada; so that, out of the whole 17,000 tons odd, Germany and Holland made over 12,000. Further, in 1905 Germany exported 16,477,500 kilos of white lead, out of which England received 10,117,900 kilos and Canada 1,836,400; so that England and her great colony took nearly three-quarters of the whole of Germany's exported white lead." We have not yet lost the trade in blue lead, sheets and pipes, although there are indications of coming competition. At present foreign competition seems to be under some disadvantage, the weights and sizes not fitting our trade, but these are sure to be altered shortly. This and other threatened industries show that there is *prima-facie* evidence to warrant a most careful enquiry into our fiscal policy, but we feel that this particular instance is only another to be added to the list of chemical manufactures which Germany has been able to secure by her better scientific training, although a good deal of this white lead is still produced by the old stack method. The factor, then, which must enable foreign competition to succeed, is that the factories are larger and the labour cheaper.

ROYAL ACADEMY EXHIBITION, 1906.

THE sending-in day for architectural works is Friday, March 30th, from 7 a.m. to 10 p.m. as hitherto. Will architects let us have their drawings as early as possible.

TESTING OF REINFORCED
CONCRETE BEAMS.

IN a paper entitled "Reinforced Concrete Beams: Theory and Experiment," read by Mr. William Blackadder, B.Sc., C.E., Harbour Engineer's Office, Aberdeen, before "The Aberdeen Association of Civil Engineers," various methods of calculating the strength of this type of construction as developed by well-known authorities were explained, and it was shown how these might be tabulated or represented graphically by curves so as to be suitable to rapidly enable the designer to proportion a beam to carry the load required. The effect of neglecting the tensile strength of the concrete, the strength of double reinforcements, and the economic proportions of beams were also dealt with, and a summary of this portion of the paper will be given in a future issue.

The latter part of the paper dealt with the actual testing of beams made by the author, all facilities for making the beams and tests being kindly granted by Mr. R. Gordon Nicol, M.Inst.C.E., Harbour Engineer. In most experiments made by engineers and constructors the beams are loaded directly with bars, usually of cast-iron, and it must be evident that this method cannot—unless great care be taken in the manner of loading—be accurate even to practical requirements, owing to the interlocking of the cast-iron bars used. Many photographs of experiments so conducted show this interlocking to a great degree; in some cases the load would almost remain self-supporting even though the beam were removed owing to most careful interlocking of the bars. This method also entails a large amount of labour unless the beams are of small size. To obviate the labour, and to obtain a true result as to the breaking load of any beam by subjecting it to a correctly estimated bending moment, the following testing machine was designed. It was made entirely out of old timber used in temporary works round the harbour, and the loading was done with cast-iron bars from the same source. It will be seen that it is merely a compactly arranged lever—in fact, in action exactly similar to the ordinary "nut cracker."

Figs. 1, 2 and 3 are elevation, plan and cross-section of the machine. A is a lever consisting of two pitch-pine piles 12ins. by 12ins. and 22ft. long, bolted together just as taken out of a cofferdam, held at one end by a chain c to the lower beams D and loaded at the long end by cast-iron bars W. By the prolongation of beams D to beyond the end of the lever there could be no overturning

of the machine about either end. B represents a beam to be tested, and the way in which the load is transferred to the beam at points a a through the transfer beam (pitch-pine) T is clearly shown and needs no explanation.

Though constructed of old materials and only a temporary testing machine, yet considerable accuracy was obtained. The lever was weighed, and balanced to find the actual centre of gravity; the chain had shackles on each side to admit of adjustment so as to keep the lever "floating" level; under the lever was put rocker R₁, made of jarrah wood, to allow free motion of lever and prevent load being transferred to one edge of the test beam if lever were out of the horizontal; and a similar rocker R₂ was put under R₁, to keep the load central on transfer beam, in the case of any tendency of the lever to rock sideways. T is the transfer beam which loads the test beam at two points a a equidistant from centre of span; at these load points on test beam were put rockers, R₄ on drawing, of 3/4 in. steel plates and 2 in. round bar to freely allow for deflection of test beam; similar rockers were placed at supported ends of test beams to allow the end of the beam to cant freely when deflection took place. These are shown at R₃.

Measurements of the lever arm of machine, and position of cast-iron bars (which were previously weighed) were taken, and so, knowing the span and position of load points a a, the actual bending moment applied to the beam, and thus its strength as a girder under any loading, were both very closely obtainable. In the application of the machine the lever was first raised by two screw jacks S₁ and S₂, the test beam and all rockers were then put

in place; screw jack S₂ was first slacked away, allowing lever to rest on the beam with a slight cant upwards to the long end; the chain was then just tightened by the two shackles and screw jack S₁ slackened off, so permitting the full load of the lever to come on the beam. Cast-iron bars were then added at the long end till the test beam broke, allowing the long end to come down on stop S. To show the remaining strength in a reinforced beam, it may be stated that after the breaking of a beam and formation of a large tension crack in the lower side, on removing cast-iron weights at the end of the lever it rose again free off the stop S, thus being still wholly supported by the broken test beam.

The test beams were 8ins. by 8ins. by 6ft. 8ins. span, and of concrete 1 cement, 2 sand, 3 of 1/2 in. to 3/4 in. granite; reinforced from 1/4 to 1 1/2 per cent. (some with inclined shear resisting bars), and broke under loads agreeing well with the theory of calculation advanced in the paper. Expanded metal and concrete slabs were also broken by the machine. These had expanded metal No. 8 in the lower side, and were 3ins. thick. They were loaded centrally, and also gave results agreeing well with the strength of such slabs as calculated by the theory proposed in the paper.

It may be said that loading directly is a more practical estimate of the strength of a beam, since in actual structures there may be the same probability of interlocking of the loads as in experiments so conducted. But if we are to found a principle of calculation on theory corroborated by tests on actual beams, then we require to find the true strength of a beam under a definite load—to find what is termed its true moment of

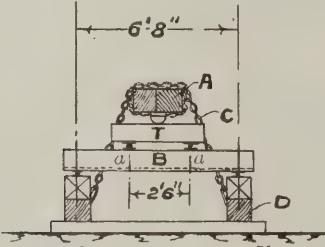
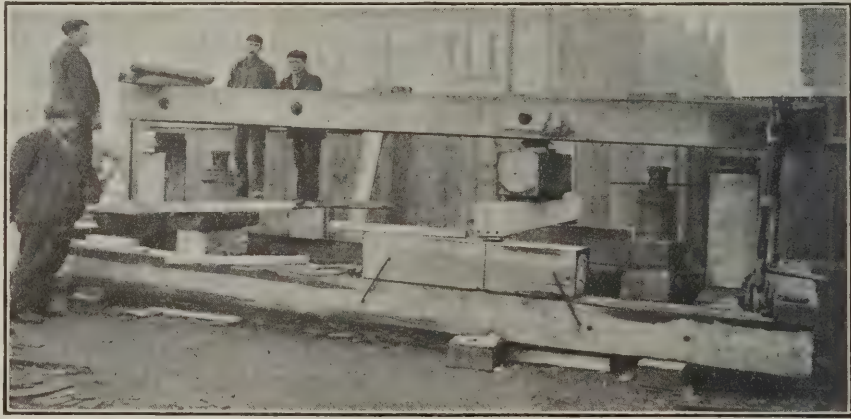


Fig. 3

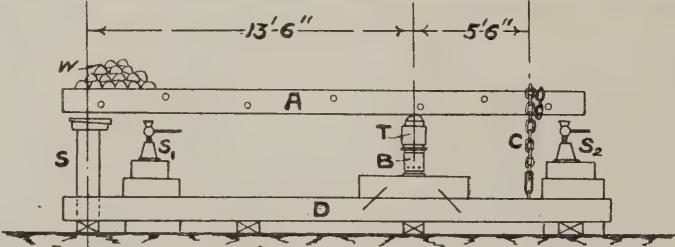


Fig. 1

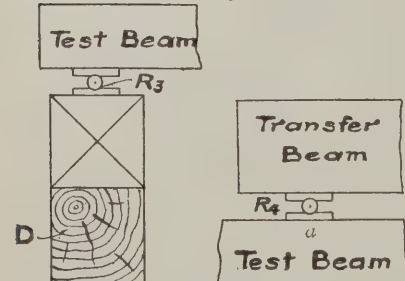
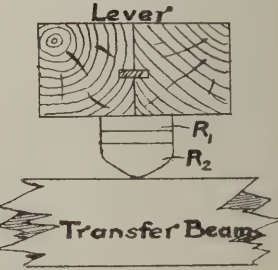
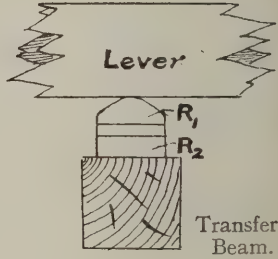


Fig. 2



resistance; then, if we wish to allow for the probable interlocking effect in an actual structure (which may vary largely in different cases), we can deduct a proportion of the load before designing the beam, or adopt a lower factor of safety. Such a machine as the above will determine the true strength of a given beam—not perhaps so accurately as a laboratory testing machine—but, even though rough and ready, yet to a degree accurate enough when dealing with so uncertain a material as concrete.

THE CEMENT TRADE.

New Bill to be introduced in the interests of Workers.

A NEW measure, drafted in the interests of cement-workers, is shortly to be introduced in the House of Commons. The Bill is promoted by the National Amalgamated Union of Labour, and the material for drafting it has been supplied by Mr. Terah E. Smith, of Gravesend, representing the London, Thames and Medway district of that union. The proposed Act will be known as "The Cement Works, Lime Works and Chalk Quarries Regulation Act, 1906." Amongst its provisions the following may be cited:—

In every cement works and in every lime works and chalk quarry the material used in the process of manufacture of cement or lime shall be truly weighed or measured at such state in the process of manufacture and generally in accordance with such rules as shall be prescribed by a Secretary of State.

The persons employed by piecework in any cement works, lime works or chalk quarry may, at their own cost, station a person (in the Act referred to as a check-weigher) at each place appointed for the weighing or measuring of the material, in order that he may take a correct account of the weight or measurement of the material, as the case may be. A check-weigher is to be given every facility for performing his duties, but he may not impede or interrupt any process of manufacture, or interfere with the weighing or measurement, or with any workmen, or with the management of the works. If the owner or manager desires the removal of a check-weigher on the ground of interference, he can complain to a court of jurisdiction, who, if of opinion that there is sufficient *prima-facie* ground for the removal of the check-weigher, may call upon the workmen to show cause against his removal. Then, if at the hearing the complaint is found to be justified, the court may make a summary order for the removal of the check-weigher.

Every Act for the time being in force relating to weights and measures shall extend to weights, measures, scales, balances, steel-yards and weighing machines used in any cement works, lime works or chalk quarry, in checking or ascertaining the wages of any person employed therein.

In every cement works, lime works or chalk quarry the owner or manager shall, for the purpose of enabling each person who is employed on piecework to compute the total amount of wages payable to him in respect of his work, furnish in writing to each person so employed particulars of the rate of wages applicable to the work to be done by such person at the time when the piecework commences, provided that if the same particulars are applicable to the work to be done by all the persons employed in the same room, shed or yard, it shall be sufficient to exhibit them in that room, shed or yard on a placard not containing any other matter, and posted in a position where it is easily legible.

Any person guilty of an offence against this Act shall be liable on summary conviction to a fine not exceeding £20.

OUTSIDE TENDERS.

Interesting Discussion at Gloucester.

THE important question affecting the acceptance of tenders by local authorities was once again discussed in connection with the deputation from the general building trades of Gloucester which waited recently upon the city council in regard to unemployment. Mr. S. T. Davies, of the Amalgamated Society of Carpenters and Joiners, who opened the case for the deputation, said their object was to call attention to the great depression prevalent in the building trade, and more particularly amongst carpenters and joiners. The question of unemployment had been growing upon them, and during the last three or four years their experiences had been very distressing. No doubt there were many causes for this. Some thought speculative building was largely responsible for the period of depression, but he himself thought there was room for speculative building, particularly if the builders could be encouraged to undertake such work in times of slackness. Some time ago it was urged that the Derby Road Council school building contract should be kept in Gloucester. They failed in that, and what was predicted had followed. Of 200 society men representing the two societies of carpenters and joiners, one-third, or between sixty and seventy, were unemployed. During the last two or three years these societies had spent about £600 in out-of-work pay in Gloucester. They had relieved the poor-rate burden on the citizens to that extent, but of course the resources of the societies were limited. Their object in coming to the council was not to seek charity but to ask that the council should do what they could in finding employment.

Local Tenders.

The deputy-mayor, in reply, said with reference to the contract for the erection of the Derby Road school, the education committee did all they could to place the work in the hands of a local firm, but the difference between the amount of the tender of the lowest local man and that of the builder to whom the contract was given was, in round numbers, £1,000. In those circumstances the education committee felt that they had no option but to recommend the acceptance of the lowest tender, which recommendation was unanimously endorsed by the council. However much they might regret the want of employment on the part of one section of their fellow citizens—and every one of them did regret it most sincerely—they felt they would be wanting in their duty to the other sections of the community if they gave away so large a sum as £1,000 out of the rates merely for the purpose of putting the contract into the hands of a local man. At the same time, while the committee recommended the acceptance of the lowest tender, they made special stipulations with the builder in question that the work should be done as far as possible by local workmen.

A Question of Domestic Economy.

Mr. Harland-Bowden said the point which had been raised involved what might be described as purely a question of "domestic economy." They had to consider whether or not they were going to face, every time they placed a contract at a lower sum outside the city, the setting-up of expensive methods for assisting local workmen who were out of employment. Did it not look as if they might save the city money by paying a certain amount more to local contractors, rather than by giving work at lower prices to outside firms?

The deputy-mayor said that if the policy referred to by Mr. Harland-Bowden were intended to be followed it should be clearly stated in the advertisements. For what purpose did they advertise for tenders? For the

purpose of getting work done at the expense of the ratepayers at the lowest possible cost, with a due regard for efficiency. In doing that they entered into an implied contract with those who tendered that, other things being equal, the lowest tender would be accepted. If they intended to exclude what he might call "foreign" tenderers, they ought to say so, and only advertise in the local papers. If the council desired to advertise so as to make known generally that they were prepared to accept tenders, and implied that they were going to take the lowest, they must honourably fulfil the conditions of the advertisement, and they must not go and intrigue and negotiate with one builder behind the backs of the other contractors to reduce his tender because he was a local man or because he was anything else. They must keep faith with the public at large; otherwise they would be sure to suffer very severely in the cost which they would have to pay for the execution of their local work. They did in all their contracts stipulate for fair wages—according to the local standard—to be paid to the workmen who were employed in carrying out those contracts, and for proper working hours to be complied with. But if it were proposed to go further and to give a premium to local men to tender for the work which they had from time to time to execute, all he could say was they must be prepared for a very large increase of the rates, because they must expect a very large increase in the amount of the tenders if they were limited in that way.

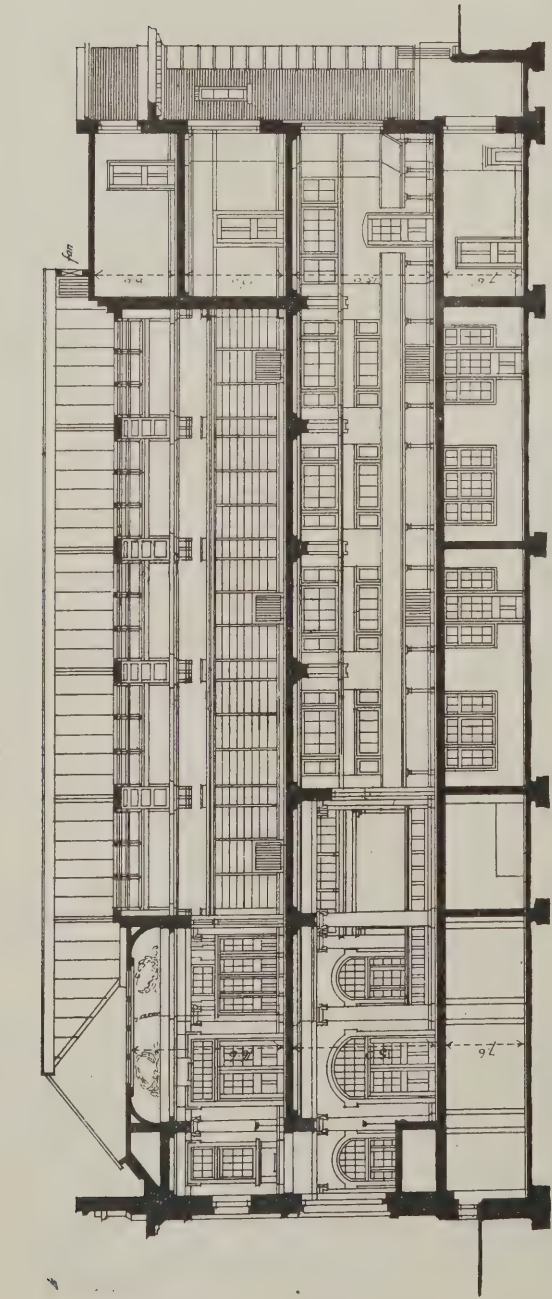
Mr. Harland-Bowden said he did not mean to imply that local contractors should receive a premium. What he desired was that in considering such a question members should endeavour to look at it from the point of view of a balance-sheet with a view to ascertaining on which side the greater advantage lay. Let them put on one side the difference between the tenders of the local and outside contractors, and on the other side the extra cost added to the rates for the relief of men who were out of employment.

Figures.

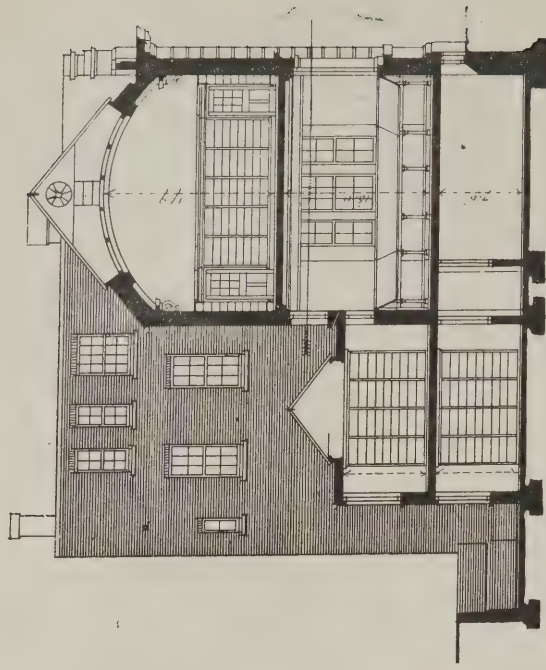
Mr. Fream said that as Mr. Harland-Bowden had raised the question of a balance-sheet, he would point out that the total amount to be paid in wages to carpenters and joiners in connection with the Derby Road school was about £1,500. If the whole of the contract had been carried out in Gloucester probably that amount would have been distributed amongst the carpenters and joiners of the city. But, as it was, a large proportion of that amount must necessarily be spent amongst the carpenters and joiners of Gloucester, because there was certain work—including the fixing of the roof timbers, floor-laying, &c.—which must be done in the city. The amount which would be lost in wages to local men was not £1,000—the difference between the accepted and the lowest local tender. The amount which would be lost in wages would be that which would be paid at Swindon for the making of joinery which would be fixed at Gloucester.

Alderman Fielding, referring to the subject of tendering for city work, said they must not forget that a large number of men were employed in Gloucester in doing work for various parts of the country. His own firm had a tender with the London County Council for £9,000. If the practice of fair and open tendering were to be discontinued local firms would have no chance of competing for work outside Gloucester, and the workmen of the city would be injured quite as much, if not much more, than they would be benefited by the adoption of such a restrictive policy.

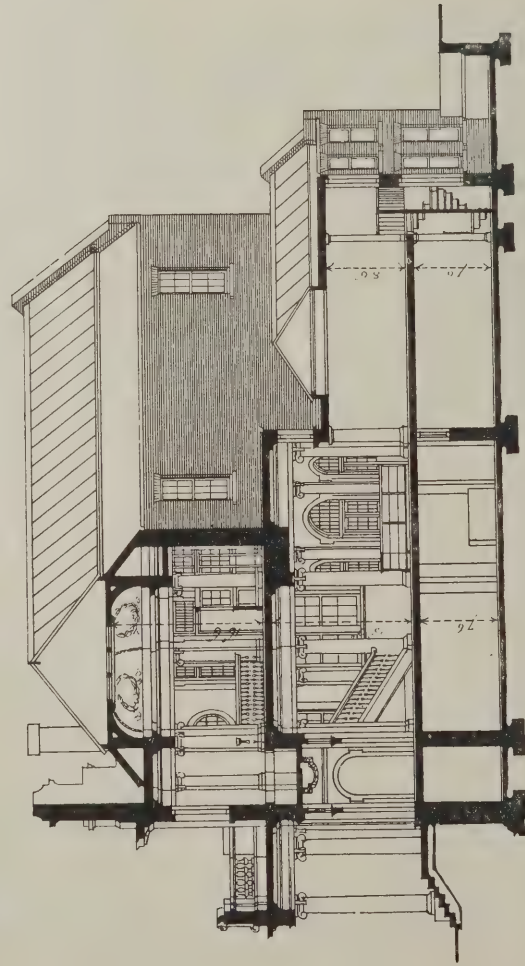
The question was referred to the Estates and General Purposes and the Streets Committees.



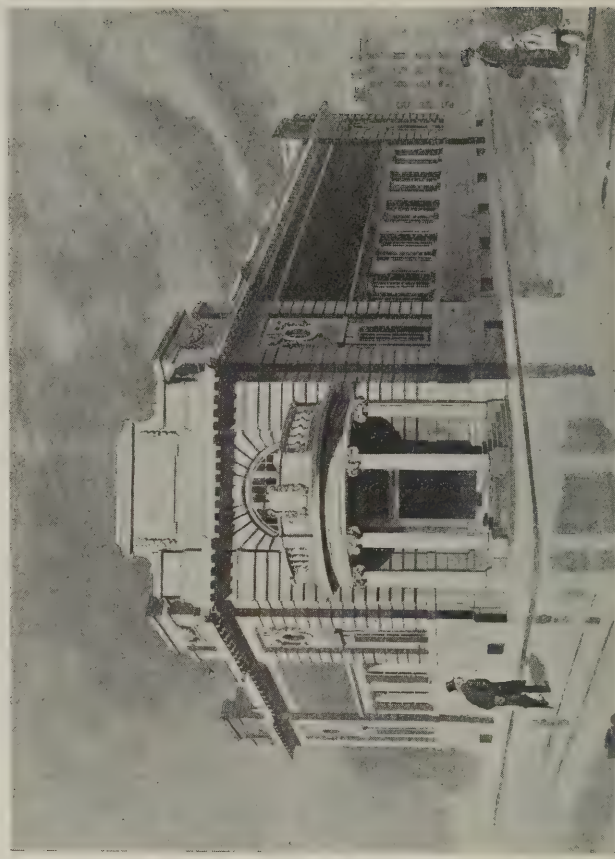
*Longitudinal
section*



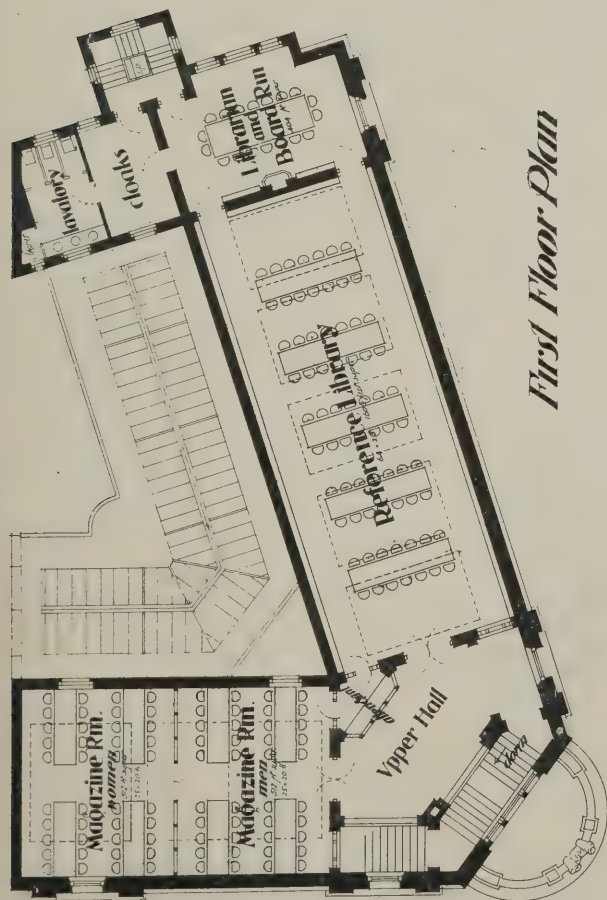
Cross section



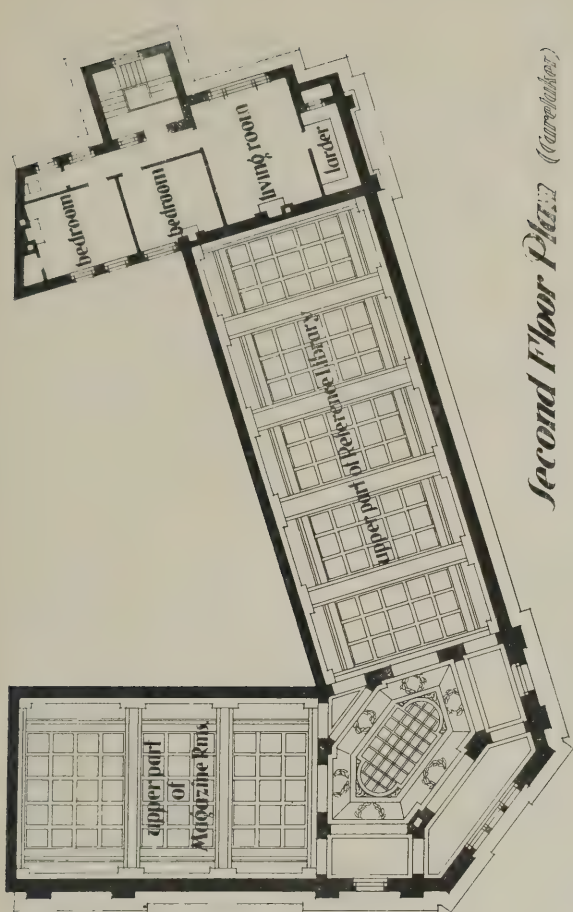
Section thro the Entrance



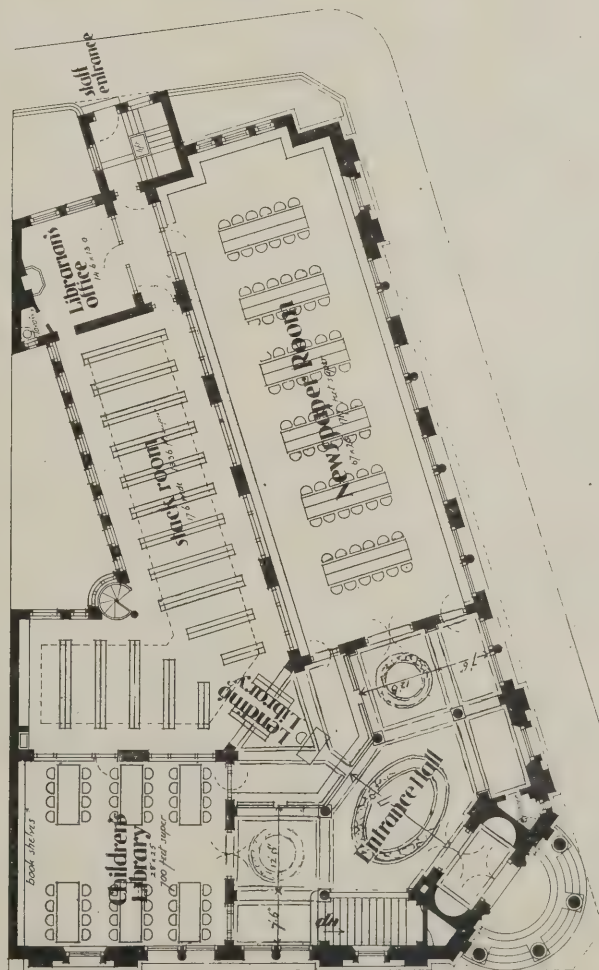
FIRST-FREMIATED DESIGN FOR HACKNEY CENTRAL LIBRARY, HENRY A. CROUCH A.R.I.B.A. ARCHITECT.



First Floor Plan



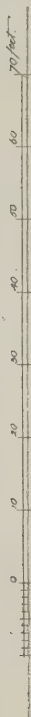
Second Floor Plan (continued)



Ground Plan



Basement Plan



HACKNEY LIBRARY COMPETITION.

THE 152 designs for the new central library which is to be built in Mare Street, Hackney, London, are on exhibition this week at the Hackney Baths from 2 to 8.30 p.m.

The award of the assessor (Mr. J. W. Simpson, F.R.I.B.A.), is as follows:—
1st (£52 10s.), Mr. Henry A. Crouch, 12, Gray's Inn Square, W.C.

2nd (£31 10s.), Messrs. Davidson & Trimnell, of Adam Street, Adelphi, W.C.

3rd (£21), Messrs. Crouch, Butler & Savage, Birmingham.

We reproduce in this issue the three premiated designs.

First-premiated Design.

In this design a departure has been made from the usual type of plan, a stack-room thoroughly well lit being provided immediately adjoining the counter for serving books. No height is wasted in this room, enabling light to be obtained on either side of the newsroom and children's room, and also cross-ventilation. The indicators are well lit on either side, while storage accommodation is provided for 30,000 books on this floor, allowing nine books to the foot run on stacks nine shelves high. In the news-room slopes are provided on three sides, giving accommodation for fifty-two newspapers, while seventy-two readers can be seated at sloping tables in the centre. The children's room will accommodate forty-eight children. Shelving is shown for 2,000 books in this room, while books can be served from the stack-room on application. Owing to the number of readers at tables provided in the newsroom, it is suggested that trade periodicals, building papers, &c., should be placed there rather than in the magazine rooms. These rooms are consequently somewhat smaller than would otherwise have been the case. Accommodation is provided in the magazine rooms for 40 men and 40 women, or 60 men and 20 women, as desired. These are under the control of an attendant, who also controls the reference library. This latter is lighted entirely from the top, the whole of the walls being given up to the storage of books: 10,000 can be housed in this room, allowing 8 books to the foot run in cases 8 shelves high. Accommodation is provided for 70 readers, and communication is arranged with the basement stores. With regard to lavatory accommodation, it is considered that this should be provided for the public using only the reference library, and joint cloak and lavatory accommodation is shown for the reference readers and the board, the former having access only on application. In the basement there is a large area for storage, as it is understood old cellars occupy the site. Heating is proposed to be by low-pressure hot water with low-pressure hot-water ventilating radiators, direct cross-ventilation being provided in the children's and newsrooms, while flues will be provided in the walls for carrying off the foul air when the windows are closed. The reference room and magazine room will be heated in a similar way, and ample ventilation will be provided in the glass barrel ceiling in a trunk in which an electric fan will be placed. It is proposed to face the building with Monk's Park stone and red brick, the construction being fire-resisting throughout, with coke-breeze floors finished in Ebnerite or some similar composition, and the glass roof to be Helliwell's patent glazing. Stairs of Granolithic. The building comprises 254,413 cub. ft., which, allowing 11d. per cub. ft. for the superstructure, 5d. for the basement and stack-room, and £350 for heating and ventilation, gives a total of £10,066.

The second-premiated design, by Messrs. Davidson & Trimnell, is estimated to cost £9,905; and the third, by Messrs. Crouch, Butler & Savage, £10,175.

THE ARCHITECTURAL ASSOCIATION.

A MEETING of the Architectural Association was held on Friday at 18, Tufton Street, Westminster, Mr. John Murray, vice-president, presiding.

Messrs. J. B. Scott and P. W. Pocock, junr., were elected members of the Association.

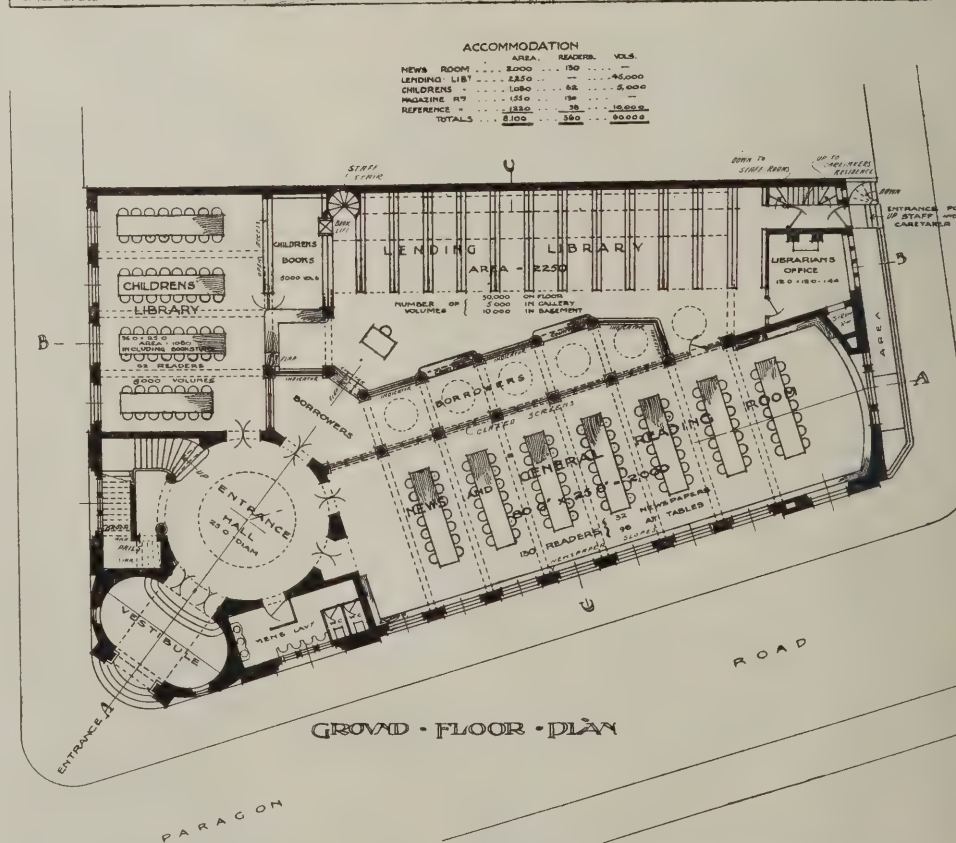
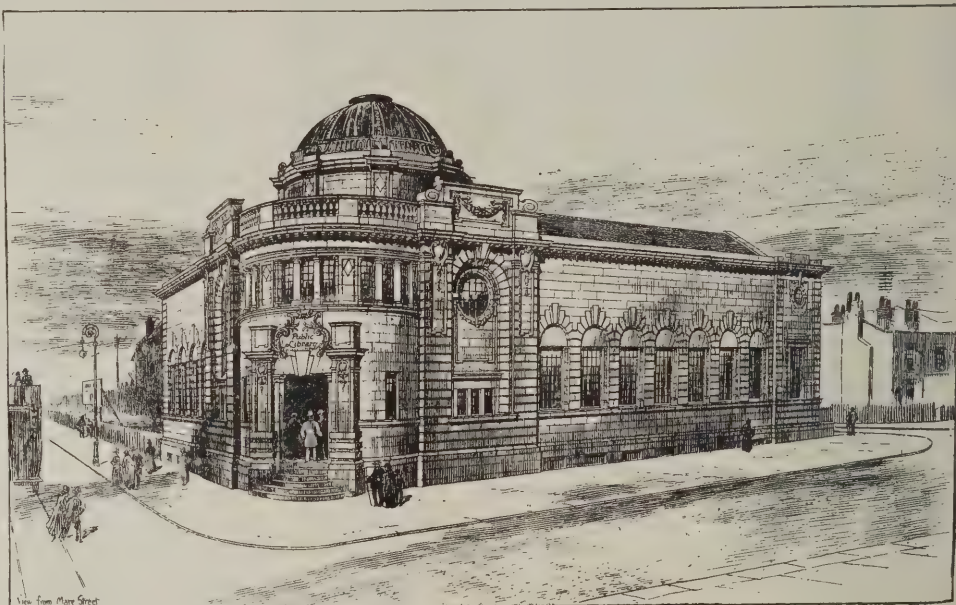
The following further donations to the Building Fund were announced:—

	£	s.	d.
Howell J. Williams, Ltd.	-	10	0
T. Tyrwhitt	-	5	0
W. Morrison	-	5	0
J. E. Franck	-	3	0
J. E. K. Cutts	-	1	0

Mr. Gilbert H. Lovegrove then read a paper on the "A.A. Camera and Cycling Club

Excursions." The paper was prepared at short notice owing to Mr. Vye-Parminster being unable to read his paper on "French Modern Architecture." Mr. Lovegrove dealt with some of the most interesting places visited by the club during the past few years, among them being Wimborne Minster, Bruges, Ypres, Peterborough, Stamford, Greenwich Hospital, London City Churches, Hereford, Ludlow, Ledbury, Oxford and Cambridge. All the places were very fully illustrated by slides from photographs taken by the members.

Mr. Matthew Garbutt proposed a vote of thanks, which was seconded by Mr. E. W. M. Wormacott. Mr. W. J. H. Leverton and the chairman also spoke.



Note.—The first-floor plan has reference library over children's room; committee-room over vestibule; lavatory over lavatory; magazine room (with division for ladies at end) over newsroom; and living-rooms at end facing Valette Road. Stores in the basement.

THIRD-PREMIATED DESIGN FOR HACKNEY CENTRAL LIBRARY.
CROUCH, BUTLER AND SAVAGE ARCHITECTS

NOTES ON COMPETITIONS.

Proposed School at Selby Oak for the King's Norton and Northfield U.D.C.

Last December the committee of the Competition Reform Society warned all their members that certain clauses in the conditions of this competition were unsatisfactory. One of the objections was that the assessor was to assist the promoters in the selection of designs. Nothing was explicitly stated about the author of the design placed first by the assessor being employed to carry out the work. The conditions generally had an unhealthy look, but the competition might have turned out well if left in the hands of a competent assessor, who, by-the-by, had not then—and as far as is known has not yet—been appointed. What is known, however, and the matter is important to anybody who may have disregarded the Reform Society's warning, is this:—An eminent member of the Council of the Royal Institute of British Architects was approached (direct) by the promoters, and asked if he would undertake the duties of assessor. His reply was just what might have been expected in the circumstances, namely, that he would be pleased to act on condition that the author of the design placed first by him was appointed to carry out the work. This the promoters have declined to agree to, and in consequence the gentleman whose services they desired has declined to act. Would that all assessors acted as conscientiously as this in the interests of competitors.

Carnegie Library, Pemberton.

The assessor, Mr. Hartley, in the competition for a new Carnegie library at Pemberton has awarded the first premium of £40 to design No. 7, by Messrs. J. B. & W. Thornley, of Wigan, and the second premium of £20 to design No. 4, by Messrs. Heaton, Ralph & Heaton, also of Wigan. The library committee have accepted Mr. Hartley's report.

Competition for Prince Rock School, Plymouth.

The conditions have been drawn up with due regard to the "Regulations" of the Royal Institute of British Architects. The only objection that can be raised is that the assessor had not been appointed at the time the conditions were issued, but the promoters say that he "shall be nominated by the R.I.B.A." In the interests of competitors it is always desirable that they should know who the assessor is before committing themselves to compete. Only such drawings are to be submitted as are required by the Board of Education, and no perspective view is required. The architects of Plymouth are fortunate at having such a set of conditions to work to.

Elementary School, Ossett.

The Competition Reform Society disapproves of the conditions in the competition for an elementary school at Ossett, because the remuneration is insufficient (being 4 per cent. and to include bills of quantities to contractors) and the cost of £9 10s. per scholar is inadequate. Members are requested to abstain from competing unless the conditions are satisfactorily revised.

Competitions Open.

Owing to pressure on our space we are obliged to hold over the list of competitions open. There are, however, only two new items to add to last week's list, namely:—

Mar. 26	WESLEYAN SUNDAY SCHOOLS AT WILLESDEN.—Particulars from the Rev. M. F. Crewdson, 4, Tavistock Road, Harlesden, London, N.W.
Date not stated.	BATHS, FIRE-STATION AND FREE LIBRARY AT REDDISH.—To cost £5,000. Applications by March 31st to Mr. Robert Hyde, Town Clerk, Stockport, for form of instructions to architects. Deposit £1 is.



SECOND-PREMIATED DESIGN FOR HACKNEY CENTRAL LIBRARY.
DAVISON AND TRIMNELL, ARCHITECTS.

OUR PLATE.

The Church of St. Andrew, Catford, London, S.E.

THIS church was consecrated in 1904 by the Bishop of Rochester. It forms the second part of a scheme which was initiated by a limited competition held in 1899, when the design of Mr. Philip A. Robson, A.R.I.B.A., Palace Chambers, Westminster, was placed first.

The temporary church (now permanent church hall) was immediately built at a cost of about £1,550, the builders being Messrs. J. Garrett & Son, of Balham, S.W. It is a very plain building of rough-cast, but suits its purpose, and has a cheerful air within. It has since been enlarged.

The church was intended to be built in sections, but it was decided to build the chancel as a memorial to the late Rev. J. Pedley, and so the whole church was undertaken minus the tower and spire, as usual. But the architect, knowing how rarely these "additions" bear out their name, revised his plan and permanently cut out these features (1) because a church loses by an unfinished appearance, (2) because the site is clay, and (3) therefore, if ever such a pleasing finish were in contemplation it would be desirable to build a detached tower on the south side, where there is sufficient room. The usual instructions were given to the architect, namely, to seat as many as possible at £10 a head. The contract sum was £8,600, Mr. F. G. Minter, of Putney, being the contractor. The church seats 900 without any galleries.

The side aisles to the nave are only passages, and the stone-ties over them are one day to be carved. The scheme of the planning being to give as many people as possible a direct view of the altar, a wide open nave was a necessity, and a small morning chapel, complete in itself, is in close contiguity to the north door, for daily service. The east windows are intended to be filled with rich glass, for which a scheme has been made; the present light appearance rather spoils a dignified creation. The reredos, too, is quite temporary. The stalls are being made by Messrs. J. Daymond & Son, who have done most of the woodwork in the church, except the pews and litany desk, for which the architect is not responsible. The organ is yet to be erected, as the door in the south wall of the choir shows.

The east end of the morning chapel, which is part of an octagon, has a somewhat novel treatment, inasmuch as the traceried stonework and glazing of the windows form a reredos.

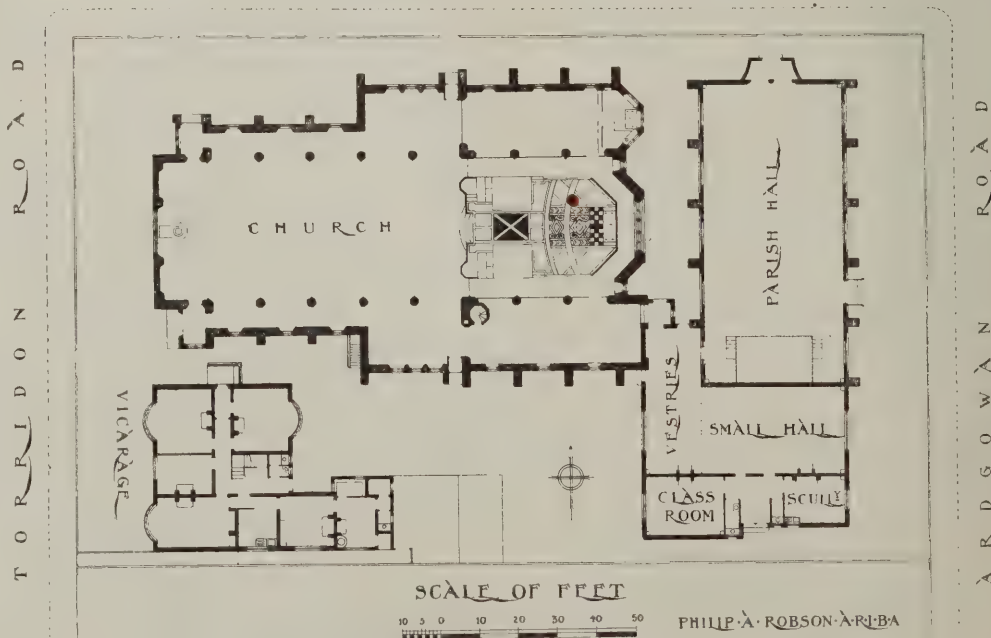
Duffy's "Acme" flooring was used in the nave and granolithic mosaic in the chancel (Messrs. B. Ward & Company), and the sanctuary has a beautiful marble floor. The lead glazing is by Messrs. Wotton & Co., of Croydon. Messrs. Longden & Co. installed the low-pressure hot-water apparatus. The materials are Lawrence's bricks (red), Portland Whitbed stone (externally), Stamford stone (internally), Roman interlocking tiles covering the main roof, and the low roofs covered with grey-green rough Precelly slates. The roof internally, which has the effect of cedar, is of fine red pine.

Liverpool Architectural Society.—Mr. Charles Spooner read his paper on "Church Fittings" before last week's meeting of this Society.



PULPIT.
(In Austrian oak, with walnut panels.)

S A N D H U R S T R O A D

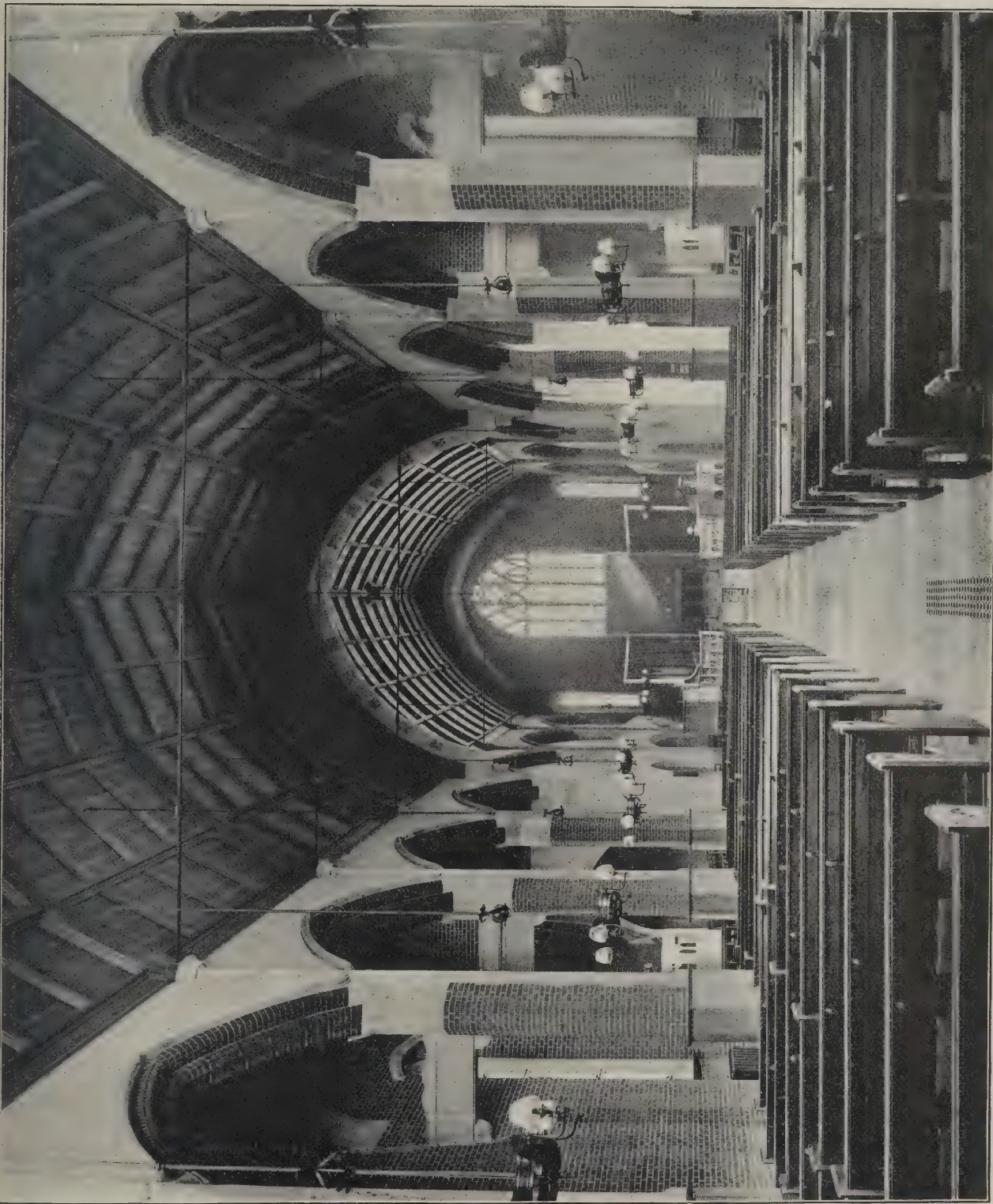


THE CHURCH OF ST. ANDREW, CATFORD.

LIBRARY
OF THE
UNIVERSITY OF ILLINOIS

Supplement to
THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD,
Wednesday, March 14th, 1906.





THE NEW CHURCH OF ST. ANDREW, CATFORD.

PHILIP A. ROBSON, A.R.I.B.A., ARCHITECT.

LIBRARY
OF THE
UNIVERSITY OF ILLINOIS

Enquiries Answered.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Correspondents are particularly requested to be as brief as possible.

The querist's name and address must always be given, not necessarily for publication.

Questions must in all cases be addressed to the Editor and be written on one side of the paper only.

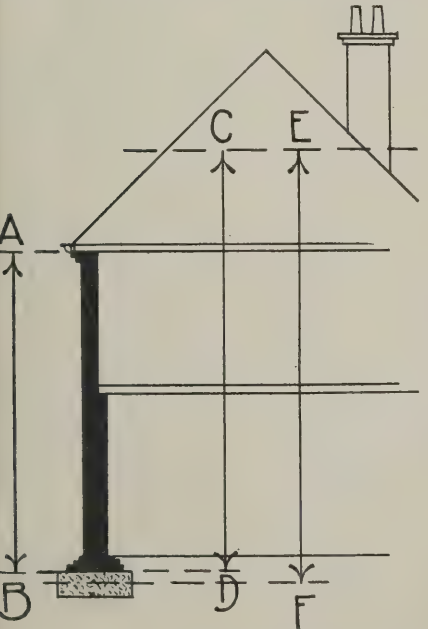
Book on Building Construction.

BURY ST. EDMUNDS.—G. P. writes: "What book on building construction do you recommend? I have just been articted to a firm of architects, and have all other books necessary. I do not wish to pay more than about £1." In the circumstances we advise you to get Mitchell's two volumes, and "Specification." The prices are given in our book list.

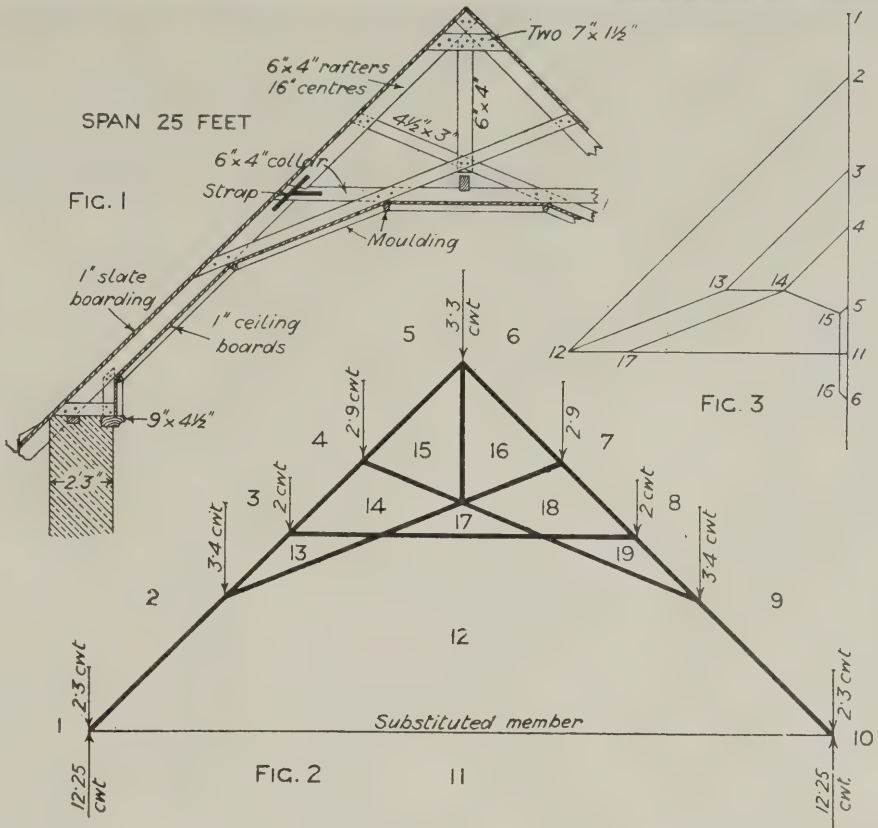
Measuring a Building.

LEICESTER.—R. G. writes: "In cubing a building do you measure from the bottom of the foundation to half-way up the gable (as C D), or from the bottom of the foundation to the plate (as A B), and, if so, would you take the roof separate and add to that obtained from foundation to plate; also, in that case, would you measure the portion of the chimney seen through the roof?"

The most usual method of cubing a building with a view to estimating its cost is to multiply its area by the height measured from half-way down the foundation to half-way up the roof, as E F. Sometimes the height is measured from the bottom of the footings, as C D. If the building up to the plate level be cubed and added to the cubic contents of the roof, precisely the same result is obtained as by cubing the whole building at once, so it is obviously a waste of time to take those items separately. Unless there is something exceptionally about the portion of the chimney showing through the roof, it would not be considered at all in cubing. All portions of a building, such as annexes,



stables, &c., which are less costly than the main portion, are usually cubed separately and priced at a lower rate. Similarly, very ornate features are kept separately and fixed at a higher rate than the rest of the building. H. Y. M.



Designing a Church Roof.

CAUTIONS writes: "Herewith a tracing of a church roof of 25ft. span. Do you consider the construction sound? The rafters are 5½in. by 4½in, red deal, at 16in. centres, single collar and double braces. I also propose to make the horizontal sole-piece at foot of rafters double. Would it be a better job if I were to put in 7in. by 2½in. pitch-pine rafters at 18in. centres, with two rows of bridging in the length? One scheme means cutting spars from log and the other using scantling sizes."

The form of roof shown in Fig. 1 was, and is still, largely used in church construction, but it is of an expensive character owing to the large amount of material required, as each rafter is separately trussed. Roofs of this kind do not lend themselves readily to calculation, but in this case as the walls are 2ft. gins. thick, provided they are not more than about 15ft. or 16ft. high, they may be assumed as capable of resisting any overturning tendency, and so for the purpose of working a stress diagram the frame diagram may be taken as Fig. 2, where an imaginary tie is substituted for the rigidity of the wall at the wall-plate level. Taking the total load on the roof as 56 lbs. per sq. ft. acting vertically, the stress diagram will be as Fig. 3, which only shows half, the other half being similar. The scantlings given on Fig. 1 are rather stronger than the stresses would appear to require, but as the walls can rarely be assumed as absolutely rigid they will probably be none too large in actual practice. HENRY ADAMS.

Height to which a Structure can be Built.

SHEFFIELD.—D. H. L. writes: "(1) If we take 8 tons per sq. ft. as the safe load on a course of brickwork, and 120 lbs. as the weight of a cubic foot of brickwork, neglecting any question of wind-pressure, to what height may a pyramid of brickwork be safely built? What is the duty supposed to be performed by bonding in this structure? (2) What is meant by saying that the height to which a pyramid of any building material may be raised is three times the height of a column of uniform section? Show how, by attend-

ing to a cardinal principle of construction, you can build a tower of brick or stone of a very great height?"

The first question was given in the Building Construction, Advanced Stage, 1901. The cubic contents of a pyramid are found by multiplying the area of the base by one-third the vertical height to the apex. The weight will therefore vary directly as the area of the base, but the surface of the base, to resist pressure, also varies as the area, so that it is clear that the height will be theoretically independent of the area of the base. Under the condition named let a = area of base, h = height of pyramid. Then $a \times \frac{1}{3}h \times 120 = a \times 8 \times 2240$. Cancel the a on each side, then $40h = 17920$. $\therefore h = \frac{17920}{40} = 448$ ft. The duty supposed to be

performed by the bonding is to spread the load uniformly over each course from the base upwards. The second question was given in the Honours Stage of Building Construction, 1901, and is based upon the same principles. If the bonding of a brick pyramid is assumed to spread the pressure uniformly over the base a solid pyramid of brickwork would have to be built three times the height of a column of uniform section of the same height and area of base to produce the same pressure per unit of area, because the cubic contents of a pyramid are only one-third those of a prismatic figure of equal height and base. One of the innumerable "cardinal principles of construction" is that bricks should break joint by proper bonding in order to distribute pressure and ensure stability; another is that the area of any supporting surface should be sufficient to keep the intensity of pressure within safe limits. In answer to the previous question, it was shown that with a maximum pressure of 8 tons per sq. ft. a brick pyramid with any size of base could be built to a height of 448ft., and this was without any allowance for wind-pressure, although such allowance ought certainly to be considered a cardinal principle. In order to build higher than this it will evidently be necessary to hollow the profile of the pyramid, and as this follows the principle of nature in the

outline of trees it might also be considered another cardinal principle. Which one the examiner referred to it is impossible to say.

HENRY ADAMS.

Notes and News.

The Alphons Custodis Chimney Construction Co., of 119, Victoria Street, Westminster, have been entrusted with the construction of the chimney-shaft at the Southern sewage works, Ealing.

The St. Pancras Ironwork Co., Ltd.—Mr. Arthur Pye Smith has been elected chairman of the board, and Messrs. Hugh Leader and T. Percival Chubb have been elected directors of this company.

Mr. H. Skyrme, architect, has opened offices at 138, Widemarsh Street, Hereford. He was for many years with Mr. F. R. Kempson, F.R.I.B.A., of Hereford and Cardiff, and in the latter city he held the post of head assistant.

Fall of a Church Tower.—The tower of All Saints' Church, Stanton, Suffolk, collapsed last week, but fortunately it fell clear of the church. For some time past it had not been considered safe to ring the bells in the tower, but no other danger was apprehended.

Plasterers' Wages Arbitration.—The National Society of Operative Plasterers have been successful in an arbitration with the London Master Builders' Association concerning a proposal by the masters to reduce the rate of pay $\frac{1}{2}$ d. per hour, from 11d. to 10 $\frac{1}{2}$ d.

Leeds and Yorkshire Architectural Society.—Mr. H. Phillips Fletcher read his paper on "The St. Louis Exhibition" before last Thursday's meeting of this society. (The paper was reported in our issue for April 12th, 1905, when it was read before the Architectural Association.)

Mud.—The following is taken from the London "Star": "A new use has been discovered for the thin liquid mud so prevalent on the roads in Kentish rural districts at this time of the year. It has been found to answer the purposes of cement, and is expected to be largely used in the repair of agricultural buildings." Comment is needless. We would observe, however, it is on record that mud has been used for mortar before; also garden mould and house rubbish.

The Position of Specialists on Building Work.—At the recent annual dinner of the Nottingham Master Builders' Association (Mr. F. H. Fish, president, in the chair) Mr. James Wright submitted "The Architects and Surveyors." He was glad to know that the feeling between the architects and builders in Nottingham was on a very much better footing than it was a few years ago. The Royal Institute of British Architects, the Institute of Builders and their own federation had produced a recognized form of contract, which was believed to be a reasonable, businesslike and equitable document, and it was very desirable that this should be generally adopted. The questions of prime costs and of specialists outside the builders' jurisdiction wanted careful handling. It had become a very general practice for specialists to be appointed by architects to carry out such works as the construction of steel floors, concrete and wood-block floors, &c. The specialists came on the work without notice to the builders and treated the latter as interlopers, when, after all, it was the builders who were responsible for the contracts. They accepted the position of introducing the specialists, but he thought that notice should be given to the builders and that the specialists should be treated as sub-contractors. That was provided for by the form of contract which he had mentioned, and he hoped to see it adopted.

Henry Saxon Snell Prize.—The subject set for this prize (£50), to be adjudicated in January, 1907, is a critical report on hospitals for the treatment of consumption.

Beckenham Church to be Completed.—It has been decided to proceed with the building of the nave of St. Michael's and All Angels' Church, Beckenham, Kent. At present the building consists of the chancel and a temporary nave. The proposed work will cost £4,000.

Then as Now.—In his lecture on the evolution of sculpture—Egypt and Greece—at the Royal Academy last week Sir William Richmond said there was a period of decline in art in the time of Rameses the Great. It grew coarser, and sculpture became degraded, although a high level of workmanship was maintained. There was, however, a great increase in the demand for it, and this led to the formation of a regular trade in sculpture in and about Thebes. But the artist had lost the old freedom in his work. All statues had to agree with certain canons to fit in with an ideal, so that in the end a mannerism took the place of the portraiture.

IN PARLIAMENT.

(By our Press Gallery Representative.)

THE following are some of the more important questions relating to building matters which have recently been addressed to ministers in the House of Commons:—

The new Processional Road.

Mr. Claude Hay asked the First Commissioner of Works if he would say what was the present position in regard to the Charing Cross entrance to the new road in St. James's Park, and when it was likely to be completed and thrown open for public traffic.

Mr. Harcourt replied that the foundations of the buildings and entrance to Charing Cross were in course of construction, but it was impossible to fix a date for the opening of the road, which must depend upon the completion of the buildings.

Irish School Plans.

Mr. McKenna, the Financial Secretary of the Treasury, informed Mr. Boland that the matter of new plans for national schools in Ireland was still under consideration.

British Granite again.

Mr. Harry Marks asked the Secretary to the Admiralty whether the contractors for harbour works were required to use British granite only; whether British granite only was to be used on the Keyham Harbour works; and whether he would give instructions that all contracts over which the Admiralty had or might hereafter have control should stipulate that only British granite should be used on such works.

Mr. Lambert, Civil Lord of the Admiralty, said the answer to the three parts of the question was in the negative, with the qualification that the Board of Admiralty could not fetter their future action.

Admiralty Works.

A memorandum which has been presented to Parliament shows the progress and expenditure on items included in the Naval Works Act of 1905. The total estimate for the Portland Breakwater was £650,000, and this item has been completed. The total estimate for Dover Harbour was £3,500,000, and the estimated expenditure up to the end of this month is about £2,686,000. The date for completion given in the 1905 Act was 1908-9. The Admiralty Pier extension, the east arm and the east reclamation, are all completed, except the above-water work at the extremities of the breakwaters. The south breakwater is making good progress, and a length of about 1,950ft. has been brought up to water-level. The total estimate for Keyham Dockyard extension was £4,500,000,

and the expenditure up to the end of this month will be about £3,721,000. The expected date of completion is 1908-9. The three graving docks and the entrance lock are completed, and it is expected that one dock will be ready for docking a ship by June next, or earlier. Among the items completed are Portsmouth Naval Barracks, Keyham Naval Barracks, Chatham Naval Hospital, Walmer Marine Depot, Keyham Engineers' College, Haslar Hospital extension, and Haulbowline Zymotic Hospital.

Obituary.

Mr. Frank Whittingham, architect, of Wrexham and Connah's Quay, died on Wednesday. He was only 28 years of age.

Mr. David Meikle, one of the original partners of the firm of Messrs. J. & D. Meikle, building contractors, Ayr, died recently, aged 86.

The late Mr. William Bate, of the firm of Messrs. Bate Brothers, builders, of Bridgnorth, who died on February 7th, left estate of the gross value of £62,827.

Mr. John Price, city surveyor for Birmingham, died last week. Mr. Price, who was in his fifty-first year, became surveyor to the Birmingham Corporation in 1896, having previously been assistant engineer in Liverpool. Since he had been in Birmingham he had carried out a number of important engineering works.

ARCHITECTS' BENEVOLENT SOCIETY

Annual Meeting.

THE annual meeting of the Architects' Benevolent Society was held on Friday at 9, Conduit Street, Mr. J. Macvicar Anderson presiding in the absence of the president, Mr. John Belcher, A.R.A.

The hon. secretary, Mr. Percivall Currey, read the annual report, in which the council expressed regret that, judging by the number of claims made upon the Society, the past year seemed to have been one of exceptional difficulty for many of the less fortunate members of the architectural profession. Towards the middle of the year it was found that the demands made upon the Society were beginning to outweigh the funds at the disposal of the council, and that it was necessary to consider means by which the income could be increased. The president (Mr. John Belcher) acceded to a suggestion that he should issue a personal letter of appeal, and this was sent out to 5,280 architects practising in the three kingdoms. The president directed attention to the fact that, although the Society had been in existence for over fifty years, and was the only institution organized specially for the relief of architects or their widows and orphans, not more than 1 per cent. of architects in active practice contributed to its support. As the income had suffered in recent years from the loss of many liberal contributors, the president appealed particularly for subscriptions. Compared with the support hitherto accorded, the result of the appeal must be considered satisfactory, the subscriptions having been increased about 20 per cent, while a considerable sum has been added to the capital. In connection with the appeal, the council specially called attention to the offer of a donation of £50 by Mr. Walter Emden, provided nine other contributions of an equal amount are received. Mr. Emden's offer has so far been supported by Mr. William Glover, Mr. H. Chatfield Clark, and the Society of Architects.

The total amount of subscriptions received during the year was £615 19s. 6d. (in 1904 £539 5s.), while the donations amounted to

£65 17s. (in 1904 £143 is.). £1,000 was distributed in grants and pensions, the number of applicants, apart from pensioners, being 86, out of which 80 were granted assistance.

Through the courtesy of Mr. John Holden, the Society's honorary local secretary at Manchester, the council have been informed that Mr. Alexander W. Mills, of Bowdon, Cheshire, an old subscriber, has bequeathed to the Society £500. Further bequests of £1 from the late Mr. C. Forster Hayward, and two Architectural Union Company's shares from the late Mr. H. H. Collins, have also been received. It is with great regret at the council have to record the death of these members (Mr. Collins was also a member of the council at the time of his death), as well as of Mr. Alfred Waterhouse, Mr. J. T. Wimperis and Mr. G. Fowler Jones, old subscribers.

The council desire to express their appreciation of the kindness of the committee of the A. Students' Smoking Concert in devoting part of the proceeds of the concert on February 2nd to the funds of the Society, the amount received being £12 12s.

The thanks of the Society are due to the Royal Institute of British Architects for office accommodation, and for the use of rooms in which to hold their meetings, and to the secretary (Mr. Locke) and his staff for their helpful courtesy in all matters connected with the Society.

The chairman, in moving the adoption of the report and balance-sheet, said that in some respects the report was satisfactory, as the subscriptions exceeded those of the previous years, but the fact remained that their efforts to raise a certain sum had only been successful to a partial extent, though he ventured to hope that they would complete the sum before long.

Mr. H. L. Florence seconded, and the motion was carried.

A vote of thanks to the retiring members of the council was passed on the motion of Mr. Arthur Ashbridge, seconded by Mr. G. Cannell.

The following elections took place, on the motion of Mr. Andrew Taylor, seconded by Mr. Osborn C. Hills:—President, Mr. John Elcher, A.R.A.; vice-president, Mr. William Elver; council, Messrs. Rowland Plumble, J. T. Hine, Ambrose M. Poynter, William Millier, H. L. Florence, G. B. Bulmer, F. W. Hunt, W. L. Spiers, Arthur Ashbridge, Walter Emden, Reginald St. A. Roumieu, Chatfield Clarke, Alfred Saxon Snell, and Colonel R. W. Edis, C.B.

Mr. W. Hilton Nash was re-elected treasurer, with thanks for his past services, on the proposition of Mr. Christopher, seconded by Mr. Rowland Plumble.

Mr. Percivall Currey was re-elected treasurer with thanks, on the motion of Mr. Rowland Plumble, seconded by Mr. Christopher.

Mr. W. Grillier moved and Mr. W. Spiers seconded the re-election of Messrs. Edward Greenop and Sydney Perks as auditors. An alteration in by-law 7 was proposed by Mr. W. Hilton Nash, seconded by Mr. W. Spiers, and carried. The object was to enable societies, allied societies and corporate bodies who are now or may become annual subscribers of not less than ten guineas, or donors of one sum of not less than fifty guineas, to be represented on the council by their president or chairman for the time being, who may also vote at all meetings, and to be entitled, on behalf of his society, to the same privileges as those of individual donors or subscribers.

A vote of thanks was accorded to the I.B.A. for the use of their rooms, on the motion of Mr. H. L. Florence, seconded by Mr. W. Hilton Nash.

A vote of thanks to the chairman concluded the meeting.

Law Cases.

An Accident on the new Central Library Building at Bristol.—At the Bristol County Court recently a young labourer named Cross brought an action under the Workmen's Compensation Act for half-pay during a period of incapacity caused by an accident whilst in the employ of Messrs. H. Willcock & Co., builders, of Wolverhampton, the contractors erecting the new central free library, Bristol (Mr. H. Percy Adams, architect). The accident, which resulted in severe head injuries, was occasioned by a brick falling on Cross whilst he was mixing up cement on the building on September 30th, 1904. The respondents took the ground that Cross was not incapacitated from employment, and that there was no responsibility on their part. The judge upheld this view and made an award in favour of respondents.

An Interesting Irish Light Case.—In the Chancery Division at Dublin recently Mr. Justice Barton gave judgment in the case of *Black v. Scottish Insurance Co., Ltd.* The plaintiff, a clothing manufacturer, claimed an injunction against the defendants for the erection of a building at the corner of Bedford Street and Donegal Square which, it was contended, obstructed the ancient lights of plaintiff's factory, warehouse and cutting rooms at the north side of James Street South, and for permitting to remain any building already erected which would cause such obstruction, and also for damages. The company had expended about £64,000 on the erection of the building in question. They denied that it interfered with the plaintiff's light, and asserted that there was sufficient light through the plaintiff's windows for ordinary trade purposes. Mr. Justice Barton, in delivering judgment, said the rule of the law in these cases laid it down that the measure of light which the Court was to have regard to was not what was needed for a special requirement but for the ordinary purposes of inhabitancy or business. A plaintiff to succeed in an action for infringement of light must show real injury and not partial inconvenience. The plaintiff in the present case turned out 120,000 suits a year, 75 per cent. of his trade being in juvenile suits of navy blue. His patterns and material had to be compared at all stages of manufacture, and this kind of work required a northern light, and the lights interfered with were northern lights. In the manufacturing part of Belfast no linen or woollen factory was complete without accommodation for examining goods. In some parts of the trade a special light was necessary. But plaintiff's business was not what was called the fine end of the trade. The plaintiff did not require a special light. An ordinary good light was essential and enough. The defendant company had erected a building of unusually large dimensions in place of a smaller building, the height to the eave being 72ft., while that of the plaintiff's building, which it overlooked, was only 36ft. The new building was also 15ft. nearer the plaintiff's premises than the former premises. The obstruction complained of was lateral and from a wall built of red brick, and evidence was submitted that it might be innocuous if faced with white brick. The defendant company, it was also shown, were careful to use white brick where their own lights were likely to be affected. However, the question of the colour of the bricks was only one of the elements in the case, coupled with the great height and close proximity. The plaintiff's business consisted of five rooms, and having considered the circumstances of each it seemed that the real or important injury was to the examining-room on the first floor, as it was here that the matching of colours and examination of suits for defects of colour took place. Defendants' witnesses admitted that an examining-room

was necessary for the business, and before the building in question was erected the room was adapted to its purpose. There was a large body of evidence which forced him to the conclusion that it was now practically useless for such purposes. It was impossible to say whether, and, if so, how far, the result might have been obviated if the wall had been built of white brick, or if it were kept effectively whitewashed. Be that as it might, his Lordship said he could not resist a large body of evidence that the new building had rendered the room practically useless for its appropriate purposes. On this part of the case very interesting evidence was given that a person working at the window of the room was rendered practically colour-blind for the purpose of matching blue cloth owing to the red rays from the brick wall. The case, however, did not depend entirely on the evidence of experts, but also on that of a considerable number of independent business men. While coming to the opinion that plaintiff had exaggerated the damage he had sustained in putting it at £1,000, his Lordship was forced to the conclusion, on the whole case, that the defendants' building had been proved to be an actionable nuisance. He would not, however, make any decree in the form of a mandatory injunction to pull down the building, although that was the form he ought to adopt if he were satisfied that the nuisance could not be obviated. The decree would be in the form of restraining the defendants from keeping erected the building so as to create a nuisance. That would leave it open to them to obviate the nuisance if they could. After that, of course, there would be liberty for both sides to apply as they might be advised.

Bankruptcies.

DURING THE WEEK ending March 9th twenty-one failures in the building and timber trades in England and Wales were gazetted.

E. C. PIPE, builder, Lowestoft. R.O. Feb. 28th.

J. CHARLES, bricklayer (late builder), Hull. P.E., Hull C.C., March 10th, at 2.

PRICE & REES, painters and house decorators, Swansea. R.O. March 1st.

G. H. KILVINGTON, builder, York. Gross liabilities £4,151; expected to rank £643; assets £586.

J. R. SHORLAND, builder, Margotfield. Liabilities £238; assets nil.

E. A. CHASE, builder, Bristol. Liabilities £2,204; assets £1,578.

W. WHITE, builder, New Brislington. Liabilities £3,125; estimated assets £3,150.

HOSKEN BROTHERS, builders, decorators, &c., Richmond. Adj. Feb. 27th.

HERBERT & JONES, builders and contractors, Kew Gardens. Adj. Feb. 28th.

H. DODD, builder and contractor, Liverpool. Liabilities £879; assets £260.

J. M. JOWETT, builder and contractor, Leeds. Deficiency £424.

C. W. PERRETT, builder, Paignton. Liabilities £700; assets estimated at £1,480.

W. WEBBER, builder, London, E.C. Liabilities £600; assets £135.

BUTT BROTHERS, builder, London. Liabilities £14,069; estimated to rank £972; estimated surplus £2,695.

S. BRANFORD, painter and plumber, &c., Claverley. P.E., Madeley C.C., March 14th, at 11.30.

E. YOUNG, builder, Eastleigh (late Twyford). P.E., Southampton C.C., March 28th, at 12.

J. H. SANDERS, builder, Bromley. P.E., Croydon C.C., May 2nd, at 11.

J. P. WOOLCOCK, builder, Penryn. P.E., Truro Town Hall, March 17th, at 11.45.

C. E. NICHOLLS, builder, Barlow Grange. Adj. March 3rd.

R. E. MAYO, builder, Brixton Hill. First meeting, London Bankruptcy Court, March 16th, at 12. P.E., same, April 6th, at 11.30.

J. E. BYGATE & A. McGRATH, slaters, Barnsley. First meeting, O.R.'s, Barnsley, March 14th, at 10.30. P.E., Barnsley C.C., March 14th, at 11.

T. WEEKS, slate merchant, Willesden. First meeting, London Bankruptcy Court, March 15th, at 12. P.E., same, April 10th, at 11.30.

J. METZ, builders' merchant, London. First meeting, London Bankruptcy Court, March 16th, at 11. P.E., same, April 6th, at 12.

WOODWARD & CO., surveyors, London. First meeting, London Bankruptcy Court, March 14th, at 1. P.E., same, April 3rd, at 12.

BARRETT, SON & DAVIS, builders and contractors, Dorchester. First meeting, O.R.'s, Salisbury, March 20th, at 1.30. P.E., Dorchester County Hall, March 30th, at 10.30.

W. R. & J. H. WALKER, builders and contractors, Smethwick. First meeting, 191, Corporation Street, Birmingham, March 14th, at 11. P.E., West Bromwich Law Courts, March 16th, at 10.30.

Complete List of Contracts Open.

News of Contracts Open are not repeated after they have been published once in these columns, so that readers will find particulars in our last issue of other contracts that still remain open.

Unless expressly stated to the contrary all deposits required for bills of quantities, &c., are returned on receipt of *bona-fide* tenders.

The words "Fair Wages Clause" inserted in certain paragraphs signify that persons tendering must conform to a fair-wages clause in the contract, which requires them to pay the rates of wages current in the district.

BUILDING.

Mar. 15. Barnard Castle.—*Pair of semi-detached cottages.* Full particulars may be obtained from T. Farrow, architect, 7, Market Place, Barnard Castle, to whom names and addresses must be sent by Mar. 15.

Mar. 15. Trefonen.—*Reconstruction of schoolrooms, classrooms, cloakrooms, urinals, &c.,* at the schools, in accordance with drawings (1 to 5) and specifications prepared by W. Pennant Ellis, architect and surveyor, Town Hall, Rhyl, N. Wales. The drawings may be seen, and a copy of the specification, also form of tender, obtained from the Rev. George Williams, M.A., The Rectory, Trefonen, between 10 a.m. and 3 p.m., upon payment of a deposit of £1 rs. Tenders, sealed and endorsed "Tender, Trefonen, Oswestry, National Schools," must be delivered at the Rectory not later than 10 a.m. on Mar. 15.

Mar. 17. Spennymoor.—*Alterations and additions* to the Administrative Block at the Isolation Hospital. Plan and specification may be seen and forms of tender obtained on application to C. R. Spencer, surveyor to the Council, Council Offices, Spennymoor. Tenders, marked "Hospital," to be sent to F. Badcock, clerk to the Council, Council Offices, Spennymoor, by Mar. 17.

Mar. 17. Glasgow.—*New offices* proposed to be erected behind Chambers, No. 7 and 8, Carlton Place, Glasgow, for the Govan Combination Parish Council, as follows:—Excavations, brick and mason works, also steel beams (one schedule), wright work, slater work, plumber work, plaster work, painter work. Schedules may be obtained and plans seen on application to John Gordon, architect, 261, West George Street, on payment of £1. Offers, marked "Tender for — Work, New Offices," to be returned to John Mitchell, inspector and clerk, 7, Carlton Place, on or before 10 a.m. on Mar. 17.

Mar. 19. Ross.—*Stabling* at The Coppice, Bishopswood, Ross, for Sir George Bulloah, according to the plans and specification prepared by Arthur H. Pearson, architect, Ross, which can be seen at the Post-office, Bishopswood. Quantities may be obtained, upon payment of £1, upon application to the Architect. Tenders, endorsed "The Coppice" (which must be on the form provided), to be delivered at the Architect's Office not later than noon on Mar. 19.

Mar. 19. Maescywwmmer.—*New C.M. chapel and schoolroom.* Plans may be seen and bills of quantities obtained of Morgan James, The Factory, Maescywwmmer, on deposit of £2 2s. Sealed tenders, endorsed "New Chapel," to be sent to John H. Davies, secretary, 6, North Avenue, Maescywwmmer, by 5 p.m. on Mar. 19.

Mar. 19. New Wortley.—*Sunday School,* for the Trustees of the Primitive Methodist Chapel, Holdforth Street, New Wortley, Leeds. Plans and specifications may be seen and quantities obtained from T. A. Butterby & S. B. Bird, architects, Queen Street, Morley, and 1, Basinghall Square, Leeds. Sealed tenders to be sent in to the Leeds offices of the architects before noon on Mar. 19.

Mar. 19. Dublin.—*Extension of brick arching,* 120ft. long by 20ft. wide, and also the taking down and re-erection of a small office at the Dublin terminus of the Great Northern Railway Co. (Ireland). Parties wishing to tender for the work can see the drawings and specification at the office of W. H. Mills, engineer-in-chief, Amiens Street Terminus, Dublin, or copies of them at the office of the District Engineer, Belfast, and forms of tender can be obtained at either of the above-mentioned places on payment of 1s. each (not returnable). Tenders, made out on the forms supplied by the company, and endorsed "Tender for Arching, &c.," should be delivered to T. Morrison, secy., Secretary's Office, Amiens Street Terminus, by 10 a.m. on Mar. 19.

Mar. 19. Belfast.—*New offices and stores,* for Messrs. Inglis & Co., Ltd. Plans and specification may be seen at the offices of the architects, signed, and copies of the bill of quantities may be obtained from W. H. Stephens & Son, Donegall Square North, on payment of £1 rs. Tenders to be lodged with Graeme-Watt & Tilloch, architects, 77A, Victoria Street, Belfast, by 10 a.m. on Mar. 19.

Mar. 19. Hurst.—*New Wesleyan Church* in Curzon Road. Plans may be seen and bills of quantities obtained at the architects' offices. Tenders to be delivered to George & Son, architects, Warrington Street, Ashton-under-Lyne, by Mar. 19.

Mar. 19. Llantrisant.—*Additions and alterations* at Danygraig House, and for erecting stabling for Dr. Ivor H. Davies. Plans may be seen and bills of quantities and all particulars obtained from the architects on deposit of £2 2s. Sealed and endorsed tenders must be delivered to Cook & Edwards, M.M.S.A., architects, Masonic Buildings, Bridgend, by noon on Mar. 19.

Mar. 19. Manchester.—*Boundary wall and entrance gates* to Christ Church Rectory, Church Lane, Harpurhey, for the Corporation. Specification, bill of quantities, and form of tender may be obtained on application to J. M. McElroy, general manager, Tramways Department, 55, Piccadilly, Manchester, on payment of 10s. Tenders are to be addressed to the Chairman of the Tramways Committee, 55, Piccadilly, Manchester, endorsed "Tender for

Boundary Wall, &c.," and must be delivered not later than 5 p.m. on Mar. 19.

Mar. 20. Portsmouth.—*Girls' Secondary School,* in Fawcett Road, for the Education Committee. On payment of a deposit of £5 5s. the specification, drawings and general conditions of contract can be seen at the offices of C. W. Bevis, architect and surveyor, Elm Grove Chambers, Elm Grove, Southsea, between 10 and 4, and form of tender and bill of quantities can be obtained on application to the Town Clerk at the Town Hall, Portsmouth. Fair wages clause. Tenders must be delivered to the Town Clerk, Town Hall, Portsmouth, not later than noon on Mar. 20.

Mar. 20. Aston Manor.—*Brickwork and boiler settings,* built-up steel stanchions and girders, &c., in connection with the extension of the electricity department, for the Corporation. Plans and specification may be seen and bills of quantities obtained on payment of £1 rs., at the Borough Surveyor's Office. Sealed tenders, endorsed "Boiler House," to be addressed to the Chairman of the Electricity Committee, Council House, Aston Manor, and delivered at the Town Clerk's Office not later than noon on Mar. 20. Fair wages clause.

Mar. 20. Cleethorpes.—*Pavilion, shelters, conveniences, &c.,* in Kingsway Gardens, for the Urban D. Council. Plans and sections (blue prints) and bills of quantities and forms of tender may be obtained, on payment of £2, on application to the Surveyor. Sealed tenders (on forms supplied by the Council only), addressed to the Chairman of the Sea Defence Committee and endorsed "Tender for Pavilion, &c.," to be sent to the Council House, Cleethorpes, by Mar. 20.

Mar. 20. Dawley.—*Alterations* to the Baptist chapel. Plans and specifications may be seen and all particulars obtained from C. R. Dalgleish, architect, 20, Castle Street, Shrewsbury. Tenders, sealed and endorsed, to be delivered to the Rev. A. Lester, The Manse, Dawley, by Mar. 20.

Mar. 20. Turfiff.—*Additions* to stabling, Glaslaw, Turfiff. Plans and specifications may be seen with the tenant and with James Duncan & Son, architects, Turfiff, and attendance will be given at Glaslaw, on Saturday, Mar. 17, at 2 o'clock p.m., to show the alterations to intending contractors. Sealed tenders to be lodged with the architects on or before Mar. 20.

Mar. 20. Westbury.—*Office* at Westbury Station for the Great Western Railway Co. Plans and specification may be seen and forms of tender and bills of quantities obtained at the office of the engineer at Bristol Station, between 10 a.m. and 4 p.m. Tenders, marked outside "Tender for Office at Westbury," and addressed to G. K. Mills, secy., Paddington Station, London, will be received up to Mar. 20.

Mar. 20. Bath.—*Extension of the grain shed, &c.,* at Bath Goods Station, for the Great Western Railway. Plans and specification may be seen and forms of tender and bills of quantities obtained at the office of the Engineer at Bristol Station, between 10 and 4. Tenders, marked outside "Tender for Extension of Grain Shed, Bath," to be sent to G. K. Mills, secy., Paddington Station, London, by Mar. 20.

Mar. 20. Leeds.—*Wesleyan Sunday School,* at Beeston Hill. Contractors desirous of tendering for the whole or the various works must send in their names to Danby & Simpson, architects, 73, Albion Street, Leeds, by Mar. 20.

Mar. 21. Bootle.—*Dwarf wall, stone coping and wall, piers,* to enclose the south recreation ground and tennis and cricket grounds, for the Corporation. Plans, section and specification may be seen and quantities obtained at the office of B. J. Wolfenden, A.M.I.C.E., borough engineer. Tenders, sealed and endorsed "Tender for Walls, South Recreation Ground, Contract No. 1," to be addressed to the Parks and Baths Committee and delivered at the Town Clerk's Office by 9 a.m. on Mar. 21.

Mar. 21. Eccles.—*Public elementary school* in Lewis Street, Patricroft. The plans may be inspected at the office of the architect, J. H. Woodhouse, 100, King Street, Manchester. A copy of the specification and bill of quantities may be obtained from the Town Clerk on payment of £2 2s. Tenders to be delivered in an official envelope, endorsed "Lewis Street School," to Edwin Parkes, town clerk, Town Hall, Eccles, by noon on Mar. 21.

Mar. 21. Canterbury.—*Mortuary* at the Borough Cemetery. Particulars of the work may be obtained at the offices of the City Surveyor. Sealed tenders must be forwarded to the Town Clerk, Burgate Street, by 5 p.m. on Mar. 21.

Mar. 22. Evercreech.—*Kilns and buildings* near Evercreech New Station for the Evercreech Lime and Stone Co. Plans and specifications may be inspected between 10 and 5 at Stone Yard, Evercreech village. Tenders to be sent in by Mar. 22.

Mar. 22. Brahan.—*Restoration* of Wester Moy farm steading, Brahan Estate. Plans and specifications may be seen with Alex. Campbell, factor, Brahan, and with the architects, Ross & Macbeth, Queen's Gate Chambers, Inverness, with whom sealed tenders must be lodged by Mar. 22.

Mar. 22. Prescott.—*Two additional infirmary blocks* at Whiston Workhouse. Quantities can be obtained at the office of James Gandy, architect, Masonic Buildings, St. Helen's, subject to a deposit of £2. Sealed tenders, endorsed, "Infirmary Blocks," to be delivered to A. F. Mann, Union clerk, Union Offices, Whiston, Prescott, by 10 a.m. on Mar. 22.

Mar. 23. Bruton.—*Alterations and additions* to Sexey's Trade School, for the Governors. Copies of the plans and specifications may be seen at the school on application to the Headmaster. Sealed tenders, endorsed "Alterations and Additions, Sexey's Trade School, Bruton," to be addressed to Arthur J. Pictor, A.R.I.B.A., architect, Bruton, Somerset, by Mar. 23.

Mar. 23. Manchester.—*Pump-house* at the Withington Workhouse, for the Guardians of the Poor of the Chorlton Union. Plans and sections may be seen and bills of quantities obtained at the offices of Charles Clegg & Son, architects, of 21, Spring Gardens, Manchester, upon payment of £1 rs. Sealed tenders, enclosed in the official envelope, to be delivered to David S. Bloomfield, clerk to the Guardians, Union Offices, All Saints', Manchester, by 5 p.m. on Mar. 23.

Mar. 24. Eckington.—*Alterations* at the old police-court, house, &c., for the Parish Council. Plans and specifications may be seen at the Parish Council Offices, 48, High Street, Eckington, any day between 9 and 12 a.m. or 3 and 7 p.m., on deposit of £1 rs. Sealed tenders, endorsed, "Tender for Old Court House," to be sent to Joseph Bolsover, clerk to the Council, 48, High Street, Eckington, by Mar. 24.

Mar. 24. New Ross.—*Parochial house* at New Ross, co. Wexford, for the Very Rev. Canon Kavanagh, P.P., V.F., D.D. Drawings and specifications may be inspected at the Parochial House, New Ross, and at the architects' office. Bills of quantities may be obtained on application to D. W. Morris, 68, Harcourt Street, Dublin. Tenders to be delivered to Doolin, Butler & Donnelly, architects, Dawson Chambers, 12, Dawson Street, Dublin, by Mar. 24.

Mar. 24. Normandy.—*Pair of cottages* at Normandy, near Wanborough Station, for H. Potter. Drawings, specification and conditions of contract can be seen at the office of the architect, A. J. Stedman, Farnham, between 10 and 4. Tenders (which must be sealed up and endorsed "Tenders for Cottages, Normandy") must reach Arthur J. Stedman, architect, South Street Chambers, Farnham, Surrey, by noon on Mar. 24.

Mar. 26. Uxbridge.—*New almshouses* in New Windsor Street, for the Lords-in-Trust for the Manor and Borough of Uxbridge. Plans and specification can be seen at the offices of William L. Eves, A.R.I.B.A., surveyor to the Lords-in-Trust, 54, High Street, Uxbridge, to whom tenders, endorsed "Tender Almshouses," are to be sent on or before noon on Mar. 26.

Mar. 26. Ross.—*Flight of steps* leading from Wye Street to the dock, for the Rural D. Council. Plan and specification may be seen at the Council Offices. Tenders, endorsed "Wye Street Steps," to be delivered to Ernest R. Davies, solicitor, clerk, Council Offices, Albion Chambers, Ross, by noon on Mar. 26.

Mar. 27. Emmaville.—*New council school,* for the Durham County Education Authority. Plans, specification and general conditions of contract can be seen and bills of quantities obtained at the office of the architects, Liddle & Brown, Prudential Buildings, Mosley Street, Newcastle-on-Tyne. Sealed tenders, endorsed "Emmaville Council Schools Tender," are to be sent to the Secretary, Elementary Education Department, Shire Hall, Durham, by Mar. 27.

Mar. 27. Birkenhead.—*Head post-office* for the Commissioners of H.M. Works and Public Buildings. Drawings, specification and a copy of the conditions and form of contract may be seen on application at H.M. Office of Works, Head Post-office, Liverpool, between 10 and 5. Bills of quantities and forms of tender may be obtained at H.M. Office of Works, Storey's Gate, London, S.W., on payment of £1 rs. Tenders must be delivered before noon on Mar. 27, addressed to the Secretary, H.M. Office of Works, &c., Storey's Gate, London, S.W., and endorsed "Tender for Birkenhead Post-office."

April 3. Crompton.—*Carnegie library* in Beal Lane, Crompton, near Oldham, for the Urban D. Council. The drawings and conditions of contract may be inspected and form of tender and bill of quantities obtained at the offices of the architect, Jesse Horsfall, F.R.I.B.A., 4, Chapel Walks, Manchester, from Mar. 17 to April 2. Sealed tenders, endorsed "Tender for Library," to be sent G. F. Gartside, clerk to the Council, Town Hall, Shaw, near Oldham, by noon on April 3.

April 5. Newcastle-on-Tyne.—*Proposed county offices* at the Moothall, Newcastle-on-Tyne. Contractors desirous of tendering for the whole of the works required in the erection of the above offices are requested to send in their names to the undersigned on or before Mar. 19. Bills of quantities will be forwarded after that date on payment of a deposit of £3 3s. Applications to be sent to J. A. Bean, county architect, The Moothall, Newcastle-on-Tyne, where the drawings can be seen. Sealed tenders (sent in the envelopes provided) to be delivered not later than 4 p.m. on April 5.

April 17. Ash Vale.—Church, at Ash Vale, Surrey, close to North Camp Station. The drawings, specification, and conditions of contract can be seen at the architect's offices, between 10 and 4. Tenders (which must be sealed up and endorsed "Tenders for Church," Ash Vale) must reach Arthur J. Stedman, architect, South Street Chambers, Farnham, Surrey, by noon on April 17.

No date. Tregare.—Alterations and additions to Pen-y-Walk, Tregare, Monmouth, for the Rev. William Evans, vicar. Builders willing to tender are requested to forthwith send in their names to Ernest G. Davies, M.S.A., architect, 25, Agincourt Square, Monmouth, and 7, Bridge Street, Hereford, when plans, specification and form of tender will be supplied.

No date. Shildon.—Caretaker's house for the Shildon Working Men's Club. Plans and specifications can be seen at the residence of J. W. Hodgson, architect, 65, Main Street, Shildon, R.S.O.

No date. Bristol.—Additions and alterations at No. 69, Park Street. Plans and specifications can be seen at Architect's Offices, Alfred Harford, architect and surveyor, 6 and 7, St. Stephen Street, Bristol. Quantities are provided, and may be had on payment of £1 is.

No date. South Molton.—Classrooms and minister's residence, in North Street, for the Trustees of the Wesleyan Church. Plans and specifications can be seen, the date for tendering, and any further particulars, obtained on application to the Rev. J. W. Hartley, Wesley House, South Molton.

No date. Kingston-upon-Thames.—Public elementary school for the Education Committee, in accordance with the plans and specifications to be seen at the office of the architect, F. W. Roper, 9, Adam Street, Adelphi, W.C., or at the office of the quantity surveyors, Boxall & Son, 8, Adam Street, Adelphi, W.C. Bills of quantities can be obtained of the quantity surveyors aforesaid on application to them by Mar. 20 and on the deposit of £2 2s. Sealed tenders, endorsed "New School," to be delivered at the Town Clerk's Office on or before a date to be indicated on the bills of quantities.

No date. Bishop's Stortford.—Drill hall. Builders desirous of submitting a tender should send in their names at once to Captain J. B. Wroughton, 1st V.B. the Bedfordshire Regiment, Hertford. Quantities will be supplied, for which a charge of £2 2s. will be made.

No date. Glossop.—Three-storey stone building. Plans and specifications can be seen at Olive & Partington, Ltd., Turn Lee Mills, Glossop.

No date. Salisbury.—Dairy buildings, for the Salisbury, Semley and Gillingham Dairy Co., Ltd., a. their premises in Dew's Road, Fisherton. For forms of tender and further particulars apply to Alfred C. Bothamst architect, 32, Chipper Lane, Salisbury.

ENGINEERING.

Mar. 16. Bridlington.—Installation of heating apparatus on the low-pressure hot-water system in connection with the new pavilion and cafe now being erected on the Royal Prince's Parade in accordance with plans and specification, which may be seen at the office of Mangnall & Littlewoods, architects, 42, Spring Gardens, Manchester, for the Corporation. Specification only may also be seen at the office of the Borough Surveyor, Town Hall, Bridlington. Tenders, endorsed "Tender for Heating," must be received by A. E. Matthewman, town clerk, Town Hall, Bridlington, by 5 p.m. on Mar. 16.

Mar. 21. Dundee.—Jetty in Hennebique's patent ferro-concrete. The general plans and specification may be seen and further information obtained at the office of T. J. Gueritte, 18, Victoria Square, Newcastle-on-Tyne, the agent for Hennebique's patent ferro-concrete. Only Hennebique's licensed contractors will be allowed to tender. Sealed tenders marked "Tender for Caledon Jetty," must be lodged with J. Thomson, harbour engineer, Harbour Engineer's Office, Dundee, by 10 a.m. on Mar. 21.

Mar. 26. Hambledon.—Pumping machinery capable of raising 3,600 gallons per hour with a lift of 22½ ft., for the Rural D. Council. Drawings and specification may be seen and particulars may be obtained at the office of R. B. Grantham & Son, 23, Northumberland Avenue, London, W.C., on payment of £5 5s. Tenders, on the prescribed form and marked "Haslemere Waterworks," must be sent to the Clerk to the Hambledon Rural D. Council, Guildford, Surrey, by Mar. 20.

Mar. 26. Leeds.—Dry gas meters, for the Corporation. Each party tendering is required to send, on or before Mar. 19, two sample five-light meters (one of which is to be left open for examination), addressed to the Gas Meter Works, Meadow Lane, Leeds. Form of tender may be obtained on application to the General Manager, Gas Offices, Leeds. Sealed tenders to be endorsed "Tenders for Gas Meters," and delivered to the Town Clerk, Town Hall, Leeds, by Mar. 26.

Mar. 27. London, S.W.—Three 10-ton hand cranes, for the County Council. Persons desiring to submit tenders may inspect the drawings and obtain the specifications, bills of quantities, form of tender and other particulars at the County Hall, Spring Gardens, S.W., upon payment to the Cashier of the Council of the sum of £2. Tenders must be upon the official forms, and the printed instructions contained therein must be strictly complied with. Each tender is to be delivered at the County Hall in a sealed cover, addressed to the Clerk of the London County Council, Spring Gardens, S.W., and marked "Tender for Cranes, L.C.C. Tramways," by 10 a.m. on Mar. 27.

Mar. 27. Ennistymon.—Water-supply for the towns of Ennistymon and Lahinch, co. Clare. Drawings and specification can be seen on application to the engineer, Brian E. F. Sheehy, 57, George Street, Limerick. The total cost of carrying out the scheme in accordance with the above plans and specifications is not to exceed £5,000. Sealed tenders, endorsed "Water Supply" (special form to be had from the Clerk, the Engineer or Surveyor, no other will be entertained), giving the names of two solvent sureties and a deposit of £5, must be sent to Nicholas Griffy, clerk to Council, Clerk's Office, The Workhouse, Ennistymon.

Mar. 27. Crumpsall.—Widening of bridge carrying Crumpsall Lane over the railway at Crumpsall, for the Lancashire and Yorkshire Railway. Plans can be seen and form of tender and specification obtained on application at the Engineer's Office, Hunt's Bank, Manchester. Tenders, endorsed "Tender for Widening Crumpsall Lane Bridge," to be in the hands of R. C. Irwin, secy., Hunt's Bank, Manchester, by 10 a.m. on Mar. 27.

Mar. 28. Grangemouth.—Dock extension, for the Caledonian Railway Co., as follows:—Two single-floored sheds, 400ft. and 300ft. in length respectively, and each 49ft. wide, with raised platforms, to be built on the central mole or tongue of the new dock; two-floored shed, 405ft. long by 4½ ft. wide, to be built on the north quay of the new dock; timber platform for passengers, 200ft. long by 12½ ft. wide, on the north side of the tongue; offices, latrines, urinals and other buildings; foundations and rails for crane-roads and foundations for capstans, snatch heads, &c.; forming and ballasting sidings, roads and quays, and laying permanent-way, paving, &c., on the same; supplying and laying water mains, hydrants, standpipes, &c. The contract drawings, specification and schedule of quantities may be seen at the office of the Secretary, Caledonian Railway Company, 302, Buchanan Street, Glasgow; or at the offices of Sir John Wolfe Barry, K.C.B., 21, Delahay Street, Westminster, S.W., between 10 a.m. and 4 p.m. Copies of the specification, schedule of quantities and form of tender may be obtained at either of the above offices on payment of £5 5s. Tenders, endorsed "Tender for Equipment of Dock Quays at Grangemouth," must be delivered at the office of the Secretary, Caledonian Railway Company, at or before 10 a.m. on Mar. 28.

Mar. 31. Chester.—Construction and alteration and electrical and general equipment of tramways, and new length of track in carshed. The drawings and specifications may be inspected on application to I. M. Jones, city surveyor, Town Hall, or S. E. Britton, city electrical engineer, Electricity Works, from either of whom a copy of the specification, general conditions and forms of tender may be obtained on payment of £3 3s. Sealed tenders, on the form supplied, and endorsed "Tramways," must reach J. H. Dickson, town clerk, Town Hall, Chester, by Mar. 31.

April 6. Brixham.—Water-supply: Supply, delivery and laying of about 4½ miles of 7 in. and 5 in. cast-iron water mains, together with the requisite sluice valves, air valves, meter, wash-outs, and other fittings, the construction of a service reservoir, boundary walls, meter house, and store, and other works, for the Urban D. Council. Drawings may be seen and copies of specification, bills of quantities, and forms of tender obtained at the office of the engineer, Fred. Wm. Vanstone, C.E., Palace Chambers, Paignton, on payment of £5. Sealed tenders, upon the form provided, endorsed "Brixham Waterworks," are to be addressed to Joseph L. Arlidge, clerk to the Council, Town Hall, Brixham, and delivered by April 6.

IRON AND STEEL.

Mar. 19. Bristol.—Wrought-iron and steel during the year, for the Corporation. Specification and forms of tender may be obtained at the City Engineer's Office, 63, Queen Square, on payment of 10s. Sample bars must be delivered at 63, Queen Square, by 10 a.m. on Mar. 13, and tenders must be sent in the envelopes provided to the same address by 1 p.m. on Mar. 19.

Mar. 19. Eyemouth.—Providing and laying about 1½ miles of 5 ins. and 4 ins. diameter cast-iron pipes, and for relative works. Specifications and schedules may be obtained from the engineers, Middleton, Hunter & Duff, 42, Frederick Street, Edinburgh, on deposit of £1. Sealed offers, endorsed "Eymouth Water," must be delivered to Charles Ewart, town clerk, Eyemouth, not later than the first post on Mar. 19.

Mar. 21. Bootle.—Wrought-iron railings and gates to enclose the south recreation ground and tennis and cricket grounds, for the Corporation. Plans, section and specification may be seen and quantities obtained at the office of B. J. Wolfenden, A.M.I.C.E., borough engineer. Tenders, sealed and endorsed "Tender for Railings, South Recreation Ground, Contract No. 2," to be addressed to the Parks and Baths Committee, and delivered at the Town Clerk's Office by 9 a.m. on Mar. 21.

Mar. 26. Ross.—Iron railing to be fixed on steps leading from Wye Street to the Dock, for the Rural D. Council. Plan and specification may be seen at the Council Offices. Tenders, endorsed "Iron Railing," to be delivered to Ernest R. Davies, solicitor, clerk, Council Offices, Albion Chambers, Ross, by noon on Mar. 26.

No date. Leeds.—Supplying and fixing about 600 yds. of wrought-iron unclimbable fencing and one pair of gates at East End Park; also five wrought-iron hand-gates for other grounds. For full particulars apply to Parks Superintendent, Municipal Buildings, Leeds.

PAINTING AND PLUMBING.

Mar. 16. Ipswich.—Repairing and painting the shelters, lavatories, &c., at Christchurch Park. Specification and form of tender can be obtained on application at the Borough Surveyor's Office, Town Hall, Ipswich. Tenders to be endorsed "Christchurch Park," and delivered at the Borough Surveyor's Office on or before 11 a.m. on Mar. 16.

Mar. 17. Beverley.—Painting the outside of the police-stations at Cottingham, Escrick, Filey, Hessle and Norton. Specifications may be seen and forms of tender obtained at the above stations, or upon application to the County Surveyor, Beverley. Tenders to be forwarded to J. Bickersteth, clerk to the Standing Joint Committee, County Hall, Beverley, by Mar. 17.

Mar. 19. Ross.—Bathroom at The Coppice, Bishopswood, Ross, for Sir George Bullough. Plan and specification, prepared by Arthur H. Pearson, architect, Ross, can be seen at the Post-office, Bishopswood. Tenders, endorsed "The Coppice," to be delivered at the Architect's Offices not later than noon, on Mar. 19.

Mar. 19. London, W.—Painting, colouring and other works, for the Guardians of the Poor of the Parish of

St. Marylebone, at their Infirmary, Rackham Street, Notting Hill, W. Persons desiring to tender may obtain specifications and forms of tender upon application to the Steward of the Infirmary any day up to Saturday, Mar. 17, between 10 and 12. Tenders, to be sealed and endorsed "Tender for Painting, &c., Infirmary," and delivered at the Guardians' Offices, at Northumberland Street, W., by 10 a.m. on Mar. 19.

Mar. 20. Sheffield.—Painting, whitewashing, colour-washing, &c., at the hospital at Swallowness. The matron will furnish information as to what is required, and may be interviewed any weekday before 2 p.m. Tenders (endorsed "Painting") to be delivered to N. Creswick, clerk to the Committee, 9, East Parade, Sheffield, by Mar. 20.

Mar. 21. London, E.C.—Cleaning and painting works at the Brook Hospital, Shooters Hill, Woolwich, and the South-Eastern Hospital, New Cross, S.E., for the Metropolitan Asylums Board, in accordance with specification prepared by W. T. Hatch, M.I.C.E., M.I.M.E., engineer-in-chief. Specification, condition of contract and form of tender for each work may be inspected at the office of the Board, Embankment, E.C., upon deposit of £1 each. Tenders must be delivered at the office of the Board not later than 10 a.m. on Mar. 21.

Mar. 22. Cowdenheath.—Painterwork at Guthrie U.F. Church. Schedules of quantities may be had and other information obtained on application to T. Hyslop Ure, architect, 43, Carnegie Street, Dunfermline. Tenders, marked "Painter Work, Guthrie U.F. Church," to be lodged with the architect by 10 a.m. on Mar. 22.

No date. Leeds.—Painting seven houses in Headingley, Leeds. Apply A. Walker & Son, Ltd., concrete contractors, 14, King Street, Leeds.

ROADS AND CARTAGE.

Mar. 15. Chester-le-Street.—Materials and carting, for the Rural D. Council, as follows:—Hand and machine, broken whinstone and limestone, and machine broken blast-furnace slag; and carting of same from the various stations on to the roads, for the year ending Mar. 31, 1907. Forms of tender, with specifications, quantities and other particulars, may be obtained from G. W. Aytton, Highways Surveyor's Office, Chester-le-Street, to whom tenders, endorsed "Tender for Road Metal," accompanied by properly labelled samples showing quality and size undertaken to be supplied, or "Tender for Carting," are to be delivered by Mar. 15.

Mar. 15. Escrick.—Cartage of road material, for the Rural D. Council. The work may be done by either traction engine or horse cartage, and the contractor may tender for the whole district or for one or more parishes. The contractor must state price per day and also price per ton. Forms of tender and all other information may be obtained from the councillor of any parish in the district; from the surveyor, H. Leckenby, Dunnington, York, or the Clerk. All tenders, endorsed "Tender for Cartage," to be sent to Frederick A. Camidge, clerk to the Council, 3, Stangate, York, by Mar. 15.

Mar. 15. Warmley.—Road stone, for the Rural D. Council. Particulars of the requirements of the Council and tender forms can be obtained of the Clerk. Sealed tenders, endorsed "Stone Tender," together with samples of stone, to be delivered to Seymour Williams, clerk to the Council, Council Offices, Warmley, Bristol, by Mar. 15.

Mar. 16. Chesterton.—Carting materials in the district for twelve months, from Lady Day for the Rural D. Council. Forms of tender, or information respecting the same, may be had upon application to the surveyor, J. Dunn, Brunswick House, Cambridge. Persons willing to contract are requested to send their tenders (sealed up) to John F. Symonds, clerk, 9, Bene't Street, Cambridge, by 6 p.m. on Mar. 16.

Mar. 16. Altrincham.—Supply of the following materials for the Urban D. Council:—Concrete flags, macadam and granite chippings and limestone chippings. Forms of tender may be obtained on application to the surveyor. Sealed tenders to be sent in, addressed to the Chairman of the Highways Committee, Town Hall, Altrincham, endorsed "Tender for —," by Mar. 16.

Mar. 16. Newark.—Road materials, for the Rural D. Council, as follows:—800 tons of granite and 2,000 tons of slag, to be delivered in such quantities and at such times and places in their district as the Council or their district surveyor shall require and direct. Further particulars may be obtained upon application to the district surveyor, R. Oakden junr., Winthelsea Avenue, Newark. Sealed tenders, marked "Tender for Road Material," together with samples, must be delivered free of expense at the Boardroom, The Ossington, Newark, on Mar. 19.

Mar. 15. Staines.—Granite for one year, for the Urban D. Council. Particulars and forms of tender may be obtained from E. J. Barrett, A.M.I.C.E., engineer and surveyor, Town Hall Staines, to whom tenders, endorsed "Tender for Granite," and sample of the material quoted for, are to be sent by Mar. 16.

Mar. 16. St. Austell.—For the following work, for the Urban D. Council:—Building walls, erecting iron railings, draining, metalling, kerbing, channelling and making-up new road from High Cross Street to East Hill. Plans and specifications may be seen and all information obtained on application to J. Samble, surveyor, Truro Road. Tenders, endorsed "Tender for Road," are to be sent to H. W. Higman, clerk, Urban D. Council Offices, St. Austell, by Mar. 16.

Mar. 17. Skipton.—Stone and team labour for one year, for the Urban D. Council. Specifications and forms of tender may be obtained from John Mallinson, surveyor, Town Hall, Skipton, and sealed tenders, endorsed "Tender for —" (as the case may be), are to be sent to him by Mar. 17.

Mar. 17. Selby.—Road material for the Rural D. Council. Forms of tender may be obtained from and must be delivered marked "Tenders for Materials," to E. Townend, clerk, Council Offices, 1, Abbey Place, Selby, by Mar. 17.

(Continued on p. xxii.)

THE TIMBER TRADE.

London Market in February.

FEBRUARY was a very quiet month for the London wood market. The deliveries from the docks show a further reduction of about 2,300 standards from those of February last year, and there has also been a reduction of about 500 standards in the overside deliveries, so that notwithstanding the smallness of the stock, which may now be estimated at about 23,000 standards less than last year, there is very little consolation to be gleaned from the figures. Messrs. Churchill & Sim report that prices have been quietly steady; a little dull for foreign deals and battens, a little better for pine and spruce deals, and without much tendency one way or the other for prepared boards. The month's trade in supplies for the coming season from abroad was a satisfactory one all round. There is no change to report in prices, but large further progress has been made in the reduction of the quantities available on the stock notes, and the position generally is a good deal more assured than it was a month ago. At the commencement of the selling season prices were strained a little higher than was altogether wise, and there was an undoubted risk that it might not be possible to maintain them, but during February that risk to a great extent passed away, and it is now fairly certain that there need be no break in general prices this year. Even for common redwood deals, which are still the difficulty of the situation, nothing worse would seem necessary than the possibility of having to face a large sale or two of them by themselves at the end of the season at some moderate reduction, or holding a proportion of them over for another year. Freights are fairly plentiful, but the improvement in general trade tends to keep rates something over the lowest of last year.

The abstract of dock stock, consumption, &c., for February, published by Messrs. Foy, Morgan & Co., is given in the table at the foot of this page.

Dock Stock.

The stock of wood in the public docks on February 28th was:—

Foreign deals and ends	-	-	1,200,000
Do. battens	-	-	2,127,000
Pine deals and battens	-	-	786,000
Spruce do. do.	-	-	695,000
Boards, rough	-	-	3,508,000
Do. prepared	-	-	5,972,000
totalling 14,288,000 pieces, as against			
17,269,000 in 1905, 20,449,000 in 1904, and			
17,476,000 in 1903.			

In other kinds the stock was as follows:—

Foreign wainscot logs	-	-	148 pieces.
Do. oak timber	-	-	323 loads.
Do. fir timber	-	-	1,924 do.
Do. Oregon pine, &c., spars	-	-	
and masts	-	-	5,051 do.
Colonial oak timber	-	-	1,366 do.
Do. birch timber and planks	-	-	3,685 do.
Do. elm and ash timber	-	-	781 do.
Do. yellow pine	-	-	317 do.
Do. red pine	-	-	64 do.
United States pitch-pine timber	-	-	12,469 do.
Do. do. deals	-	-	23,000 pieces.
East India teak	-	-	7,306 loads.

Deliveries.

The deliveries for the first two months have been of—

Foreign deals and ends	-	-	568,000
Do. battens	-	-	856,000

Pine deals and battens	-	-	159,000
Spruce do. do.	-	-	174,000
Boards, rough	-	-	897,000
Do. prepared	-	-	2,177,000
totalling 4,831,000 pieces, as against			
5,422,000 in 1905, 5,835,000 in 1904, and			
6,923,000 in 1903.			

The deliveries for February were—

Foreign deals and ends	-	-	284,000
Do. battens	-	-	428,000
Pine deals and battens	-	-	88,000
Spruce do. do.	-	-	91,000
Boards, rough	-	-	453,000
Do. prepared	-	-	1,073,000
totalling 2,417,000 pieces, as against			
2,849,000 in 1905, 3,059,000 in 1904, and			
3,605,000 for 1903.			

The deliveries direct from ship to craft for the first two months of the year have been—

	P.s.h.	1905.	P.s.h.	1904.	1903.
Deals and battens	4,910	3,431	3,957	2,591	
Boards	1,347	1,292	916	1,438	
Total	6,257	4,723	4,873	4,029	

and for February—

	P.s.h.	P.s.h.	P.s.h.	P.s.h.
Deals and battens	1,678	1,797	1,325	661
Boards	473	898	514	759
Total	2,151	2,695	1,839	1,420

Soft Woods.

Swedish Deals and Battens.—The demand in London was dull throughout the month, and it has been difficult to maintain in practice the prices for deals and battens theoretically so amply justified by the situation outside the market. For prepared boards the demand has been brisker, and the quotations given in January have been easily adhered to.

Norwegian Boards.—The fresh arrivals have been on a small scale, and there has been no change in the price of prepared boards. The market is firm and the stock is running comparatively low.

Russian Deals and Battens.—There is practically no change to report in this market during February. Prices have remained round about previous levels, but it has not been quite easy to keep them there in the absence of adequate local demand.

Finnish Battens.—Prices have been maintained for the small stock of Finnish battens in London in sympathy with the prospects ahead, but the month's trade was a very small one in volume.

Prussian Timber.—The market for fir timber has been quite firm, but without any further rise in prices so far as London is concerned. For oak timber there has been a better demand, and prices definitely improved here during February.

Canadian Timber.—The pine deal market in London has been quite active, and the dock stock is changing hands much more freely than for a long time past. Prices, too, have improved to within measurable distance of shippers' ideas of value. For spruce deals also prices improved during February, following a further rise in prices for arrival, which again checks business ahead. Birch has been the most easily saleable of the hardwoods at some little improvement in rates. For oak there is no change to report. Elm, ash and yellow-pine timber have been neglected. The arrival of sawn timber during the month was quite small, and this

market has of necessity dragged up again. Prices ahead are higher than ever; the demand has been good and the stock here is vanishing far too quickly. Some Oregon timber has been brought to the test of auction sale during the month and has sold cheaply—10s. per load below the London market price for pitch-pine and nearly 20s. below the cost of pitch pine for arrival. There was a fair arrival of planks during the month. The market price for them is improving.

Hardwoods.

Teak.—Messrs. C. Leary & Co. report that the East Indian teak market suffered during almost all of February from a distinct want of keenness on the part of buyers, but sellers are under no necessity to force sales and are consequently still able to command the extreme prices recently paid.

Messrs. Denny, Mott & Dickson, Ltd., report that the landings in the docks in London during February consisted of 874 loads of logs and 634 loads of planks and scantlings, or a total of 1,508 loads, as against 1,755 loads for the corresponding month of last year. The deliveries into consumption were 327 loads of logs and 345 loads of planks and scantlings—together 672 loads, as against 1,769 loads for February, 1905. The welcome feature in the figures is the maintenance of the better supplies which commenced during January. It must, however, be recognized that whilst an appreciable portion of both the logs and planks consist of Java wood, the quality of some of the shipments from Burmah leaves something to be desired, and the dock stocks of first-class quality and specification are still very inadequate—although the unprecedentedly high prices now ruling naturally restrict the demand. It is, however, increasingly clear that first-class teak must be highly paid for all this year, the only alternative being the taking of second-class wood at a lower price, which, if a dangerous, is perhaps a necessary experiment in the present state of abnormally short supplies of good wood both in Burmah and Siam.

Mahogany.—Considerable quantities of wood have been disposed of at auction during the past fortnight, and as the fresh arrivals have been of negligible proportions the nett result is a noticeable depletion of the already moderate stocks; a hardening of prices all round seems probable in the near future.

The Royal Academy Travelling Studentship for Architectural Students will this year be for the design of a town church.

Scottish Gardens and Garden Architecture.—A paper on this subject was read before last week's meeting of the Edinburgh Architectural Association by Mr. R. S. Lorimer, A.R.S.A. A historical account was given of some of the principal gardens in Scotland, Balcaskie in Fife being instanced as the ideal of what a Scottish country gentleman's garden ought to be. It was a fine specimen of a terrace garden. The lecture was illustrated by a series of lantern slides, which showed some of the gardens of Scotland and their sculpture and architectural setting, and another series illustrating some foreign—French and Italian—garden sculpture.

ABSTRACT OF STOCK, CONSUMPTION, &c., IN LONDON DOCKS, FOR FEBRUARY.

S.C. Dks. and M. Dks.	Deals (Fir).	Battens (Fir).	Pine.	Spruce.	Pitch-pine Deals.	Deals and Battens in Aggregate.	Rough Boards (All Countries).	Flooring.	Floated Timber.
	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Loads.
Public dock stock	1,039,983	2,264,767	784,300	694,757	23,526	4,807,333	3,508,732	5,971,764	20,500
Monthly public dock consumption	233,981	469,950	90,198	91,710	4,887	890,726	419,132	1,079,245	3,314
Overside stock	477,321	958,698	184,004	187,088	—	1,807,111	855,029	323,773	—
Overside consumption (estimated of dock):—									
92 per cent. Sawn	215,263	432,354	82,982	84,373	—	814,972	385,601	669,132	—
62 " Planed									
Duration of supply at same rate of consumption	3'38 months.	3'57 months.	5'59 months.	5'01 months.	4'81 months.	3'88 months.	5'42 months.	3'60 months.	6'19 months.

Tenders.

Addressed postcards on which lists of tenders may be stated will be sent post free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Fetter Lane, E.C. Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Beckenham.—For the erection of a private residence at Hayes Lane, Beckenham. Mr. G. St. Pierre Harris, architect and surveyor, 8, Ironmonger Lane, E.C., and Orpington, Kent:—

T. Graham	£4,668
Perry Brothers	4,404
T. Crossley & Son	4,386
Hudson Brothers	4,330
J. E. Arnold & Son	4,284
J. Duthoit	4,197
Somerford & Son	4,190
T. W. Grady*	4,155

* Accepted subject to modification.

Brighton.—For the erection of Elm Grove mixed school, Wellington Street, for the Education Committee:—

Kenworthy Brothers, Caterham Valley	£4,880	3	11
Rowland Brothers, Horsham	3,739	0	0
W. A. Field & Co.	3,630	0	0
G. Longden & Sons, Sheffield	3,568	14	8
J. Longley & Co., Crawley	3,568	0	0
Sattin & Evershed	3,542	0	0
H. J. Penfold	3,447	0	0
G. Lynn & Sons	3,429	0	0
G. R. Lockyer	3,290	0	0
F. & G. Foster, Norwood Junction	3,234	0	0
Norman & Burt, Burgess Hill	3,208	0	0
J. Barnes & Sons	3,200	0	0
R. Cook & Sons*	3,186	0	0
W. H. Hyde, Norwood Junction	2,952	0	0

* Accepted. [Rest of Brighton.]

Bristol.—For the erection of a Baptist mission hall at Freeland Buildings, Eastville, Bristol. Mr. B. Wakefield, architect, 45, Nicholas Street, Bristol:—

W. Townsend	£1,377	0	0
W. & J. Hurford	1,351	9	0
R. F. Ridd	1,337	0	0
H. W. & E. J. Neale	1,295	0	0
S. Farr	1,288	17	6
W. E. Carey, Portishead	1,242	0	0
E. J. Stock, Blagdon	1,200	0	0
A. Dowling*	1,194	0	0

* Accepted. [Rest of Bristol.]

Cheltenham.—For Naunton Park Schools, Cheltenham. Messrs. Chatters & Smithson, architects, Cheltenham:—

W. T. Bloxham, Banbury	£15,797
Pethick Brothers, Plymouth	15,744
Wilkins & Son, Bristol	15,235
J. Gutteridge, Peterborough	15,200
Lane & Son, Wolverhampton	14,969
Long & Sons, Bath	14,930
H. Smith, Kidderminster	14,633
E. Walters & Sons, Bristol	14,500
R. Skemp, Cheltenham	14,475
Estcourt & Son, Gloucester	14,440
Channon & Son, Cheltenham	14,250
Billings & Sons, Cheltenham	14,157
W. Jones, Gloucester	14,100
L. Jones, Wolverhampton	13,998
Bowers & Co., Hereford	13,985
Parnell & Son, Rugby	13,969
Dallow & Sons, Birmingham	13,725
Collins & Godfrey, Tewkesbury	13,477
T. Cuthbert, Nottingham	13,150
C. Moss, Loughborough	11,088
Eastwood, Kettering	12,855
C. Wright, Leicester	12,777
W. Crane, Ltd., * Nottingham	12,587

* Accepted.

Coventry.—For streets on the Poplar Estate, Earlsdon, Coventry. Mr. G. E. Jenkins, architect, &c., Bank Chambers, Coventry:—

Kelley & Son	£1,698	9	0
W. Higgins	1,672	17	10
W. Boon & Sons*	1,640	17	0

* Accepted.

Dorking.—For alterations and additions to Westcott Hall, for Mr. C. J. Wills. Mr. A. W. Verner, architect, Redhill:—

King & Son	£1,568
A. B. Apter	1,519
Cummins & Sons,* Dorking	1,475
A. B. Wilest	1,150

* Accepted. † Withdrawn.

Garston.—Accepted for the erection of public baths at Garston, for the Liverpool City Council:—

Turner & Moss, 7 to 23, King Street	£13,033
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Ingatstone.—For the erection of an engine-house, the construction of a small covered service reservoir, and other incidental works in connection with the Ingatstone waterworks, for the Chelmsford Rural District Council. Mr. James Dewhurst, A.M.I.M.E., engineer, Avenue Chambers, Market Road, Chelmsford:—

T. C. Thompson, Upminster	£1,888	12	0
G. Double, Ipswich	1,820	3	0
J. Jackson, Forest Gate	1,789	0	0
H. Shallow, Nottingham	1,750	0	0
S. Redhouse, sen., Finsbury	1,668	2	4
Choat & Sons, Chelmsford	1,508	0	0
P. Green,* Ingatstone	1,497	10	0
Exors. of J. Arundel, Bradford	1,422	0	3

* Accepted.

King's Lynn.—Accepted for pulling down and rebuilding 43 and 44, High Street. Messrs. A. R. Calvert & W. R. Gleave, architects, Nottingham:—

G. Hopewell & Son, Nottingham	£2,050
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Leeds.—Accepted tenders for the erection of Trinity Presbyterian Church, Harehills Avenue. Mr. W. H. Beevers, A.R.I.B.A., architect, 26, Bond Street, Leeds:—

Mason—J. Richardson, Chapeltown	£3,146	0	0
Joiner—F. O. Farrall, Wortley	750	0	0
Slater—J. Atkinson & Son	113	10	0
Plumber—T. Barrand	68	10	0
Plasterer—F. Mountain	137	4	0
Painter—Greenwood Brothers, Briggate	65	12	0
Leaded Lights—Williams Brothers, Kaleyards, Chester	86	8	0
Northern Asphalt Co.	11	18	8

[Rest of Leeds.]

Leighton Buzzard.—For the erection of a factory building at Messrs. Morgan & Co.'s carriage and motor works. Messrs. S. & A. H. Salisbury, M.S.A., architects, Harpenden:—

Lathey Brothers, Battersea	£1,990
F. G. Minter, Putney	1,906
H. Lovatt, Ltd., Wolverhampton	1,760
W. G. Dunham, Luton	1,723
D. Rowell & Co., Westminster	1,617
T. Virrell,* Leighton Buzzard	1,493

* Accepted.

London, S.E.—For the erection of a new sorting-office at Peckham, for H.M. Office of Works, &c.:—

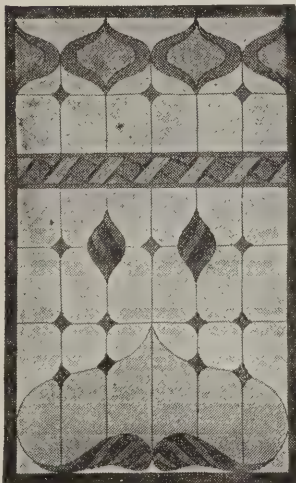
Credit.			
B. & A. Gale	£4,069	0	0
R. L. Stuart & Sons	3,657	0	0
J. E. Saunders	3,585	0	0
E. Smart & Sons	3,401	0	0
Patman & Fotheringham	3,375	0	0
W. Mills	3,328	0	0
Gathercole Brothers	3,300	0	0
W. V. Goad	3,285	0	0
C. Ansell	3,155	0	0
H. Lovatt, Ltd.	3,150	0	0
Martin, Wells & Co.	3,149	0	0
H. L. Holloway	3,139	0	0
R. A. Lowe	3,134	0	0
J. & W. Drake	3,131	10	0
Turtle & Appleton	3,120	0	0
J. Smith & Sons	3,075	0	0
H. C. Payne	3,053	0	0
R. & E. Evans	3,039	0	0
J. & C. Bowyer	2,997	0	0
B. E. Nightingale	2,976	0	0
J. Shelbourne & Co.	2,897	0	0
J. Barker & Son	2,868	0	0
F. Barker & Co.	2,827	0	0
F. Webster & Son	2,810	0	0
Edwards & Medway	2,790	0	0
Galbraith Brothers	2,785	0	0
W. H. Hyde	2,766	0	0
H. J. Williams, Ltd.	2,747	0	0
F. & G. Foster	2,662	10	0

Malpas (Mon).—Accepted for erecting three blocks of cottages, for the Rural District Council. Messrs. T. M. Lockwood & Sons, architects, Foregate Street, Chester:—

T. G. Huxley, Malpas	£2,108
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(Continued on p. xxiv.)

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(Continued from p. 149.)

Mar. 17. Knutsford.—Supply of the following materials, for the Bucklow Rural D. Council:—Blue Welsh Pennmaenmawr setts, small stones, chippings, limestone chippings, edging stones, socket glazed pipes, grit setts, hand-broken Welsh Pennmaenmawr stones, road grids, spades, shovels, road brushes, copper slag, cinders and for paving, from April 1, 1906, to Mar. 31, 1907. Further information and forms of tender may be obtained of Joseph Burgess, Tabley, Knutsford. Tenders, with samples, must reach George Leith, clerk to the said Council, Union Offices, Knutsford, by 10 a.m. on Mar. 17.

Mar. 17. Southwell.—Casting road material for one year, for the Rural D. Council. Forms of tender, with estimated quantities of material, may be obtained for the parishes forming the south portion of the Council from Henry Morris, highway surveyor, Southwell, Notts, and for the north portion of the Council from Richard Woolhouse, highway surveyor, Causton, Newark. Tenders must be sent to G. E. Kirkland, clerk to the Council, Southwell, by Mar. 17.

Mar. 19. Pontefract.—Road material, for the repair of the highways for the year ending Mar. 31, 1907. Forms of tender will be furnished on application to J. Dickon Smith, clerk, Union Offices, Pontefract, to whom tenders must be sent or delivered, together with sample of the material, by Mar. 19.

Mar. 19. Wing.—Supply of the following materials, for the Rural D. Council:—750 tons of granite, and 1,800 tons s'ag, sand and gravel, at the various stations and wharves in the district (including unloading and all wharfage charges), to be delivered as required. Tender forms may be obtained from the surveyor, M. G. Curney, Leighton Buzzard, and must be forwarded with samples, and endorsed "Tenders for Materials," to C. W. B. Calcutt, clerk of the Council, Leighton Buzzard, by Mar. 19.

Mar. 19. Sulcoates.—Whinstone, granite and gravel, for the year ending Mar. 31, 1907, for the Rural D. Council. Particulars and forms of tender may be obtained from the Council's surveyor, A. Greaves, Woodbine Villa, Hessele. Tenders, endorsed "Stone," must be delivered to Charles W. Dunkerly, solicitor and clerk to the Council, 7, Land of Green Ginger, Hull, by Mar. 19.

Mar. 19. Wellingborough.—Granite, for the Rural D. Council. Forms of tender may be had of the Clerk of the Council, and no tender will be received which is not on such form. Tenders, with specimens of stone, must be sent to the Workhouse at Wellingborough by Mar. 19.

Mar. 20. Maidstone.—Supply of road materials &c., for the Urban D. Council. Specifications, forms of tenders and all other information may be obtained on application at the office of the borough surveyor, T. F. Bunting, at the Fair Meadow, Maidstone. Sealed tenders, which will only be received on the forms supplied, endorsed "Tender for the supply of ——" must be delivered at the Town Clerk's Office by Mar. 20.

Mar. 20. Leek.—Supply of the following materials, for the Urban D. Council, for the year ending Mar. 31, 1907:—2½ in. and 3 in. flags, 4½ in. and 2 in. kerbs, 4 in., 5 in. and 6 in. grit setts, Portland cement, blue lias lime, macadam stone, cast-iron manhole step iron, manhole covers, lampole covers, bass rooms, cast-iron frames and grids. Specification and form of tender may be obtained upon application to W. E. Beacham, C.E., surveyor and water engineer, Town Hall, Leek. Sealed tenders, endorsed "Materials," to be delivered at the Town Hall, Leek, not later than noon on Mar. 20.

Mar. 20. Prescott.—Carting, for the Urban D. Council, for a term of three years ending Mar. 31, 1909. Forms of tender may be obtained from Richard Norris, surveyor, Bank Buildings, Prescott. Sealed tenders, endorsed "Carting," to be sent to Henry Cross, clerk to the Council, 2, Derby Street, Prescott, by Mar. 20.

Mar. 20. Gretton.—About 915 tons of broken granite and screenings, on or before Dec. 1, to be delivered (carriage free) at the following stations, viz., Corby and Weldon, Gretton, Fineshade Siding, Harringworth, Rockingham and Wakerley, at such times and in such quantities as the Surveyor of the Council shall from time to time order. Printed forms of tender and specifications, containing full particulars, may be obtained on application to the Clerk. Tenders, marked "Granite Tender, Gretton," and samples to be delivered to Frederick Oakley, clerk, Council Offices, Uppingham, 10 a.m. on Mar. 20.

Mar. 20. Gretton.—Carting about 915 tons of granite from the stations of Corby and Weldon, Gretton, Fineshade Siding, Harringworth, Rockingham and Wakerley to the various highways in the district, at such times, to such places and in such quantities as the Surveyor of the Rural D. Council shall require and direct. Forms of tender, showing the quantity of material for each parish and the station from which it is to be carted, may be obtained on application to the Clerk. Tenders are to be marked on the cover "Team Labour, Gretton," and sent to Frederick Oakley, clerk, Council Offices, Uppingham, by 10 a.m. on Mar. 20.

Mar. 20. Uppingham.—About 3,500 tons of broken granite and screenings, on or before Dec. 1 next, to be delivered (carriage free) at the following stations:—Uppingham, Rockingham, Seaton, Luffenham, Wakerley, Manton, East Norton and Morcott, at such times and in such quantities as the Surveyor of the Council shall from time to time order. Printed forms of tender and specifications, containing full particulars, may be obtained on application to the Clerk. Tenders, marked "Granite Tender, Uppingham," to be sent to Frederick Oakley, clerk, Council Offices, Uppingham, by Mar. 20.

Mar. 20. Uppingham.—Carting about 3,500 tons of granite from the stations of Uppingham, Rockingham, Seaton, Luffenham, Wakerley, Manton, East Norton and Morcott to the various highways in the district, at such times, to such places and in such quantities as the Surveyor of the Council shall require and direct. Forms of tender, showing the quantity of materials for each parish and the station from which it is to be carted may be obtained on application to the Clerk. Tenders are to be marked on the cover "Team Labour, Uppingham," and sent to Frederick Oakley, clerk, Council Offices, Uppingham, by 10 a.m. on Mar. 20.

Mar. 21. Hereford.—Hauling for the year, for the Rural D. Council, the particulars of which, with forms of tender, can be obtained from H. F. Froggatt, surveyor, Whitecross Road, Hereford, or H. Bishop, surveyor, Moreton-on-Lugg, Hereford. Tenders, endorsed on the outside "Highway Tenders," to be sent to R. Moore, clerk, Hereford, by Mar. 21.

Mar. 21. Brighton.—Supply of dressed granite kerb and channel, as under:—5,000 ft. run 2 in. by 6 in. granite flat kerb, 6,000 ft. run 2 in. by 6 in. granite flat channel. Specification and form of tender may be obtained on application at the office of the Borough Surveyor, at the Town Hall, Brighton. Sealed tenders, endorsed "Tender for Granite Kerb," must be addressed to Hugo Talbot, town clerk, Town Hall, Brighton, by 10 a.m. on Mar. 21.

Mar. 21. Elham.—Supply and delivery of stone for the Rural D. Council, in the under-mentioned parishes:—Elham, 260 cub. yds. of flint; Elham, 100 cub. yds. of (broken) rock; Hawkinge, 600 cub. yds. of flint; Lyminge, 300 cub. yds. of flint; Lyminge, 40 cub. yds. of (broken) rock; Lympe, 300 cub. yds. flint; Lympe, 20 cub. yds. beach; Monkshorton, 140 cub. yds. of flint; Newington, 100 cub. yds. of flint; Paddlesworth, 80 cub. yds. of flint; Postling, 160 cub. yds. of flint; Saltwood, 360 cub. yds. of flint; Sellenge, 120 cub. yds. of flint; Stanford, 80 cub. yds. of flint; Stowting, 200 cub. yds. of flint; Swingfield, 80 cub. yds. of flint. Particulars and forms of tender may be obtained from A. Hambrook, surveyor, Lyminge, Kent. All tenders (which must be on the printed forms supplied) must be sent to Mr. Loneragan, 11, Cheriton Place, Folkestone, by Mar. 21.

Mar. 21. London, W.—Formation of a new road and laying pipe sewers on the Gunnersbury Estate, Bollo Lane, Chiswick, W. Plans and specification can be seen and further particulars obtained upon application at the office of Nowell Parr & A. E. Kates, surveyors, Brunswick House, Brentford, and sealed tenders, endorsed "Tender for New Road," to be delivered to Bolton & Co., solicitors, 3, Temple Gardens, Temple, E.C., by noon on Mar. 21.

Mar. 21. Clayton-le-Moors.—Sewering, levelling, paving, channelling and making good nine front streets and nine back streets, for the Urban D. Council. Plans may be seen and specifications, quantities and forms of tender may be obtained (on payment of £1 rs.) on application to Arthur Dodgeon, surveyor to the Council. Also the construction of a short length of brick culvert at Super Tip. Specifications may be seen and form of tender and further particulars obtained on application to the Surveyor of the Council. Sealed tenders, endorsed "Street Works," or "Culvert," as the case may be, to be delivered to James Smith, clerk to the Council, Urban D. Council Offices, Clayton-le-Moors, by noon on Mar. 21.

Mar. 21. Twickenham.—Forming, levelling, kerbing, channelling, paving, metalling and making good Southfield Gardens, Grove Avenue and Athelstan Road. Plans can be seen and specifications and forms of tender obtained on application to F. W. Pearce, surveyor to the Council, Town Hall, Twickenham. No tender will be accepted unless made on the prescribed form. Sealed tenders, endorsed with the name of the street and marked "Tender for Street Improvement Works," to be delivered to H. Jason Saunders, clerk to the Council, Town Hall, Twickenham, by noon on Mar. 21.

Mar. 22. Eastry.—Flints, and re-casting stones from depôts for the Rural D. Council. Tenders are also invited for steam-rolling with 10 ton rollers for the Rural D. Council. Forms of tenders and schedules of quantities may be obtained of the district surveyor, D. E. Foster, Hazel Bank, Eastry, Dover, or the assistant surveyor, W. Goodsell, Durlock Road, Ash, Dover. Sealed tenders, endorsed "Tender for Road Material," "Tender for Carting," and "Tender for Steam-rolling," addressed to the Eastry Rural D. Council, must be delivered at the clerk's office, Workhouse, Eastry, near Dover, by Mar. 22.

Mar. 22. Luton.—Road materials in accordance with the specifications prepared by the borough surveyor, S. F. L. Fox, A.M.I.C.E., Town Hall, Luton. Tenders, accompanied by samples and endorsed "Road Materials," must reach George Sell, town clerk, Town Hall, Luton, by 4 p.m. on Mar. 22.

Mar. 22. Farsley.—550 tons of 4 in. by 5 in. granite setts, specially dressed to admit of a close joint, delivered at Stanningley Station. Also for 650 lineal yds. 12 in. by 8 in. (8 in. face up) York stone kerb. Further particulars can be obtained from C. H. Wright, surveyor, Farsley, to whom samples and prices endorsed "Setts" or "Kerb" must be delivered by Mar. 22.

Mar. 24. Driffield.—Road material for the Rural D. Council, as follows:—About 6,000 tons of whinstone, 1,000 tons of slag, 900 tons of sea cobbles, 500 tons of sea gravel, 200 tons of tarred chips. Particulars and forms of tender can be obtained on application to T. Casson Beaumont, C.E., surveyor, Driffield, to whom tenders, endorsed "Tender for Materials," are to be sent by Mar. 24.

Mar. 24. Axbridge.—Road steam-rolling and scarifying, for the Rural D. Council. This work necessitates four rollers and two scarifiers for about ten months in the year. Further particulars, together with forms of tender, can be obtained from George A. Millard, district surveyor, Cheddar. Tenders, endorsed "Steam Rolling," to be sent to William Reece, clerk to the Council, Council Offices, Axbridge, R.S.O., Somerset, by Mar. 24.

Mar. 24. Levenshulme.—Draining, paving, curbing, flagging, channelling and completing Henderson Street Extension and Nall Street, for the Urban D. Council. Specifications, bills of quantities and further particulars may be obtained from the Council's surveyor, James Jepson, Guardian Chambers, Tiviot Dale, Stockport, on payment of £1 rs. Tenders, endorsed "Tender for Private Street Works," to be sealed and delivered to J. Ogden Hardicker, clerk to the Council, Northern Assurance Buildings, Albert Square, Manchester, by Mar. 24.

Mar. 24. Saffron Walden.—Haulage by team or steam for the year commencing Mar. 31, on the district council roads. Full particulars and specifications may

be obtained from Henry Smith, surveyor, Saffron Walden. Tenders, endorsed "Tenders for Haulage," to be sent to W. Adams, deputy clerk to the Council, Saffron Walden, by Mar. 24.

Mar. 24. Repton.—Road materials and cartage, for the Rural D. Council. Printed forms of tender, containing full particulars, may be obtained from T. R. Sidwick, surveyor of highways, Repton, Burton-on-Trent; and all tenders must be on the printed forms supplied, and properly filled in, and sent to C. F. Chamberlin, clerk, Union Offices, Burton-on-Trent, by Mar. 24.

Mar. 27. Deptford.—Making-up and paving portions of Avignoa Road, Musgrove Road, Yeoman Street and Whitecher Street, all within the borough, and for the execution of other works in connection therewith, in accordance with the specifications and plans to be seen at the Borough Surveyor's Office, Town Hall, New Cross Road, S.E., between 10 and 4 (Saturdays 10 and 12). Sealed tenders (which must be on forms to be obtained from the Town Clerk) must be delivered, in accordance with the Council's regulations printed on the form of tender, at the Town Hall not later than 4 p.m. on Mar. 27.

Mar. 27. Malling.—1,800 cub. yds. of quartzite, basalt or granite, for the Rural D. Council. Full particulars and forms of tender, with terms of contract, may be obtained of John Marshall, surveyor, West Malling, Sealed tenders, endorsed "Tender for Road Materials," to be delivered to Frederick J. Allison, clerk, Council Offices, West Malling, Kent, by Mar. 27.

Mar. 27. London, W.—Making-up the following roads for the Ealing Town Council:—Coldershaw Road (portion), Fordhook Avenue (first portion), Hillcroft Crescent (second portion), Queen's Road and Sunderland Road. Drawings and specification may be seen and form of tender, together with schedule of quantities and other particulars, obtained from Charles Jones, M.I.C.E., borough engineer, Town Hall, Ealing, W., any day during office hours, upon payment of a deposit of 10s. 6d. for each road. Sealed tenders, in the envelopes provided, endorsed "Tender for Making-up ——" must be delivered at the Town Clerk's Office by the first post on Mar. 27.

Mar. 29. Normanton.—Supply of the following materials, for the twelve months commencing April 1, 1905:—Concrete flags, stone flags, kerbs, channels, stone setts, granite and limestone road material. Conditions, specifications and forms of tender can be obtained from A. Hartley, consulting surveyor, Council Chambers, Castleford. Tenders to be sent to C. B. L. Fernandes, clerk, Council Offices, Normanton, by Mar. 29.

Mar. 29. Sale.—Private street works. Paving and making good of the following passages, for the Urban D. Council:—Rear Eliza Street and Mason Street; rear Symons, Manor, Linley and Sefton Roads; rear 82 to 96, Cross Street; rear 7 to 19, Hope Road and 2 to 8, Thorn Grove; rear 2 to 30, Seymour Grove; rear 9 to 29, Northenden Road; rear 137 to 143, Northenden Road; rear Old Hall Road. General conditions, plans and specification may be seen and bills of quantities obtained at the office of William Holt, engineer and surveyor, Council Offices, Sale, on deposit of £1. Sealed tenders, endorsed "Private Street Works, Contract No. 3," to be delivered into the hands of D. Halliwell, clerk to the Council, Council Offices Sale, by 5 p.m. on Mar. 29.

April 5. Hastings.—150 to 200 tons of Rhenish basalt spalls, for the Corporation. Specification, form of tender and other information may be obtained on application at the office of the Borough Engineer P. H. Palmer, M.I.C.E., Town Hall, Hastings. Tenders, under cover, endorsed "Tender for Basalt," to be delivered to Ben. F. Meadows, town clerk, Town Hall, Hastings, by noon on April 5.

April 4. Tenterden.—Supply of the following materials, for the Corporation:—Cherbourg quartzite, basalt or other approved material, flints and ragstone. Also for the carriage of the above. Further particulars and forms of tender may be obtained of W. L. C. Turner, borough surveyor, Town Hall, Tenterden, to whom samples should be sent. Tenders to be sent to J. Munn Mace, town clerk, Tenterden, Kent, by April 14.

SANITARY.

Mar. 15. Bridge.—Scavenging the under-mentioned parishes for twelve months from April 1 to Mar. 31, 1907:—Barham, Bridge, Chatham, Littlebourne, and Petham. The Council finds sanitary carts and appliances, and the contractors are to provide sheds for their protection. Full particulars can be obtained from the Sanitary Inspector, Bridge, Canterbury. Sealed tenders, marked "Tender for Scavenging," must be delivered to T. Louis Collard, clerk, Bridge, by 10 a.m. on Mar. 15.

Mar. 16. Barnstaple.—Construction of a sewer in the parish of Fremington (from North Lane to the Main Road, and from the end of North Lane to the end of Hobb's Lane), for the Rural D. Council. Plans and specification, &c., may be seen at the office of Eric G. Kingwell, building surveyor, 85, Boutport Street, Barnstaple. Tenders, to be endorsed "Sewer, Fremington," to be sent to W. Pitts Tucker, Bridge Chambers, Barnstaple, on or before Mar. 16.

Mar. 19. Southend-on-Sea.—Conveniences on the slopes of the Cliffs, for the Corporation. Plans and specification may be seen and bills of quantities obtained, on deposit of cheque for £1 rs., upon application to E. J. Elford, M.I.M.E., borough engineer. Sealed tenders, endorsed "Conveniences," to be delivered at the Town Clerk's Office before noon on Mar. 19.

Mar. 21. Stroud.—Storm-water drain, for the Rural D. Council, in accordance with specification prepared by the district surveyor, Walter Brooke, A.M.I.C.E. Specification may be seen on application to J. E. Povey, clerk to the Council, Union and Council Offices, Stroud, Kent, to whom tenders, enclosed in sealed envelopes and endorsed "Storm-water Drain—Sole Street," are to be delivered by Mar. 21.

Mar. 22. Gorton.—Providing and laying about 545 in. yds. of 24 in. pipe sewer, with manholes, for the Urban

D. Council. Plans may be seen and bills of quantities obtained at the office of C. J. Lomax, Alliance Buildings, 37, Cross Street, Manchester, by deposit of £2 2s. Tenders must be delivered to C. T. Singer, clerk to the Council, Town Hall, Gorton, by noon on Mar. 22.

Mar. 22. Guildford.—*Sewerage* of a portion of the extended area of the borough situate in the St. Nicholas Ward. The approximate length of sewers is as follows:—1,297 yds lineal g.n. stoneware pipes, 10 yds. lineal 6 in. stoneware pipes, 14 manholes and 1 flushing chamber. Plans may be seen and a specification with bill of quantities obtained on application to C. G. Mason, C.E., the borough engineer and surveyor, Tuns Gate, on payment of £3 3s. Tenders, endorsed "Tender for the Sewerage of Artington (1st section)," are to be sent to F. S. Miller, town clerk, Town Clerk's Office, Bridge Street, Guildford, by noon on Mar. 22.

Mar. 24. Chingford.—*Bacteria beds, settling tanks* and other appurtenant works, and also for the erection of pumping station, sump and hydrostatic tank, at the Urban D. Council sewage works. Plans and specifications (prepared by W. Turner Streatheir, of Waltham Abbey) can be obtained from the Council's surveyor, Walter Stair, Council Offices, Chingford, upon a deposit of £2. Tenders, endorsed "Sewage Works," to be delivered to Leonard C. Bowen, clerk to the Council, Council Offices, Station Road, Chingford, by noon on Mar. 24.

Mar. 26. Kettering.—*Sewerage and sewage-disposal works*, for the parishes of Broughton and Cransley. Plans and sections of proposed works may be seen and specifications and bills of quantities, together with a form of tender, may be obtained on application to D. J. Diver, High Street, Desborough, Northants, with remittance of £2 2s. Sealed tenders, endorsed "Tenders for Broughton & Cransley Sewerage Works," are to be delivered to Charles W. Lane, clerk to the Kettering Rural D. Council, Council Offices, George Street, Kettering, by Mar. 26.

Mar. 26. Mountain Ash.—*Laying about 400 yds. of 6 in. sewer*, and about 240 yds. 4 in. drains at Old Ynysybwll. Specification, plans and sections may be seen, and forms of tender and bills of quantities obtained, on application to the Surveyor, Town Hall, Mountain Ash. Sealed tenders, prepaid and endorsed "Old Ynysybwll," to be sent to H. P. Linton, clerk to the Council, Town Hall, Mountain Ash, by 10 a.m. on Mar. 26.

Mar. 26. Skirbeck.—*Scavenging and road watering* for the year, for the Parochial Committee. Contractor to find his own or hired horse and scavenging carts. Water cart provided. The contractor to enter into an agreement the terms of which may be seen upon application at the Clerk's Office. Tenders, marked "Tender for Scavenging, &c.," to reach J. H. Tooley, clerk 6, Bridge Street, Boston, by Mar. 26.

Mar. 25. Todmorden.—*Sewers.* Construction of 429 lin. yds. of 27 in. diam., 204 lin. yds. of 24 in. diam., 698 lin. yds. of 21 in. diam., 430 lin. yds. of 18 in. diam., 218 lin. yds. of 15 in. diam., and 277 lin. yds. of 12 in. diam. earthenware pipe sewers, and 117 yds. of cast-iron pipe sewers, of various sizes, together with all necessary manholes, lampholes, and other contingent works, to be laid in Brook Street, Market Ground and Burnley Road, for the Council. Drawings may be seen and specification, bill of quantities, and form of tender obtained at the Borough Surveyor's Drawing Office, Market Ground, upon the deposit of £1. Sealed tenders, endorsed "Tender for Burnley Road Sewer," and addressed to "The Chairman of the Health Committee," must be sent in to D. Sutcliffe, town clerk, Town Hall, Todmorden, by 9 a.m. on Mar. 26.

Mar. 26. Todmorden.—*Sewers.* Construction of 326 lin. yds. of 3 ft. g.n. diam. and 28 lin. yds. of 4 ft. 6 in. diam. cast-iron pipe sewers, and 1,752 lin. yds. of 3 ft. g.n. internal diam. brick and concrete sewer, with all necessary manholes, lampholes, and other contingent works, to be laid from Lobb Mill to Stansfield Bridge, for the Borough Council. Drawings may be seen and specification, bill of quantities, and form of tender obtained at the Borough Surveyor's Drawing Office, Market Ground, upon the deposit of £1. Sealed tenders, endorsed "Tender for Halifax Road Sewer," and addressed to "The Chairman of the Health Committee," must be sent in to D. Sutcliffe, town clerk, Town Hall, Todmorden, by 9 a.m. on Mar. 26.

Mar. 26. Tonbridge.—*Sewerage and sewage-disposal works* (Contract No. 1). Construction of about 3,400 lin. yds. of g.n. and 1,020 lin. yds. of 6 in. stoneware pipe sewer, and 950 lin. yds. of 6 in. iron pipe rising and distributing mains, together with forty manholes, sedimentation tanks, &c., in connection with the Hildenborough sewage scheme, for the Rural D. Council. Plans may be seen and specification, schedule of quantities, form of tender and other particulars may be obtained on application to Frank Harris, engineer and surveyor to the Council, Broadway, Southborough, Tunbridge Wells, upon payment of £3 3s. Sealed tenders, in envelope provided, endorsed "Hildenborough Sewage Works," to be delivered to Neville R. Stone, clerk, 23, Church Road, Tunbridge Wells, by the first post on Mar. 26.

Mar. 27. Lancaster.—*Sewerage and sewage-disposal works.* About 1,500 yds. of g.n. and 6 in. sewers, with manholes, &c., and also for the construction of grit chambers, septic tanks, contact and streaming filters, for the Rural D. Council. Plans and specifications may be seen and bills of quantities obtained at the office of J. R. Lupton, surveyor, Lancaster. Sealed tenders, and endorsed, should be sent to W. H. Ritson, clerk, Lancaster, Durham, by Mar. 27.

Mar. 27. London, W.—*New soil-sewer* in Hanger Lane, and manholes, &c., in connection therewith, for the Ealing Town Council, as under:—About 2,388 ft. of 15 in. pipe; about 1,056 ft. of 12 in. pipe; about 1,638 ft. of 9 in. pipe. Drawings and specifications may be seen, and forms of tender, together with schedule of quantities and other particulars, obtained from Charles Jones, M.I.C.E., borough engineer, Town Hall, Ealing, W., any day during office hours, upon payment of a deposit of £5 5s. Sealed tenders, in the envelope provided, endorsed "Tender for New Soil Sewer," must be delivered at the Town Clerk's Office by the first post on Mar. 27.

MISCELLANEOUS.

Mar. 10. Epsom.—*Supply of the following stores, &c., for the Urban D. Council for one year:*—Sewerage ironwork; gully gratings; shovels, picks, brooms, forks, dust sumps, &c.; disinfectants; cement and lime; stone-ware pipes and gulleys; kerbing and channelling; setts; broken granite and flints; bricks and paving. Specification and forms of tender may be obtained upon application to the Surveyor's Office, "Bromley Hurst," Church Street, Epsom. Sealed tenders, addressed to the Clerk of the Council and endorsed "Tenders for Stores," to be delivered at the Clerk's Office by noon on Mar. 19.

Mar. 16. Morley.—*Supply of the following materials for the year, for the Corporation:*—Granite, setts, flags, kerbs (Yorkshire stone), sewer and drain pipes, sand, cement, lime, cast-iron lamp pillars, manhole and ventilating covers, gully gratings and frames, pitch, creosote oil and weed brooms. Forms of tender and further particulars may be obtained on application to the Borough Engineer. Tenders, sealed and endorsed "Tender for —," to be delivered at the Town Clerk's Office, Town Hall, Morley, by Mar. 16.

Mar. 17. London, E.—*For the supply of the following stores, for the East Ham Borough Council, for the period ending Mar. 31, 1907:*—Glazed stoneware pipes; glazed stoneware gully fittings (London and country make); Portland cement; greystone and chalk limes; aluminiferous for sewage precipitation; lime for sewage precipitation; stock and other bricks; coal and coke; engineers' sundries (oils, colours, painters' brushes, &c.); hand-broken granite; crushed granite; broken flints; granite kerbs; cast ironwork, gulleys, &c.; shovels, brooms, picks and handles; disinfectants; hire of horses and carts for scavenging, dust collection, &c.; sewer ventilating columns; paving flags; timber (carpenters' and joiners' work and wheelwrights' w.r.k.). Particulars and form of tender may be obtained on application to the Town Clerk. Fair wages clause inserted. Tenders to be sent in addressed to "His Worship the Mayor of East Ham, Town Hall, East Ham, E." and endorsed according to the supply of work tendered for, by Mar. 17.

Mar. 17. Fulwood.—*Supply of the following materials, for the Urban D. Council:*—Granite macadam; carting granite from dock; earthenware pipes and junctions; iron pipes; best scavenger brushes; straight kerbs, setts and channel stones and limestone chippings. Specification and form of tender may be obtained on application from the Surveyor, Council Offices, Fulwood. Tenders, endorsed "Tender for Stores," must be sent to Arthur Brierley, clerk to the Council, Urban D. Council Offices, Garstang Road, Fulwood, by Mar. 17.

Mar. 19. Croydon.—*Supply of the following materials, for the Guardians:*—Builders' materials, deal ends and battens for firewood, electrical fittings and appliances, glass and earthenware, ironmongery. Tenders, accompanied by samples where practicable, must be addressed to the Guardians and sent to the Union Offices, Mayday Road, Thornton Heath, by 6 p.m. on Mar. 19, properly sealed and endorsed, "Tender for —," and postage and carriage free, or they will be rejected.

Mar. 19. Bacup.—*Supply of the following materials, for the Corporation:*—Flags, kerbs, channels and setts (local stone); granite macadam, granite chippings and limestone chippings; earthenware pipes, &c.; waste-water closets; bricks (red); ironmongery, tools and brushes; iron castings, &c.; covers, flags and bricks. Further particulars and forms of tender can be had on application at the Borough Surveyor's Office. Tender, under separate cover, marked with the name of the article tendered for, must be delivered to A. Blasdale Clarke, town clerk, Town Clerk's Office, Bacup, by Mar. 19.

Mar. 19. Trowbridge.—*Supply of the following materials, for the Urban D. Council:*—Hiring of horses and carts, supplying of brushes, brooms, shovels and picks, scarifying and steam-rolling. Particulars and forms of tender may be had on application to the Surveyor. Sealed tenders, properly endorsed "Horse Hire," &c., as the case may be, to be sent to H. G. Nicholson-Lalley, town surveyor, Town Hall, Trowbridge, by 2 p.m. on Mar. 19.

Mar. 20. Prescott.—*Supply of the following materials, for the Urban D. Council:*—Pipes, grids, manhole covers, gulleys, oils, disinfectants, stores, &c., for the year ending Mar. 31, 1907. Specification may be seen at the offices of Richard Norris, surveyor, Bank Buildings, Prescott. Sealed tenders, endorsed "Stores," to be sent to Henry Cross, clerk to the Council, 2, Derby Street, Prescott, by Mar. 20.

Mar. 20. Chadderton.—*Supply of the following materials, for the Urban D. Council, during the year ending Mar. 31, 1907:*—Broken granite, earthenware pipes, gulleys, &c.; setts, flags and kerbs, pitch and oil, and limestone chippings. Forms of tender may be obtained on application at the Surveyor's Office, Town Hall, Chadderton. Sealed tenders, endorsed "Tender for Materials," to be sent to Henry Hoyle, solicitor, clerk to the Council, Town Hall, Chadderton, by noon on Mar. 20.

Mar. 20. St. Helens.—*Supply of the following materials for the Corporation, for a period of twelve months:*—Concrete flags 24 in. thick; granite setts, 4 in. cube, and 6 in. by 4 in.; granite kerbs, 10 in. by 7 in. (Irish); granite channels, 10 in. by 5 in. (Irish); macadam and chippings; ironwork (manhole covers, &c.); glazed socketed stoneware pipes; scavenging brushes; carolic acid and powder. Conditions of contract, specification and form of tender can be obtained upon application to George J. C. Broom, M.I.C.E., the borough engineer, Town Hall. Tenders for any of the above materials must be sent in, upon forms supplied, not later than noon on Mar. 20, addressed to the Chairman of the Paving, &c., Committee, Town Hall, St. Helens, and endorsed "Tender for —." A sample quantity of each of the materials (except ironwork) must be forwarded, carriage paid, to the Corporation's Depot, Salisbury Street, St. Helens.

Mar. 21. Bredbury.—*Supply of the following materials, for the Bredbury and Romiley Urban D. Council:*—Grit setts, curbs, concrete and Lancashire flags, macadam, tar, creosote oil, paraffin oil, chippings,

brushes, earthenware pipes, bends and junctions, and also team and labour. Samples to be forwarded to the Surveyor, School Brow, Bredbury, from whom further particulars and forms of tender can be obtained. Sealed tenders to be delivered at the District Council Offices, School Brow, Bredbury, by noon on Mar. 21.

Mar. 21. Richmond.—*Supply of granite, ironmongery and plumber's materials to the Workhouse for twelve months from April 1, 1905, to Mar. 31, 1907.* Printed forms of tender and contract, which only can be received, containing full particulars and conditions, and estimates of quantities required, may be obtained on personal application at the Guardians' Offices, Parkshot, Richmond, Surrey, or by forwarding an addressed envelope (foolscap size) duly stamped. Tenders addressed to the Guardians, endorsed "Tender for —," and accompanied by samples of the articles tendered for, must be received at the Guardians' Offices not later than 5 p.m. on Mar. 21.

Mar. 21. Clayton-le-Moors.—*Supply of the following materials, for the Urban D. Council:*—Flags, channels, kerbs, setts and broken granite; earthenware pipes; and ironwork. Forms of tender may be obtained on application to Arthur Dudgeon, surveyor to the Council. Sealed tenders, endorsed "Tender for Materials," to be delivered to James Smith, clerk to the Council, Council Offices, Clayton-le-Moors, by noon on Mar. 21.

Mar. 23. Wrexham.—*Supply of the following materials:*—Borough Surveyor's Department: Macadam, setts, kerb and channel stones; cement and flags; lime; earthenware pipes, gulleys, chequered tiles and channels; oils, paints; tools and ironmongery; sanitary materials and disinfectants; teamwork; timber. Borough Electrical Engineer's Department: Engine-room stores; cables; joint boxes and jointing materials; double-pole service cut-outs; meters; incandescent lamps; arc lamp carbons; ironmongery; consumers' installation materials; wood troughing, &c. Forms of tender to be obtained from the Borough Surveyor and from the Borough Electrical Engineer for their respective departments. Contracts to be subject to the condition known as the fair wage and hours clause. Sealed tenders, endorsed "Tenders for —," to be addressed and sent in to Thomas Bury, town clerk, Wrexham, by Mar. 23.

Mar. 23. East Molesey.—*Supply of the following material, for the Urban D. Council:*—List 1: Cartage (daywork and piecework); limestone Derbyshire marble asphalt (supply only); Portland cement; Quenast granite; Kentish brown flints; Hungry Hill flints; Farnham fine gravel; Norway granite kerb; steam roller (hire of); granite gravel, granite dust and granite setts. List 2: Sanitary stoneware pipes; greystone lime. Specifications, particulars and forms of tender may be obtained upon application to the Surveyor, District Council Office, East Molesey. Sealed tenders for List 1, addressed to the Chairman of the Highways and Lighting Committee, and for List 2, addressed to the Chairman of the Drainage Committee, to be delivered at the District Council Office, St. Mary's Road, East Molesey, by 4 p.m. on Mar. 23.

Mar. 24. Exeter.—*Works and repairs, and the supply of such materials as may be ordered by the Guardians for their properties and the workhouse buildings, for a period of one year, from Ladyday next.* Forms of tender, with conditions of contract and schedules of prices, can be had on application to R. M. Challice, surveyor to the Guardians, 14, Bedford Circus, Exeter. Sealed tenders to be delivered to Arthur Snell, clerk to the Guardians, Exeter, by Mar. 24.

Mar. 24. Waterloo-with-Seaforth.—*Supply of the following materials for one year, for the Urban D. Council:*—Macadam and chippings; cartage of macadam, setts, &c., from the North Docks. Liverpool; horse hire; Hasting len or Yorkshire flags, setts, kerbs, channels and crossing stones; granite crossing stones; concrete flags; Portland cement; pitch and tar; lamp columns; sewer ventilators and manhole covers; cast-iron ventilating pipes; cast-iron street gulleys. Specifications and other particulars may be obtained on application from F. Spencer Yates A.M.I.C.E., the surveyor to the Council, at the Town Hall, Waterloo. Sealed tenders, on forms supplied and endorsed "Tender for —," are to be delivered at the Town Hall, Waterloo, by Mar. 24.

Mar. 24. Gateshead.—*Supply of the following materials for one year, for the Borough Council:*—Whin stone macadam, Whin setts, Whin chips, Wain curb, Whin channel, Whin wheelers, limestone macadam, Freestone and Caithness flags, metal gulleys, manhole covers, &c.; shovels, picks, scavenging brooms, lime and cement. Specification and form of tender can be obtained at the office of N. Percy Pattinson, borough surveyor, Town Hall. Tenders are to be sent in, sealed and endorsed "Tender for Materials," by Mar. 24.

Mar. 26. London, E.C.—*Supply of the following stores, for the Madras Railway:*—Bar iron, steel sheets, plates and wire, zinc and tin sheets, copper and brass sheets and wire, pig lead, white and red lead, paints and colours, carpenters' and engineers' hand tools, anvils, hammers, ricks, crowbars, spanners, bollows, files, screwdrivers, nails, glass, crockery, ironmongery, leather, lamp wicks, locks, wire netting, hammer handles, saws, chain, shovels, grindstones, tar, turpentine, varnishes and brushes, as per specifications to be seen at the Company's offices, for which a charge will be made (which cannot be refunded). Tenders to be delivered in sealed envelopes, endorsed "Tender for General Stores—Part I." (or Part II., as the case may be), to W. H. Cole, secy., 1, Broad Street Place, Finsbury Circus, London, E.C., by noon on Mar. 26.

Mar. 31. Truro.—*Horse hire and materials, for the City Council:*—To supply the whole or part of the horses and carts required for sanitary work, highways, general, and the carriage of road metalling. The following materials are required:—Road metalling; glazed socketed earthenware pipes, bends, junctions, gulleys, &c.; granite kerbs, paving, channelling, &c.; iron castings, lamp-pillars, gully-grids, frames, gratings, &c.; bass and rotary brooms; and disinfectants. Specifications, for form of tender and all other information to be obtained at the City Surveyor's Office. Sealed tenders, upon the forms supplied, suitably endorsed, according to class of goods tendered for, to be delivered at the City Surveyor's Office, Truro, by 10 a.m. on Mar. 31.

TENDERS—cont. from p. xxi.

Parkstone.—For the erection of a bungalow at Sandbanks, for Mr. Stewart King. Mr. Walter Andrew, architect, Parkstone:—

Miller & Sons ...	£1,899	0	0
Jenkins & Sons ...	1,625	0	0
Burt & Vick ...	1,533	10	0
A. & F. Wilson ...	1,445	0	0
Baker & Pearcy ...	1,294	0	0
Chinchen & Co., * Parkstone ...	1,216	0	0

* Accepted.

Parkstone.—For additions and alterations to Sande-
cotes School, for the Church Corporation, London.
Mr. Walter Andrew, architect, Parkstone. Quantities by
the architect:—

Miller & Sons ...	£2,919	10	0
Burt & Vick ...	2,806	10	0
Brown & Son ...	2,800	0	0
Jenkins & Sons ...	2,744	0	0
A. & F. Wilson ...	2,734	14	4
A. J. Colborne ...	2,686	8	6
Baker & Pearcy, * Parkstone ...	2,576	11	6

* Accepted.

Stockport.—Accepted for the completion of Chester-
gate Council Schools, for the Education Committee.
Messrs. Cheers & Smith, architects, Blackburn and
London:—

J. Ridyard, Ashton-under-Lyne ... £10,651

Swindon.—For the erection of the Ferndale Road
Council Schools, for the Corporation. Messrs. Nicholls &
Stockwell, architects, 25, Regent Circus, Swindon.
Quantities by Messrs. Drew & Sons, 28, Regent Circus,
Swindon:—

Jenkins & Sons ...	£14,687	0	0
W. Jones ...	14,400	0	0
J. Long & Sons ...	14,123	0	0
A. J. Colborne ...	12,996	5	11
Annett & Son ...	12,960	0	0
R. J. Leighfield ...	12,735	2	8
T. Cuthbert ...	12,700	0	0
J. G. Norman ...	12,157	9	0
H. & C. Spackman, * Hunt Street ...	12,029	16	4

* Accepted.

Trealew.—For the erection of a residence at Trealew,
for Mr. W. R. Nicholas. Messrs. A. O. Evans, Williams
& Evans, architects, Pontypridd:—

C. Jenkins & Son, Porth ...	£2,700
J. B. Mundy, Maerdy ...	2,596
J. Edwards, Tonyrefail ...	2,562
W. H. Gay, Cardiff ...	2,503
E. B. Smith-Jones, Pontypridd ...	2,459
W. C. Hinchley, Pontypridd ...	2,419
E. R. Evans & Brothers, Cardiff ...	2,349
Knox & Wells, * Cardiff ...	2,339

* Accepted.

Current Market Prices

FORAGE.

	£ s. d.	£ s. d.
Beans ... per qr.	1 13 0	1 14 0
Clover, best ... per load	3 12 0	4 2 6
Hay, good ... do.	3 5 0	3 12 6
Sainfoin mixture ... do.	3 5 0	3 15 0
Straw ... do.	1 8 0	1 14 0

MISCELLANEOUS.

Bricks Stocks, d/d to job	per 1,000	1 14 0	—
Do. Flettons on rail ...	do.	1 4 0	—
Do. Pressed Wire Cuts, d/d to job ...	do.	1 16 0	—
Do. Blue brindled wire cuts ...	do.	1 1 0	—
Do. do. wire cuts ...	do.	1 5 0	—
Do. do. pressed fac- ings ...	do.	1 17 6	—
Coke Breeze, into carts at gasworks ...	per load	0 2 0	—
Do. d/d to job ...	do.	0 4 0	—
Castor Oil, French ...	per cwt.	1 1 10	1 2 0
Colza Oil, English ...	do.	1 5 3	—
Copperas ...	per ton	2 0 0	—
Lard Oil ...	per cwt.	2 15 0	2 17 0
Lead, white, ground, car- bonate ...	per ton	16 0 0	—
Do. red ...	do.	15 0 0	0 19 0
Linseed Oil, barrels ...	per cwt.	1 0 6	—
Petroleum, American ...	per gal.	0 0 6	0 0 6½
Do. Russian ...	do.	0 0 5½	0 0 5½
Pitch ...	per barrel	0 8 0	—
Shellac, orange ...	per cwt.	9 10 0	9 11 0
Soda, crystals ...	per ton	3 2 6	3 5 0
Tallow, Town ...	per cwt.	1 6 9	1 7 0
Tar, Stockholm ...	per barrel	1 5 0	—
Turpentine ...	per cwt.	2 7 0	—

METALS.

Standard Copper ...	per ton	80 0 0	80 5 0
Do. Strong sheets ...	do.	92 10 0	93 0 0

	£ s. d.	£ s. d.
Lead, Soft Foreign ...	per ton	15 10 0
Do. English ...	do.	15 10 0
Do. pipes ...	do.	18 15 0
Do. sheets ...	do.	18 5 0
Galvanised Corrugated sheets ...	do.	12 7 6
Spelter G.M. ...	do.	24 0 0
Angles, Scotland ...	do.	6 15 0
Bars, do. ...	do.	7 15 0
Marked bars, Staffs ...	do.	9 0 0
Common bars, do. ...	do.	7 5 0
Angles, M'boro. ...	do.	6 10 0
Joists do. ...	do.	6 5 0
Angles, Midlands ...	do.	6 15 0
Joists do. ...	do.	7 0 0
Girder plates, Midlands ...	do.	7 15 0
Angles, Foreign, c.i.f. ...	do.	6 2 6
Tees do. do. do. ...	do.	6 5 0
Joists do. do. do. ...	do.	5 10 0
Channels do. do. do. ...	do.	5 12 6
Nails, Wire ...	do.	9 0 0
Tin, Foreign ...	do.	164 5 0
Do. English ingots ...	do.	165 0 0
Zinc, sheets, Silesian ...	do.	27 5 0
Do. do. Vielle Montaigne ...	do.	27 10 0

TIMBER.

Soft Woods.

Fir, Dantzic and Memel	per load	2 15 0	5 0 0
Pine, Quebec, Yellow ...	do.	4 2 6	7 10 0
Do. Pitch, American ...	do.	2 19 0	5 0 0
Laths, log, Dantzic ...	per cu. fath.	4 0 0	6 0 0
Deals, Råfö, Yellow ...	per std.	16 0 0	—
Do. do. do. 2nd, 4x9 ...	do.	13 10 0	—
Do. Archangel, White, ...	do.	11 15 0	12 0 0
Do. do. do. 1st, 3x9 ...	do.	12 15 0	—
Do. do. do. 2nd, 3x11 ...	do.	12 5 0	—
Do. do. do. 2nd, 3x9 ...	do.	10 15 0	—
Do. do. Yellow, 1st, ...	do.	14 15 0	—
Do. do. do. 2nd, 2½x7 ...	do.	12 10 0	—
Do. do. do. 3rd, 2½x7 ...	do.	9 10 0	—
Do. Kem Yellow, 1st, ...	do.	18 10 0	—
Do. do. do. 2nd, 3x9 ...	do.	16 0 0	—
Do. Ingrampont, Yel- low, Unsorted, ...	do.	6 5 0	—
Do. Quebec, Bright, Pine, 3rd, 3x10 ...	do.	10 10 0	—
Do. do. do. 3rd, 3x7 ...	do.	9 10 0	—
Do. Montreal, Red Pine, 2nd, 3x9 ...	do.	10 15 0	—
Battens, Gefle, Yellow, 3rd, 1½x9 ...	do.	10 0 0	—
Do. do. do. 3rd, 1½x8 ...	do.	7 15 0	—
Do. do. do. 3rd, 1x11 ...	do.	10 10 0	—
Do. do. do. 3rd, 1x9 ...	do.	9 15 0	—
Do. do. do. 3rd, 1x8 ...	do.	8 5 0	—
Do. do. do. 3x8 ...	do.	9 0 0	—
Do. Hommelvik, Yel- low, Unsorted, 2x4½ ...	do.	11 5 0	—
Do. Lovisa, Yellow, Unsorted, 2x4 ...	do.	8 15 0	—
Do. Christianssand, Yellow, Unsorted, 2x4 ...	do.	8 5 0	—
Do. Skelleftea, Yellow, Unsorted, 1½x7 ...	do.	10 0 0	—
Do. do. do. 1½x7 ...	do.	9 10 0	—
Do. Gamleby, Yellow, Unsorted, 1x6 ...	do.	8 5 0	—
Do. do. do. 1x5 ...	do.	7 10 0	—
Do. Archangel, Yellow, Unsorted, 3x4½ ...	do.	8 5 0	—
Do. Skutskar, Yellow, Mixed Qualities, 1½x9 ...	do.	8 15 0	—
Do. Ingrampont, White, Unsorted, 2x3 ...	do.	8 0 0	—
Do. Quebec, Bright Pine, 3x6 ...	do.	9 5 0	9 10 0
Do. do. do. 3x5 ...	per cwt.	9 0 0	—
Flooring Boards, Fred- riksstad, Yellow, 3rd, 1x7 ...	per square	0 8 9	—
Do. do. do. Mixed, 1x5 ...	do.	0 7 9	—
Do. do. do. do. 1x4½ ...	do.	0 7 3	—
Do. Gefle, Yellow, 3rd, 1x7 ...	do.	0 9 6	—
Do. do. do. do. 3rd, 1x7 ...	do.	0 9 3	—
Do. Skutskar, Yellow, Mixed Qualities, 1x7 ...	do.	0 8 6	—
Do. do. do. do. 1x6½ ...	do.	0 8 3	—
Do. do. do. do. 1x6 ...	do.	0 8 3	—
Do. do. do. do. 1x5½ ...	do.	0 8 0	—

HARD WOODS.

	£ s. d.	£ s. d.
Ash, Quebec ...	per load	4 0 0
Birch, New Brunswick ...	do.	2 7 6
Do. Quebec do. ...	do.	2 12 6
Box, Turkey ...	per ton	7 0 0
Cedar, Cuba ...	per ft. sup.	0 0 3
Do. Honduras ...	do.	0 0 3
Do. Tobasco ...	do.	0 0 3
Do. Brazilian ...	do.	0 0 3
Do. Quebec ...	per load	4 5 0
Elm, plank ...	per ft. cu.	0 2 6
Jarrah, plank ...	do.	0 3 0
Mahogany, Average Price for Cargo, Houduras ...	per ft. sup.	0 0 4½
Do. Tobasco ...	do.	0 0 5½
Do. Cuba ...	do.	0 0 11½
Do. African ...	do.	0 0 3½
Do. Lagos ...	do.	0 0 3½
Oak, Wainscot ...	per log.	3 15 0
Teak, Indian, logs ...	per load	10 0 0
Do. do. planks ...	do.	13 0 0

Coming Events.

Wednesday, March 14.

QUANTITY SURVEYORS' ASSOCIATION. — Annu-
al Dinner, Criterion Restaurant.

EDINBURGH ARCHITECTURAL ASSOCIATION. — Mr.
J. G. Gillespie on "A Study of the English Renais-
sance," at 8 p.m. (Associates' Paper.)

ASSOCIATION OF ENGINEERS-IN-CHARGE. — Mr. Gt
Bibby on "Ventilation of Public Buildings," at
8 p.m.

INSTITUTION OF CIVIL ENGINEERS. — Students' Visit
to Charing Cross Railway Station. Assemble at
station at 2.30.

Thursday, March 15.

BIRMINGHAM BUILDERS' EXCHANGE. — Mr. Peter B.
Ball on "Talks on Canadian Cities," at 6 p.m.

SOCIETY OF ARCHITECTS. — Mr. F. S. Strange on
"The Painted Rood Screens of East Anglia," at 8 p.m.

CHEMICAL SOCIETY. — Ordinary Meeting at 8.30 p.m.

WORKSHIPPFUL COMPANY OF CARPENTERS. — Mr. E.
Guy Dawber on "The Yeoman's House in England,"
at 8 p.m.

Friday, March 16.

BIRMINGHAM ARCHITECTURAL ASSOCIATION. —
General Meeting at 8 p.m.

INSTITUTION OF MECHANICAL ENGINEERS. —
Ordinary Meeting at 8 p.m.

Saturday, March 17.

ST. BATHOLOMEW-THE-GREAT, WEST SMITH-
FIELD. — Lecture on the History and Architecture of
the Church.

THE SIR JOHN CASS TECHNICAL INSTITUTE. — Fifth
Annual Students' Soirée, at 7 p.m.

Monday, March 19.

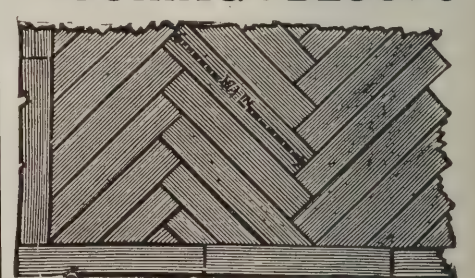
ROYAL INSTITUTE OF BRITISH ARCHITECTS. —
Mr. Sydney Perks on "Flats," at 8 p.m.

Tuesday, March 20.

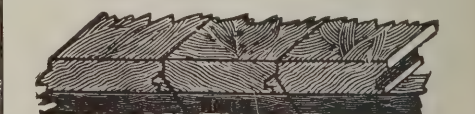
ARCHITECTURAL ASSOCIATION OF IRELAND. — Meet-
ing at 8 p.m.

ARCHITECTURAL ASSOCIATION CAMERA AND
CYCLING CLUB. — Demonstration on "Lantern Slides,"
at 7.30 p.m.

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17½ x 3 x 2	8 3	7 9	11 5
17½ x 3 x 1½	6 9	6 3	9 3



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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

March 14th, 1906.

FIRE SUPPLEMENT (MONTHLY).

THEATRE PROTECTION.

THEATRE safety, though probably one of the oldest problems dealt with under the head of fire-prevention, still occupies a most prominent position in the debates of the technical and fire-service societies of the world. Why this should be necessary we scarcely know, seeing that practically the whole of the problems of theatre protection have long been solved in this Metropolis, as also in Vienna and Berlin, and that it is scarcely possible to obtain any new results or new experiments excepting in the one direction of the fire-resistance of scenery. Ever since 1881, when the great Ring Theatre fire of Vienna shocked all civilized countries, the questions as to theatre safety have been thoroughly thrashed out. They have long been summarized, and we might say that final results were obtained about 1900, with the one exception of the scenery question just referred to. The time we think has now arrived when the different countries could combine to agree to certain standards of fire-protection applicable to the different classes of theatres and variety halls throughout Europe and the United States of America. The time for argument and suggestion has passed; the time for standardization has arrived. It would be well if the British Fire Prevention Committee who took the lead in standardizing questions as to the fire-resistance of materials would take this matter up of standardizing the primary measures of theatre safety by calling together a conference on the subject to finally set up the principles which could find universal adoption in all countries as being the minimum requirements necessary for the safety of the public and the artistes concerned.

The theatre is very much an international institution; theatre companies travel from one country to another, our own companies visiting the most distant colonies, and, for instance, French companies constantly being seen in Russia, Egypt, &c. The public that visits the theatres, too, is international in the extreme, and no visitor to any city can scarcely avoid spending some part of his evenings in the local playhouse. Thus, if any subject may be technically of international importance and of mutual interest to the inhabitants of all countries and to the artistes of all countries it is that of theatre safety, and the sooner standardization is achieved the better.

We have from time to time dealt with the question of the tests on matters of theatre safety which were conducted at Vienna with a model theatre. We now publish (on the next page) some very interesting drawings which have been prepared by Herr Seeling, of Berlin, indicating a section of a number of Continental theatres with the view of showing the space that is as a rule filled by smoke and noxious gases upon an outbreak of fire in the stage, which gases it is desirable should escape as rapidly as possible by ventilators or ducts in the roof over the stage; the sections also showing the relation of this space over the stage to the gallery seating with the unfortunate well room or dive that

is so frequently a feature of theatres, and places a part of the audience at a point to which the gases and smoke are easily drawn. These sections are all drawn on an identical scale in relation to the model theatre that was under test.

To all interested in questions of theatre safety and safety from fire in large assembly rooms these drawings should be of considerable interest, and we present them as a most valuable contribution on Herr Seeling's part towards demonstrating the absolute necessity of everywhere freeing such buildings from smoke and noxious gases in the event of a fire.

CONCRETE AS A FIRE-RESISTANT.

WE have from time to time dealt with the important question of the fire-resistance of different concrete aggregates. Although the official reports on the British Fire Prevention Committee's tests of last month have not yet been issued, it is an open secret that they have borne out to a most remarkable degree the experimental tests which were executed last autumn with various bays of concrete: two firms engaged in reinforced-concrete construction having adopted for their concrete aggregates very similar to those which had withstood the experimental test so well, and which as now applied on a larger scale have borne out the expectations in respect of them in a most remarkable manner.

On another page of this present supplement we give some notes regarding these tests of last month. These we would supplement by saying that the New Expanded Metal Co.'s reinforced concrete floor was a floor of brick aggregate with "Ferrocete" cement, and that the floor designed by Messrs. Skelton & Co. had a clinker-concrete for its bays and coke-breeze concrete for its girder coverings.

To all who have followed the tests which are being conducted by the Committee and those which are being undertaken by the Columbia University of New York, it must have been observable that the expanded metal results in London surpass those which were obtained in the United States, and we attribute this in the main to the more suitable aggregate and the better cement employed in the London test.

Regarding the floor designed by Messrs. Skelton & Co., it was practically identical with the one tested in August, 1905, by the Committee, but in that case Thames ballast concrete was used and failed lamentably, the coverings of the beams breaking away and some minor bays actually collapsing. With the concrete used last month the same design of floor withstood its test with little or no damage.

We can of course not deal with the tests at length until the official reports are issued, but only comment on such points as are common property. Thames ballast concrete will, we trust, soon be a thing of the past where fire-resistance is desired, although it will of course long remain in use where fire-resistance is of no interest.

TWO LONDON FIRES.

AS in our previous supplement, we again give particulars of some of the notable fires of the past few weeks with the view of demonstrating the extraordinary wreckage occasioned in buildings that are not adequately protected against fire, and we have selected as examples two fires—the one at the Oil Mills, Poplar, and the other at Messrs. Johnson & Phillips' premises at Old Charlton. The former of these fires took place on the 25th of February and the latter on the 26th.

The Poplar Oil Mill.

The Oil Mill fire broke out at 7.30 p.m. on Sunday evening, February 25th, on the property of the Cotton Seed Co., Ltd., Wharf Road, Cubitt Town, these premises being used as seed oil crushing mills and stores. The general arrangement of the property is best seen from the plan presented (see Fig. 4), the main buildings comprising each five floors and their frontage to the river being about 120ft., with a depth of about 150ft.

The fire broke out in the mill, and is supposed by some to have been caused by friction, but of course suppositions of this kind—unless supported by actual proof—cannot be relied upon.

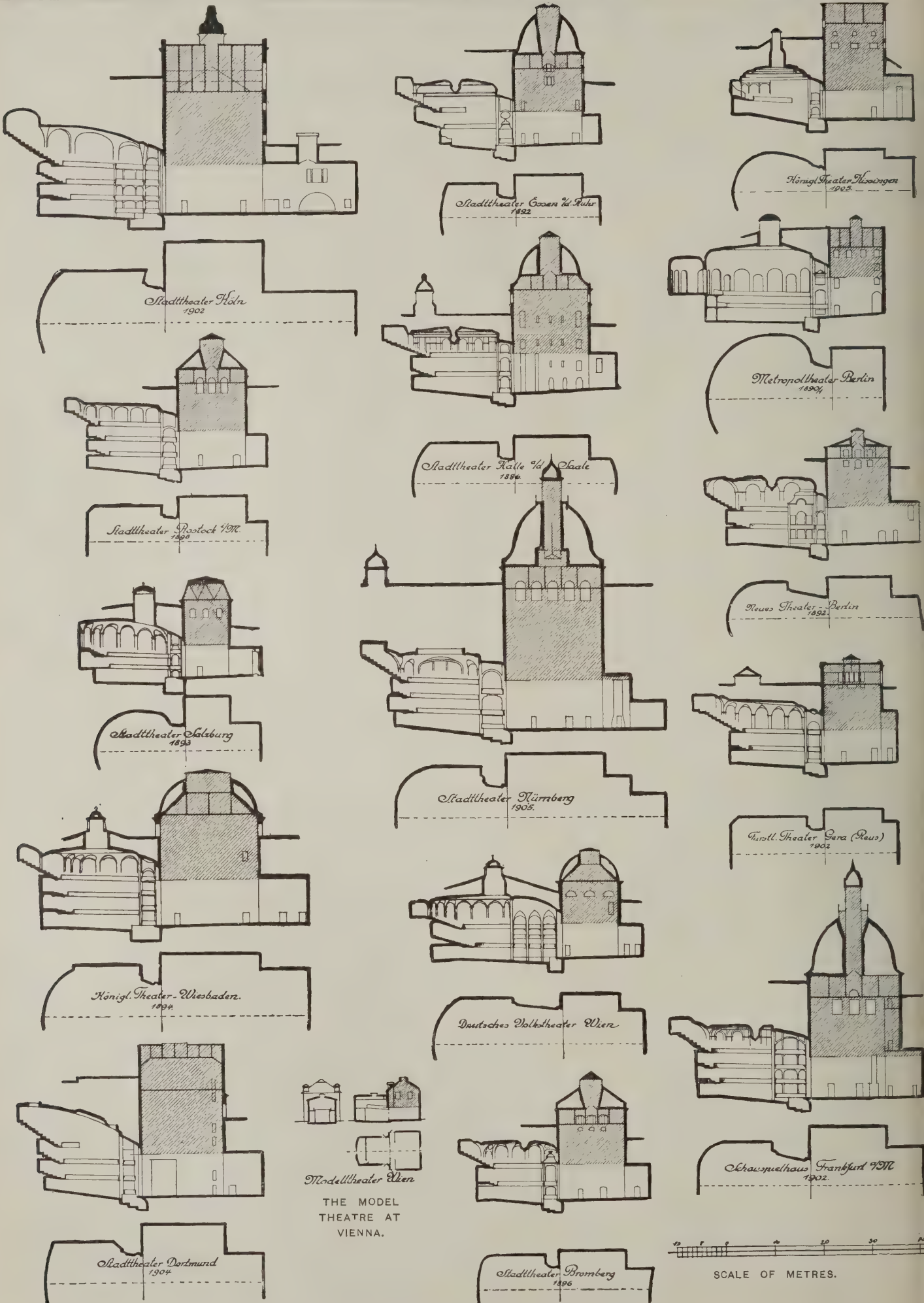
An early attempt was apparently made by the private firemen on the spot to cope with the fire, but it is reported that they did not take the precaution to immediately call in the fire brigade, and time was thus wasted. The result was that when the brigade arrived in force they found a fire of considerable severity, and they had to limit their efforts to prevent its spread to other property. The fire was attacked both from the land and the water side.

The total schedule of insurance on the property is upwards of £60,000, of which it is believed that Lloyd's had £51,000. Of the £60,000 apparently quite one-third had been lost.

From the technical point of view, the most interesting feature was that the cast-iron frames of the wrought-iron doors, which former were bolted to the walls, although remaining in position split in various places (see Fig. 4). The doors themselves, though of unusually heavy construction and fastened with heavy bolts, buckled. This all points to the absence of provision for expansion in the doors and frames. There were of course double sets of doors with lobbies between them, otherwise the flames would have passed into the adjoining block through the openings formed by the buckling of the doors on the fire side.

Further interesting points are to be found in the entire destruction of the steel supports and beams, as is to be expected where they are so unwisely left without suitable covering or protection. The views (Figs. 1, 2 and 3) taken from three points show quite a remarkable picture of the havoc wrought through the absence of primary structural safeguards. They should be an object-lesson to architects, and could also well be shown to clients.

Apart from the technical questions involved, we think this fire is again one of



THE ACCUMULATION OF SMOKE AND NOXIOUS GASES OVER THEATRE STAGES: DIAGRAM OF CONTINENTAL THEATRE SECTIONS. PREPARED BY HERR SEELING, ARCHITECT, BERLIN.

those instances where the present efficiency of the London Fire Brigade has once more shown itself in a most effective manner; the tactics employed in the operations certainly saving a vast amount of property, regardless of the fact that the brigade was hampered by what we would term "a late call."

Johnson & Phillips' Fire.

Turning to the fire at Messrs. Johnson & Phillips's Cable Works, the department affected by the fire was that of the cable covering section. These premises covered a large acreage, but the fire in question was limited to this particular workshop. Unsuited construction is again the cause of unnecessary havoc.

THE MILAN CONGRESS.

THE interest in fire-prevention in Latin-speaking countries has been somewhat in abeyance, but no doubt the impending International Fire Congress at Milan will assist matters materially. We understand that among questions under review at the Milan Conference will be the discussion of reinforced concrete as a fire-resistant, and that this all-important question is to be dealt with by Mr. James Sheppard, senior surveyor of the North British and Mercantile Insurance Co. Mr. Ellis Marsland has been entrusted with the question of protection to door- and window-openings, another subject which is to be dealt with at this congress. Subjects new to the conference will be the prevention of fire on railways and ships; and the protection of life in factories, warehouses and similar buildings. It is interesting to observe that in what some ten years ago would have been essentially a fire-service or fire-brigade congress no less than four out of ten subjects under review deal specially with questions of building construction.



Photo: Ars.

FIRE AT JOHNSON AND PHILLIPS'S ELECTRICAL WORKS, OLD CHARLTON, KENT.

FIRE-RESISTING CONSTRUCTION.*

By Alfred E. Corbett, A.R.I.B.A.

MY subject is far too wide to permit in one evening anything like an exhaustive summary, and I can only attempt to outline some of the main principles involved, with some notes on systems of flooring.

My notes will refer chiefly to ordinary town commercial buildings. Many such buildings, with their light joisted floors, matchboarded partitions, &c., seem to be built on purpose to burn easily, and the appalling speed with which fire races through them causes heavy financial loss and may easily cause loss of life. In every building architects should endeavour to avoid such flimsiness of structure and to provide at least some measure of temporary protection to give the occupants a chance of escape and the firemen a chance of quelling the outbreak.

Beyond this essential minimum the value of truly fire-resisting construction from a purely commercial point of view is somewhat open to debate. The cost will be greater, and it is very difficult to get an adequate return from the insurance companies in the shape of reduced premiums.

This attitude of the companies is probably in great measure due to the absolute failure of many so-called "fireproof" buildings in the past, and we may hope that, now the science is better understood, more recognition will be given to fire-resisting construction. I should mention as a step in the right direction the publication in July last by the Fire Offices Committee of two "Specifications for fire-resisting buildings." These can be had from the Fire Offices Committee, and are on the whole very well drawn up. It is stated that buildings erected in accordance with these specifications will be insured at reduced rates, but information cannot be obtained as to just how much reduction will be made.

The defect appears to be that the rules are not elastic enough for practical usefulness. The American systems of schedule rating offer much more encouragement to architects. In them a schedule is drawn up including all likely varieties of construction and detail, with so much per cent. deduction from or addition to the premiums for each variety.

This enables an architect to tell his client exactly how much return he will get for his outlay on any particular improvement.

Of course it is possible to spend money so that a building shall be practically secure from destruction by fire, and to recoup ourselves for the extra outlay by not insuring at all. This has been done in some cases, but would be deemed too speculative by most clients, especially as the combustible contents are always liable to be burnt, no matter how perfect the building, just as coal is burnt in a fireproof stove.

This purely business aspect of the subject—the question "Does it directly pay the individual owner, financially, to put up a really fire-resisting building?"—is perhaps the only weak link in an argument in favour of fire-resisting construction. Even on these grounds I believe it would pay in some cases, but I fear not in many at present.

There is, however, the important argument that a fire-resisting building ensures freedom from the interruption of business caused by a fire and consequent rebuilding. This alone is worth a considerable sum of money, though it appears somewhat intangible when compared to a reduction in insurance premiums. The apparent advantage of a fire in enabling an owner to rebuild on a more convenient plan is negated by the fact that the insurance agreement is only to reinstate, *i.e.*, to make the building as it was before the fire; and rebuilding on different lines can generally only be done by losing part of the insurance.

Looked at from a national point of view, there is an enormous waste of national wealth every year by fire. The insurance companies recoup the individual owner, but they only do so by spreading the loss over a great number of owners, and the cost of their management and profits is a heavy addition to the bill.

Statisticians estimate the loss by fire in the British Isles at 17 million pounds per annum, *i.e.*, the structural value of the Manchester Town Hall destroyed by fire every ten days. If to this actual loss we add the cost of sustaining the insurance companies, we find that the nation loses the value of the Manchester Town Hall every week; and this by fires the greater part of which could easily be prevented by proper construction.

A still more potent argument is the fearful danger of loss of life through fire, terrible examples of which keep occurring. This

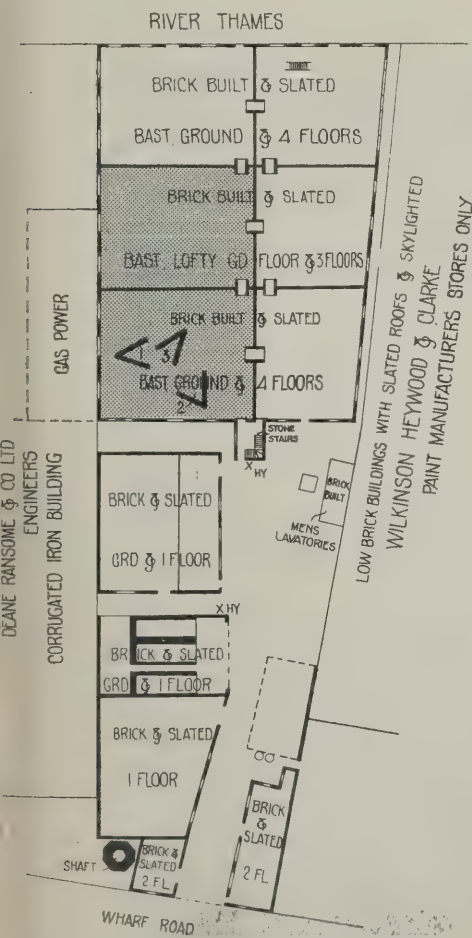


FIG. 5.—PLAN OF POPLAR OIL MILL FIRE.
(Angles 1, 2 and 3 show positions from which general views were photographed. Hatched portions indicate buildings gutted.)

* A paper read before the Manchester Society of Architects on February 8th, 1906.



FIG. 1.
THE EFFECT OF FIRE ON UNPROTECTED STANCHIONS AND BEAMS AT THE POPLAR OIL MILL FIRE.

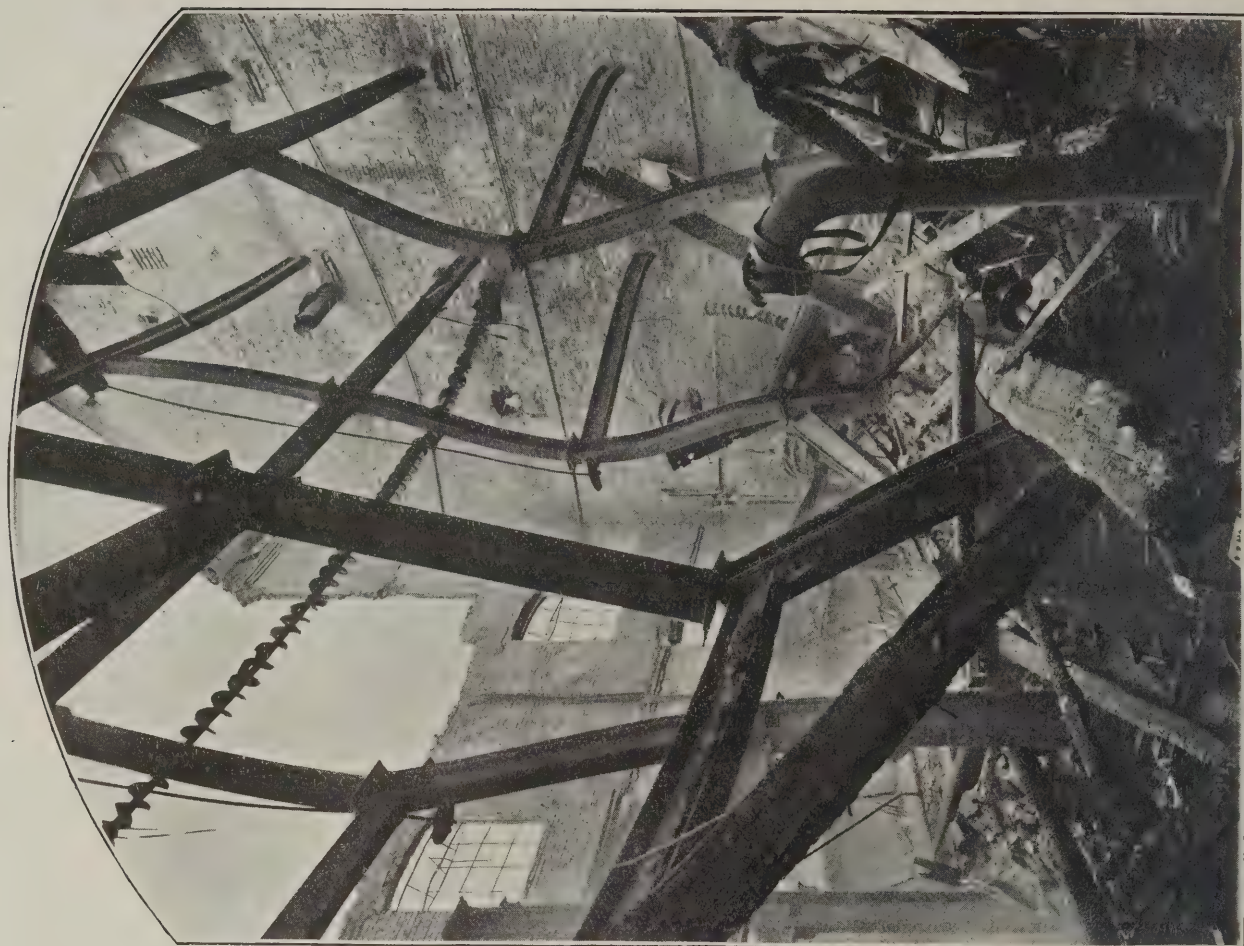


FIG. 2.
THE EFFECT OF FIRE ON UNPROTECTED STANCHIONS AND BEAMS AT THE POPLAR OIL MILL FIRE.

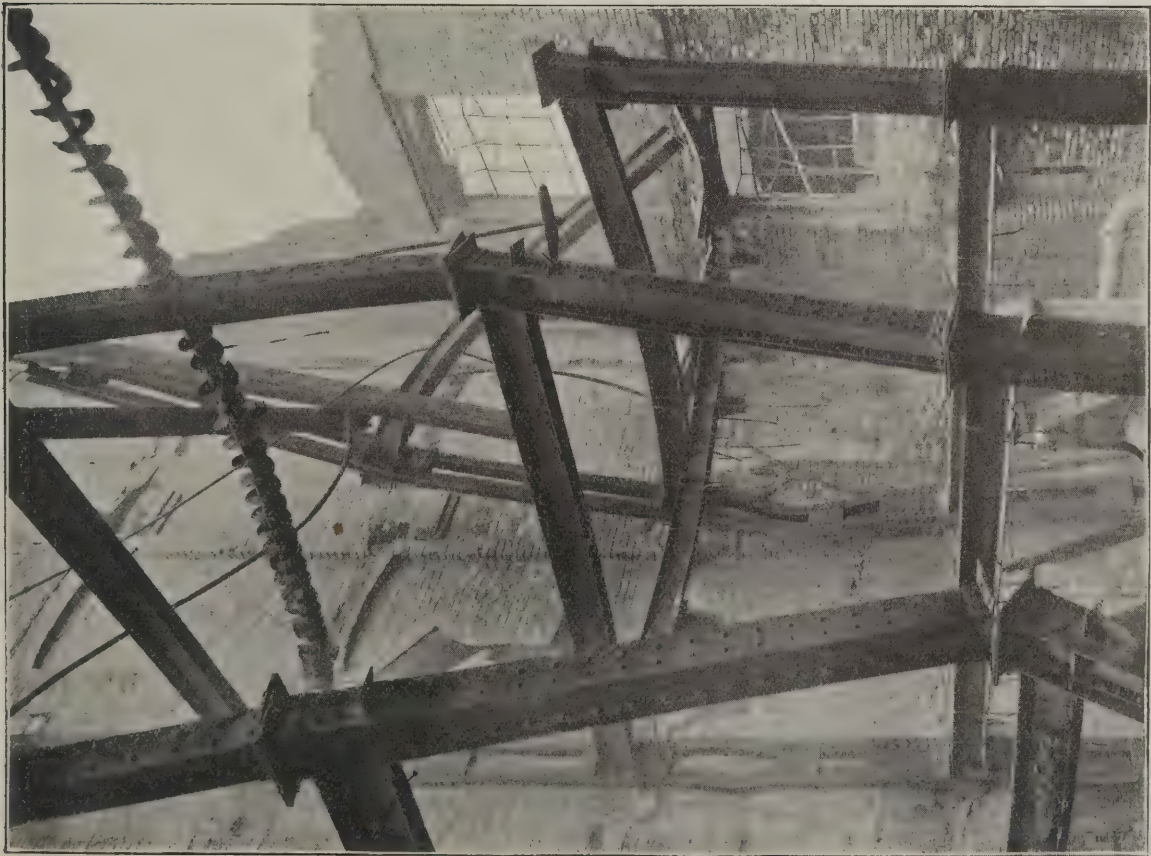
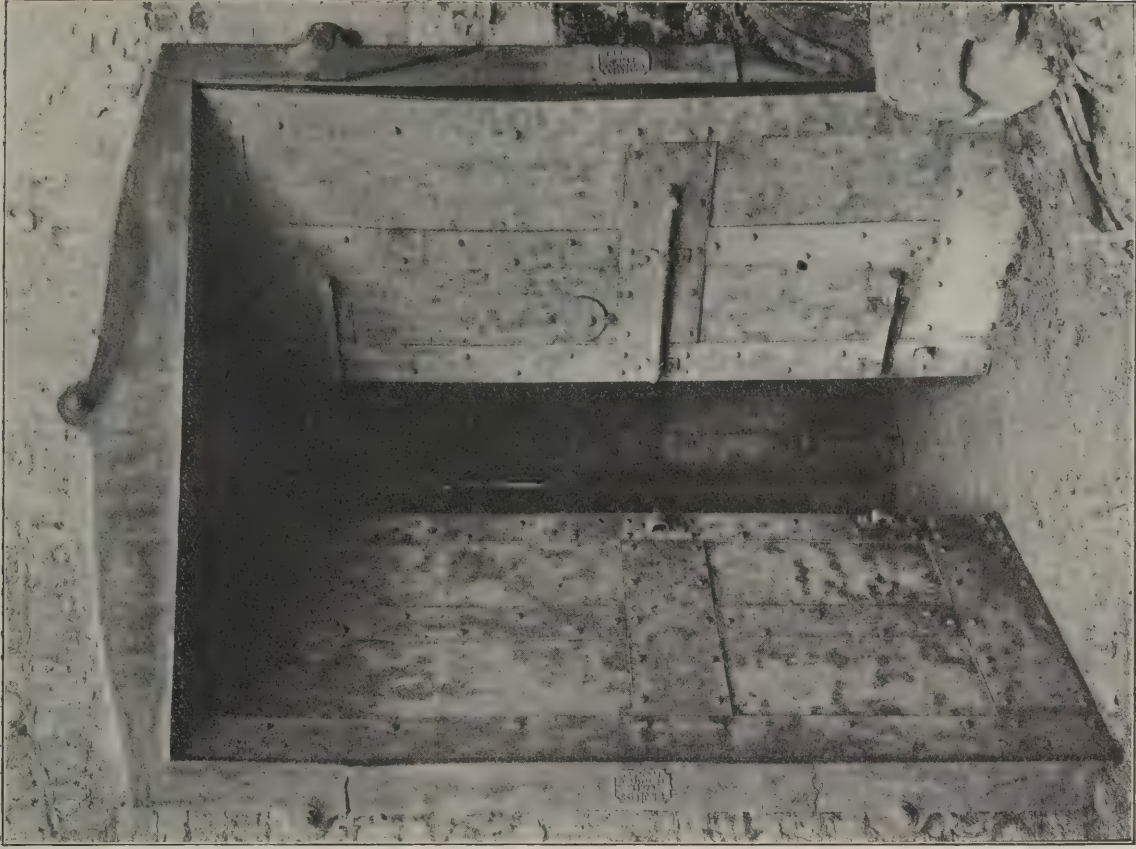


FIG. 3.—THE EFFECT OF FIRE ON UNPROTECTED STEELWORK.
(Note effect on the wall stanchions.)

VIEWS AT THE POPLAR OIL MILL FIRE.



Photos: A.T.S.

FIG. 4.—A PAIR OF WROUGHT-IRON DOORS IN CAST-IRON FRAMES.
(Note buckling of doors and breakage of frames.)

alone should induce architects and owners to make every effort towards good construction, and, taken with the other arguments, makes a conclusive case in favour of fire-resisting construction.

A Fire-resisting Staircase the First Essential.

Taking the safety of human life as the first essential, the staircase is the one thing that must be fire-resisting in any reasonably-constructed City building. The material should be concrete reinforced with steel; or it may be some kind of hardwood used in large sizes. The very worst material to use is stone. The portion of a stone step exposed to the heat of a fire expands, while the ends, embedded in the walls, retain their original size; the natural consequence being a fracture near the wall. The application of water hastens the effect.

I may quote a Scotch fire-brigade officer's account of a fire in a building, where "two flights of unprotected and lightly constructed wooden stairs" were "joined by a stone landing 5ft. square and 5ins. thick. After the fire both wooden stairs were much damaged, but admitted the passage of the firemen; the stone landing had collapsed into a thousand fragments!"

Other cases might be cited showing that even a comparatively light wooden stair is better than a stone one, and a heavy wooden stair is much better, being little inferior to a good concrete stair.

To Limit the Spread of Fire.

Having considered this elementary precaution against loss of life, the point of next importance is to limit the spread of fire through the combustible contents of the building.

In London there is a legal limit of 250,000 cub. ft. as the extent of a warehouse. In Manchester and Salford there is no limit under the by-laws, but the insurance companies' tariff charges extra premiums for any Manchester warehouse over 300,000 cub. ft. in extent.

If a fire could rage unchecked through 300,000 cub. ft. of warehouse it would be very likely to get beyond the control of the fire brigade, and sub-division into smaller "risks" is very desirable.

This should be done by using fire-resisting floors throughout; but even in buildings of ordinary construction the need for sub-division exists, and after the great Cripple-gate fire of 1897 most of the new buildings erected on this site were given at least two fire-resisting floors—one over the ground floor and one over the second or third floor—thus cutting the building up horizontally into three risks instead of one.

Open Wells a Danger.

Many buildings are divided horizontally by fire-resisting floors, but have the value of the division very nearly destroyed by leaving the stair and lift wells open, forming possible furnace shafts right up the building.

It is essential to real protection that these wells should be enclosed, preferably by brick walls, and that all openings into them should have close-fitting fire-resisting doors. Wooden doors covered with tinned sheet steel are frequently used for this purpose. The British Fire Prevention Committee has tested some of these doors, giving the better results of the two kinds tested. It is very important that the doors should not twist, to prevent the passage of what is known as a "fire-haze"—i.e., an exceedingly hot vapour produced by the fire, which will burst into flame as soon as it reaches the fresh air, and may get past a twisted door and carry the fire into an upper storey of the building.

To be even more secure against spread of fire up staircase wells many American and some Continental warehouses or factories have

stairs enclosed in brick towers outside the buildings, approached on each floor level by short open galleries. This is an excellent plan where practicable, as it leaves the floors unbroken by any openings.

The enclosing walls of a staircase well must be carried up through the roof, and the roof of the well should consist of light iron framing supporting ordinary thin glass. This use of thin glass has been much debated, but is now generally agreed to be the best treatment. The object is automatic ventilation of the enclosed well in case of fire. Any hot vapour or smoke ascending the well would break the thin glass almost immediately, and would then escape freely into the open air, with no tendency to force its way through chinks of doors into other floors and so spread the fire.

How Windows Spread Fire.

Even though the floors be fire-resisting and the stair wells properly enclosed there is still a possibility of fire spreading from a lower to an upper floor by means of the windows, especially where they face an enclosed court or well, which acts as a chimney and forces the flames against the upper windows.

There is still greater danger from ordinary windows, i.e., the "exposure hazard." When a hot fire occurs in a building facing a narrow street or area the glass windows in any opposite building will soon begin to crack and the woodwork to smoke, and very shortly the second building is on fire.

This exposure hazard is commonly ignored, but its importance can hardly be over-emphasized. It is most illogical to spend a considerable sum of money in making a building fire-resisting, and to take no precautions whatever against fire entering your building by the windows and destroying its contents.

How to Protect Windows.

The best window protection is the use of steel roller shutter doors or tinned wooden shutters, made like the tinned wooden doors before mentioned. It is advisable either to have the shutters fitted to close automatically, or else to have gear for closing them simultaneously.

When the window frames, &c., are incombustible the shutters should be outside, to save them from damage.

When wooden frames are used the shutters should be inside, as if they were outside there would be a possibility of the sashes igniting by the heat of the shutter and admitting the fire.

Next after shutters the best protection is the use of fire-resisting glass in the windows,

and this has the great advantage of always being in position, whereas shutters may sometimes be left open through carelessness or accident.

The principal kinds are Pilkington's wired-glass and Luxfer prisms, and I have prepared a rough table summarizing the British Fire Prevention Committee's tests in this direction.

No glass can be expected to stand in large areas, and the limit of size should be 4 sq. ft.

A point in which fire-resisting glass is inferior to shutters is that it does not stop radiant heat, so that it is possible for a hot neighbouring fire to radiate heat through the glass and ignite the goods inside without in any way breaking the glass.

Another useful check against the exposure hazard is the use of external sprinklers or "drenchers," which may be made to work either automatically like ordinary sprinklers or by a valve worked from the pavement.

Slow-burning Construction.

Turning now to the construction of floors. &c., we may note the claims of what is known as "slow-burning construction" or "American mill construction," i.e., brick walls, heavy wooden posts and beams, and heavy plank floors, which are generally finished with a thinner upper surface of hardwood.

Although ordinary light wooden joists and thin floor-boards are about as inflammable a construction as it is possible to find, if we take a somewhat larger quantity of wood and concentrate it into beams and planks of heavy scantlings we shall find that even an intensely hot fire will only destroy it very slowly, and that it can be relied on to carry its load more safely than any unprotected steelwork or even than many structures laying claim to be considered fireproof.

Favourable Testimony.

There is nothing new about this system, and as evidence in support of it I will read part of a letter written to the "Times" thirty years ago by the Chief of the Metropolitan Fire Brigade (Sir Eyre Massey Shaw) concerning the behaviour of some 12in. square pitch-pine posts which were tested in a very severe warehouse fire and afterwards by a further fire test. He concluded that "a massive storey post of even the most inflammable wood is absolutely and perfectly proof against any heat which can be applied to it, will not of itself burn at all, but requires a continual supply of highly inflammable substance to keep it burning, and when this supply is withdrawn ceases to burn, and lastly, after being exposed for seven hours to flames of very great intensity,

SUMMARY OF BRITISH FIRE PREVENTION COMMITTEE'S GLAZING TESTS.*

Red Book.		Number and size of lights.	Duration unbroken.	Maximum temperature.	Note.
			Minutes.	Degs. F.	
95	Pilkington's wired glass	5, each 2ft. 3ins. by 4ft. 6ins.	45, unbroken	1,500	Bulged 1½ins. Water made two small irregular holes.
97	Pilkington's wired glass skylights.	4, each 2ft. by 2ft.	45, unbroken	1,660	Bulged, but not displaced.
91	Luxfer prism casements, 4in. squares and diamonds, &c.	2ft. by 2ft.	45, unbroken	1,520	Bulged ¾in. No glass displaced.
29	Luxfer prism casements, 4in. squares.	3, each 3ft. by 4ft.	35, fell in	1,660	One remained in position, except for 14 squares.
20	Luxfer prism casements, 4in. squares.	3, each 3ft. by 4ft.	21, flames through.	1,500	In position for 30 minutes, but buckled zins. Seven prisms broken.
31	Pilkington's wired glass casements.	3, each 2ft. 10ins. by 4ft.	30, flames through.	1,760	Glass unbroken for 45 minutes, but doubled up.
32	Pilkington's wired glass skylights.	2, each 2ft. 6ins. by 4ft. 7ins.	30, unbroken	1,650	Bulged zins.
30	Luxfer prism skylights 4in. squares.	5, each 1ft. 8ins. by 3ft.	21 to 30, fell in	1,290	One remained 30 minutes unbroken.
33	¾in. plate glass - - -	3ft. by 4ft.	12, broken	1,220	—
33	Leaded lights, 4in. squares -	3ft. by 4ft.	7, broken	1,050	—
33	32 oz. sheet glass - -	3ft. by 4ft.	6, broken	1,030	—

* This summary is the author's, and not the Committee's official summary of tests, which is to be shortly issued. Different makes and thicknesses of glazing were under test.

† These three tests resulted in classification as affording "temporary protection" against fire.—Ed. B.J.]

is not injured to a greater depth than about 2 ins. from the original outer surface, and still shows a centre as clean and fresh as when it was first put in."

This he considered to be "strong practical testimony in favour of massive timber for the internal supports of heavily loaded buildings." There is much more recent evidence to the same effect.

Other authorities object to the system on several grounds. Firstly, and I think with most reason, on account of the danger of dry-rot. To guard against this many precautions should be taken to which I have no time to refer, but even with the greatest care and the most efficient ventilation it is difficult to be absolutely secure against rot.

Then there is the dense smoke sometimes given off by burning timber, which may suffocate the occupants before they can escape.

Lastly, I may quote from a recent lecture to the Royal Institute of British Architects by Mr. Gibson, of New York:—

"It takes longer to impair the strength of floors and pillars of this kind than it does those of unprotected iron. Yet very large conflagrations have proved that after all it is only a question of a limit to be passed when the massiveness of the timber becomes a horrible addition to the quantity of fuel. It may be safely asserted that the days of slow-burning wooden constructions are numbered so far as concerns large cities."

The question of heavy wood *versus* protected steel is still an open one. I believe that the former is the better in some cases, though not in all, and it is important to know the best kind of timber to use.

Tests on Solid Timber.

There are several British Fire Prevention Committee tests to refer to. Red Books Nos. 73 and 18 refer to fir timber, and show that a severe fire for two hours destroyed the surfaces of beams, &c., to an average depth of 2 ins. Nos. 71 and 79 refer to the Australian hardwoods, jarrah and karri, and show that a still more severe fire for two hours only destroyed the surfaces to a depth of 1 in., as compared to 2 ins. for the fir timber, conclusively proving the superiority of the Australian woods.

There are also about twenty tests of solid doors of various woods. Comparing the results of all these tests we find that jarrah is very slightly better than karri, and that the two are much in advance of any other timber tested. The others in order of merit are oak, teak, deal and pitch-pine.

What is Fire-resisting Construction?

Fire-resisting construction, as distinguished from slow-burning construction, implies the absolute disuse of combustible material and the thorough protection of such materials as iron and steel, which, although incombustible, are far from being fire-resisting.

As the disastrous effects of fire on unprotected iron or steel are so well known, I only need say that for use in any fire-resisting building these materials should always be protected adequately.

Of fire-resisting materials undoubtedly the best for building purposes is good common brickwork set in lime-mortar.

Almost equally efficient is the best concrete, but various kinds of concrete differ greatly in fire-resisting value. Broken stone or ballast concretes are the worst for fire-resistance. The aggregate should be a substance which has already passed through fire, and many experiments and results of actual fires indicate that coke-breeze is the safest aggregate to use. Coke-breeze concrete is not so strong in the first instance as most other kinds, but tests have shown that after the application of a severe fire test to several kinds of concrete the coke-breeze concrete suffered so little comparatively as to be actually the strongest after the test.



FIRE AT BYERDEN MILL, BURNLEY.

Red Book No. 16 affords confirmatory evidence, and Red Book No. 101 describes an interesting test carried out last October on concrete with seven different kinds of aggregate.

This test does not finally settle the matter, and the Committee hopes to undertake further similar tests,* but as far as the results go they indicate that coke-breeze is the best aggregate, it having been the only slab which remained flat and free from cracks throughout the severe three hours' test.

All the other slabs cracked more or less except the burnt-ballast concrete (*i.e.*, with burnt clay as the aggregate), and as the water jet at the end of test washed off about 3 ins. of the surface of this concrete it was hardly satisfactory.

The other aggregates, in order of merit, as nearly as one can tell from this test, were furnace slag, broken brick, furnace clinker, broken granite, and, much the worst, Thames ballast.

What is Coke-breeze?

A point of the greatest importance is the definition of what "coke-breeze" really is.

In a gasworks small coal is put into a number of closed retorts; these are heated by a furnace, the gas is driven off from the coal, and ordinary coke is the result.

The smaller lumps and dust of this coke are usually considered to be coke-breeze fit for making concrete, but this is quite wrong, as the small coke is combustible and will burn out from the concrete.

When the retorts are emptied a small proportion of the coke is transferred to the furnace beneath them to provide fuel for heating the retorts. After being thoroughly burned in this furnace it drops through the bars into the ash pan, and is, therefore, sometimes called "pan-breeze." It is this material which should be used for concrete.

Major Winn, R.E., defines coke-breeze as "the incombustible residue of coke fires," while the new Building Act of Chicago defines coke-breeze as "cinders from steam boilers." There is probably no appreciable difference between the two, but there is a very obvious difference between this burnt material, whether from coke or coal fires, and the unburnt coke commonly used.

The United States engineer's official report on lessons from the Baltimore fire says:—

"On the whole cinder concrete is safe only when subject to the most rigid and intelligent supervision; when made properly, of proper materials, however, it is doubtful whether even brickwork is much superior to it in fire-resisting qualities, and nothing is superior to it in lightness, other things being equal."

The other material chiefly used for protecting steelwork is terra-cotta, which may be either porous, semi-porous or hard burnt,

* Several additional tests have already taken place.
—ED. B.J.

though hard-burnt terra-cotta is much the least efficient of the three.

Time will not allow consideration of other materials employed.

American Floor Systems.

Before discussing any British system of flooring it may be well to glance at some American work, intended to be fire-resisting, which failed in the great Baltimore fire of 1904. The usual type has steel joists about 5 ft. apart supporting flat arches of hollow hard terra-cotta. The soffits of the steel joists are protected in many cases by clipping a terra-cotta slab under them with metal clips, which generally proved to be the weakest point of the protection. The steel columns are surrounded by hollow slabs 3 ins. or 4 ins. thick. In many buildings the lower webs dropped off throughout the building, exposing the steelwork and ruining the strength of floor. In cases where the webs were thicker less damage was done. To again quote the United States engineer's report: "The trouble with the hollow terra-cotta tiles, as commercially applied, is that they have been skinned down to a minimum thickness; the webs are rarely more than $\frac{3}{8}$ in. thick. When exposed to the fire these soon get red hot; the rest of the tile, being surrounded by dead air-spaces, remains cool; the change in temperature near the junction of exposed and non-exposed webs is so rapid that stresses are set up exceeding the strength of the material and the exposed web drops off. If it does not, do this under the heat alone, a stream of water from the nozzle of a fire hose quickly brings about the same result. If the material in the webs were made thicker, so that entire variations in temperature would occur within the thickness of the exposed web, these stresses would not exist, and a steel frame so covered would be able to resist many fires with no loss to itself worthy of note." He advises $1\frac{1}{2}$ ins. of porous terra-cotta as the minimum.

In all these Baltimore examples the weakest point was the soffit protection of the joists. Where metal clips were used for fastening the protecting slab they always gave way and exposed the joists.

(To be concluded.)

A MILL FIRE.

BYERDEN MILL (also called Lodge Mill), Burnley, was destroyed by fire at the end of last October. It was built about forty years ago. It has been suggested that the fire was caused by sparks emitted from a railway engine, the line immediately adjoining mill. All the interior of the mill was wood except pillars. The whole of the interior was burnt out, and the remains were in such a tangle that the scrappers used dynamite to get into it. The dangerous masonry was similarly gutted. The mill is to be rebuilt for a weaving shed for 750 looms.

FIRE TESTS.**"Kulm" Ceilings.**

WE are presenting in the current issue an illustration taken from Report No. 105 of the British Fire Prevention Committee's publications, illustrating a ceiling constructed of "Kulm" pumice slabs applied below an ordinary wood joist floor with a view of affording temporary protection against fire.

We have in a previous supplement mentioned this test, but we would specially call attention to the illustration as showing that neither fire nor water passed through this ceiling in the course of a test of forty-five minutes' duration in which the fire attained a temperature of over 1,500 degs. Fahr., and which fire test was followed by the application of water from a steam fire engine for a period of two minutes.

The summary of the report states that the ceiling was found to be intact, and there was no charring or scorching of the woodwork; there was no sagging of the ceiling and the latter remained tightly fixed to the underside of the joists.

The application of this ceiling merits attention as a simple matter in protecting an ordinary wood joist floor against fire. In the current Building Act Amendment Act owners of projecting shops are apparently permitted to fill in between the joists with a dry concrete slab, and nothing is said

about jointing up these slabs or making the job a really sound one. Surely it would have been much better and simpler to provide some application of a ceiling to the underside of the joists of this description. The mere filling-in of loose blocks allows smoke and flame to easily get through and to crawl up on either side of the wood joists. How the application of such dry blocks ever came to be specified as according fire-resistance is indeed a matter of wonderment to all who really understand what happens at fires. No doubt in the many re-amendments and alterations the Act had to pass through, the dry block with its possible open spaces crept in unawares.

A Further Series of Tests.

A further series of important fire tests were completed the week before last, their investigations terminating late on Saturday. There was a considerable attendance of members and visitors during the week, including the representatives of the various Government departments concerned. The tests as usual were conducted by sub-committees.

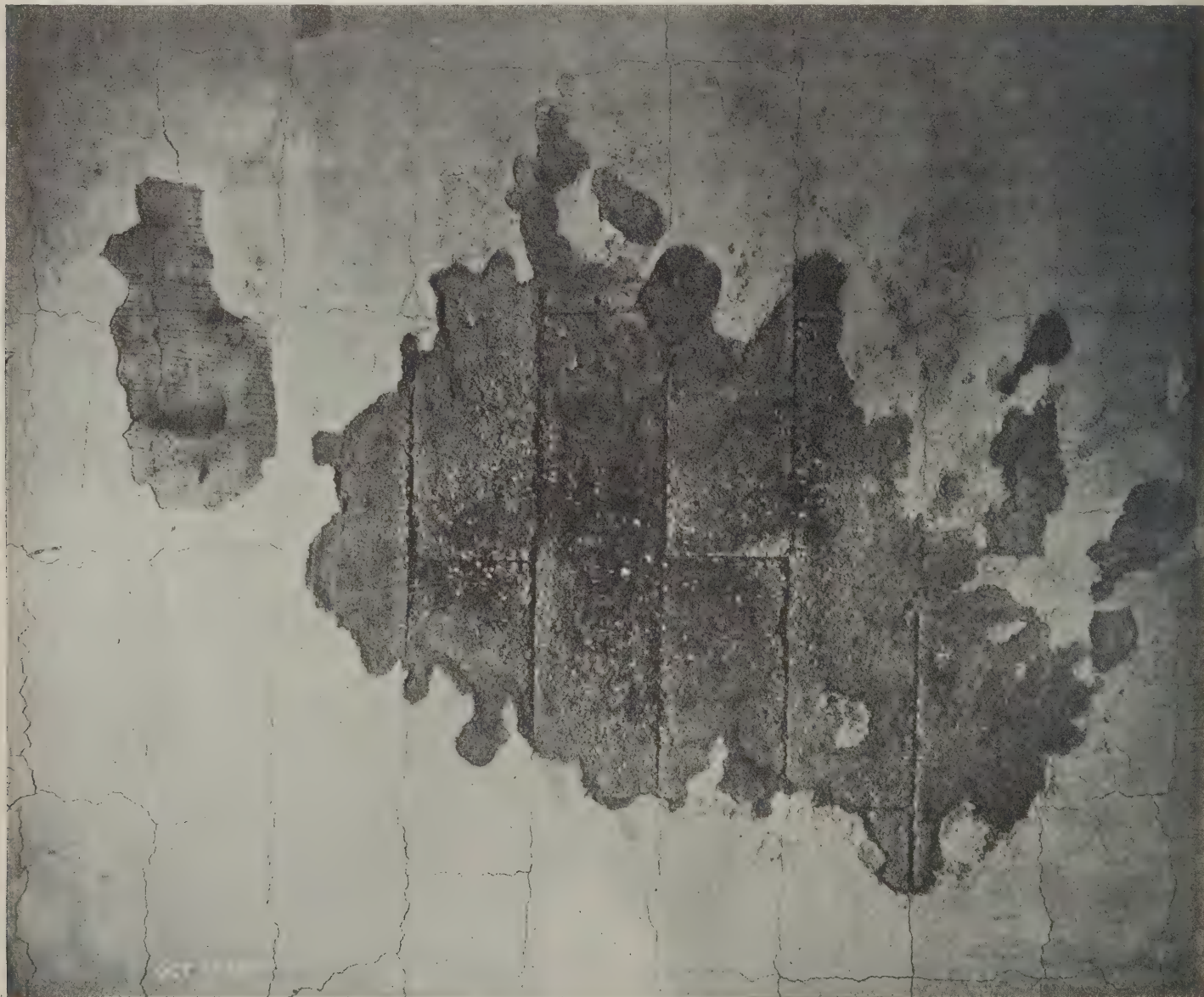
Reinforced Concrete Floors.

Two concrete floors were under test for the purpose of classification as affording "full protection" (class B) against fire, this necessitating a fire test of four hours at temperatures reaching between 1,800 degs. Fahr. and 2,000 degs. Fahr., followed by the

application of water from a steam fire engine for five minutes (two branches), the floors being loaded with $2\frac{1}{2}$ cwts. per ft. super. The one floor was of brick concrete reinforced with expanded metal supported by encased ordinary girders. The other floor was of clinker-concrete reinforced with small joists, supported by encased broad flange girders. In both "Ferrocete" cement was used and the period allowed for the setting and drying was almost the same. Both floors obtained classification as affording "full protection." By the last named floor test, among other matters, the superiority as a fire-resistant of clinker-concrete versus Thames ballast concrete was again proved, a floor of almost identical design of Thames ballast concrete having failed last autumn.

Roller Shutter Door.

Two fire tests with roller shutter (Kinnear type) were also completed—one with double shutters for a four hours' test, and one with single shutters for a two and a half hours' test, followed by the application of water. Both attained classification as fully protective (class B and class A respectively). Both were of thin steel plate under $\frac{1}{16}$ in. thick, and both had, prior to the final application of water, been subjected to streams of water fifty minutes before the conclusion of the tests, *i.e.*, had this additional test applied beyond what was necessary for classification.



VIEW OF UNDERSIDE OF "KULM" CEILING AFTER TEST.

THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

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Repetition in Architecture. THIS is a question of much interest. The architect must necessarily come under the same criticism as the painter, but there is this difference between them, that the conditions of the architect's problems are very often exactly similar to those of a previous building he has carried out; and, moreover, there is a tendency for architects to become restricted to one class of work, such as schools or workhouses or hospitals. It naturally follows that where the conditions are the same the results must be similar, except for the additional knowledge of details which the architect acquires in the actual execution of the several problems, resulting in a better solution than he achieved before. But very few buildings are the same in every particular. The clients have generally very different desires, or at least different ideals, and the latter are not beyond the conditions which the architect should endeavour to express and fulfil in the completed work. There is, however, a tendency on the part of the public to restrict the architect, like other artists, to the style with which he has made them familiar. We have several examples of well-known practitioners whose work is praised as distinctive, but on closer inspection it will generally be found that the distinction is traceable to the fact that they show little or no development from their original essay. Now, though it is much less reprehensible that a man should repeat a

style of which he may be regarded as the complete inventor, yet architecture is the result of the experience of the past, and a man seldom breaks away completely from tradition, unless it is in l'Art Nouveau or in the arts and crafts style—if we may so call it—a style which may be said to be based on an ignorance of precedent and the unbounded liberty of the individual to put forward the disordered fancies of his brain. For an artist to show such want of development betokens limited ability; and powerful as the influence of the public may be to restrict him to a style to which they have become accustomed, and so appreciate, he should strive always against it. We do not suggest that architects should do as some well-known members of the profession did twenty or thirty years ago, namely, leap nimbly from the copying and development of one particular phase of past architecture to another—Early English, Renaissance, Elizabethan or what not; but we think it would have been better for these architects to have taken as their starting-point one particular phase and to have developed it to fit modern conditions, and then gone on from that point to the evolution of a modern style.

A Colonial Example. It is refreshing to see the interest which is taken in America and abroad in the development of cities according to some scheme. San Francisco only a short time ago decided to spend £2,000,000 in the development of the city according to the plan of Mr. D. H. Burnham, the well-known American architect. The latest scheme we hear about comes, we are glad to say, from one of our own colonies. The Ontario Association of Architects some time ago appointed a committee to draw up a plan of improvements for Toronto, and it seems very probable that this plan will be adopted in great part by the Legislature, and the growth of the city thus forced to expand logically in accordance with some definite scheme. We have all seen the want of some such plan in our own towns, and we can appreciate how important it is to settle what land is to be purchased and laid out as parks and main thoroughfares while the land is yet purchasable at a reasonable figure. Toronto, it seems, is to be free of that defect in the future. Mr. W. A. Longton, the chairman of the plans committee, says: "When we leave Toronto, as the Scotchman leaves Edinburgh, can we look back to old Toronto as he looks back to 'Auld Reekie'? I am afraid not. The reason is that Edinburgh has character; it is called the modern Athens I suppose because of its hill. We have none of those natural advantages in Toronto; we have to make them. I do not say we have no advantages, but they are not of such a salient character that you cannot snow them under with cheap houses. There is not anything that we cannot spoil, in Toronto. But if we

will preserve it and make it a town of some character, then we shall feel when we come back as I heard a man on an ocean vessel say he felt in going back to Boston. He said he had seen nothing in his travels that he liked so well as the golden dome of the State House on Beacon Hill. That one can believe. Beacon Hill and Boston have something to which one can attach himself; something to make a man say, 'This is my town; I was born in Boston.' Oliver Wendell Holmes makes one of his characters say, 'I am a Boston boy.' That cannot be said of any town that has not got a strong and definite character. In Toronto that character must be made by planning."

Dominating Aldwych and Kingsway. THE London County Council have had some trouble to find speculators willing to utilize the most important part of the site in the Aldwych and Kingsway improvement scheme. We refer to the central portion of the arc bounded by Kingsway, with the Strand as a chord, and on the two sides by the soft approaches. This site dominates Kingsway and will be the largest block of buildings on the Strand frontage, so that it is important that there shall be no piecemeal treatment of it. There have been several schemes proposed, and the latest is that which was brought before yesterday's meeting of the London County Council, with the approval of the Finance Committee. This is for a lease of ninety-nine years at a ground rent of £55,000 a year. The site has frontages of about 636ft. to Aldwych, about 413ft. to the Strand, about 236ft. to the approach on the west side of the site, and about 231ft. to that on the east side. The proposal has been made by Mr. L. Wormser on behalf of a syndicate who have prepared a scheme for developing the site as a whole. A company is to be formed for this object with a capital of £1,000,000. It is proposed to erect on the central portion of the site a stone building of commanding architectural features. This building will contain large galleries for use in a permanent exhibition of arts and manufactures; it will also contain a theatre, a concert hall and a restaurant. Beyond the central block of buildings the site will be enclosed by shops with basements, ground floors and two floors above. There will be seventy-eight shops on the ground floor and seventy-eight on the first floor, while the second floor will be let for commercial purposes. The promoters have undertaken to spend not less than £500,000 in the erection of these buildings. There will be no larger area between the shops and the central building than that which is necessary to provide for the access of light and air. The plans, elevations and specifications of all the buildings will be entirely subject to the Council's approval.

BUILDING LEGISLATION.

A Comparison of English and American Laws.

By Horace Cubitt, A.R.I.B.A., P.A.S.I.

THE erection of buildings in this country has been for many years so much influenced by various regulations that it seems surprising that there is very little in print either in the proceedings of institutions devoted to furthering the interest of good building or in the professional press which gives in comparative form our own building regulations and those of other countries.

In the present article an attempt will be made to institute a comparison between building legislation in London and the provinces and that in the cities and towns of the United States. Rural by-laws being of such a diverse nature, no general conclusion can be arrived at, and they have therefore not been dealt with.

It may, however, be considered that building legislation in the United States is hardly able to be favourably compared with that in this country. It is indeed true that administration in the American cities has often been justly condemned for the want of honesty and integrity to which on the whole we are accustomed, but the great improvement in this direction which has recently taken place still continues, and it will be shown by subsequent quotations that when properly administered American regulations in many respects tend to the erection of better buildings than our own by-laws.

The subject in its entirety is so wide that it is only possible to deal with it at all successfully in a short article by devoting special attention to one of the main branches. It has therefore been decided to limit the review to regulations having reference chiefly to the construction of buildings, the question of sanitation, sufficient in itself for another article, not being touched upon.

Typical American legislation will be taken and compared with that current in places with similar populations in this country, and thus, the conditions of life being not very dissimilar, it is hoped that a fair comparison will be made. The building laws of the State of Massachusetts will first be considered, then the special laws relating to the city of Boston, and in conclusion the New York Building Code will be dealt with. The first two enactments will be compared with the well-known original Model By-laws issued by the Local Government Board, upon which the building regulations of almost all our provincial towns are directly based, and the last with the London Building Acts of 1894 to 1905.

The Laws of Massachusetts.

dealing with the inspection of buildings, besides being what we should call adoptive, are also of a very elastic nature, it being stated that every city or town which accepts these provisions may "for the prevention of fire and the preservation of life by ordinances or by-laws not inconsistent with law," and applicable throughout the whole or any defined part of its territory, regulate the inspection, materials, construction, alteration and use of buildings and other structures within its limits. The expression "any defined part of its territory" evidently presupposes the establishment of building limits in accordance with a common American custom, the most thickly populated part of the district being contained within these building limits, and outside which limits modified by-laws, if any, are in force. The fact is more clearly illustrated in a regulation prohibiting the erection of dwelling-houses more than 8ft. in length or breadth and 7ft. in height unless made of or covered with incombustible materials, "within such limits" as the town may from time to time prescribe. Structures

situated more than roof-top from any other building are, however, exempted from this regulation.

In addition to such by-laws as each town may frame on its own account, other provisions are compulsory in those towns which take advantage of their power of making by-laws. These provisions, which refer to (1) proper ventilation, (2) sufficient means of escape in case of fire, (3) proper fire stops in floors, walls and partitions, can be enforced with regard to all buildings except dwelling-houses which are more than two storeys in height and have accommodation for more than ten persons above the second storey. Other regulations deal with the safety of elevators, the provision of fire alarms in hotels, and the means of escape from theatres.

Merits and Defects as compared with Model Code.

Compared with our Model By-laws, the building laws of Massachusetts appear to lack the standardization, if the term may be used, which the existence of a model code provides, and if adjoining towns are able to frame no slight proportion of their building regulations with the single proviso that they must not be inconsistent with law, a very chaotic condition of affairs seems likely to prevail.

On the other hand, however, there is the very desirable absence of the cast-iron system we know so well in this country; and although the American method of instituting building limits is probably not the most desirable solution of our problem of building legislation, yet it can hardly be doubted that such an arrangement would render impossible the present unfortunate condition of affairs in some of our districts, which, though rural in themselves, yet happen to form part of an urban district and come under urban by-laws. The opinion of many English authorities appears to be rather in the direction of allowing buildings at specified distances from highways and lands of adjoining owners to be exempt from the operation of by-laws dealing with construction, and it may thus be desirable to repeat the previously stated fact that in the State of Massachusetts all structures roof-top from any other building, although within the building limits, are yet exempt from the by-laws.

Fire Regulations.

The regulations dealing with the means of escape in case of fire from buildings have no parallel in our Model By-laws, no provincial authorities having any power in this direction except with regard to places of public assembly and factories and workshops in which more than forty persons are employed.

The method of procedure with regard to dangerous structures in all the instances of American legislation dealt with in this paper is very similar to that in this country. One very important point is, however, worthy of notice: under the Public Health Act, 1875, which applies to the whole of England with the exception of the Metropolis, dangerous structures cannot be dealt with unless they are dangerous to passengers or to inhabitants of adjoining buildings. In the American instances referred to such structures come within the operation of the law if they are unsafe or dangerous to life or limb in the case of any person whatever, this being also the state of affairs under the London Building Act, 1894.

The Special Laws.

The special laws relating to the city of Boston are on the whole of a very far-reaching character, but probably less stringent regulations would not be sufficient to safeguard the interests of so large a town as Boston, the population being considerably over 400,000, and consequently slightly larger than that of Birmingham.

One of the first points which call for attention in the Boston building laws is the

existence of a Board of Appeal. It can hardly be denied that such an arrangement is far better than our custom of allowing a disputed matter to go before a magistrate with the option of an appeal to the courts, so that in no case whatever can the questions in dispute be decided by men with the necessary technical knowledge. The constitution of this Board of Appeal may perhaps be considered to be based upon rather too liberal grounds; it is formed of three persons, one appointed by the mayor and holding office for three years, one an architect chosen by the Boston branch of the American Society of Architects and holding office for two years, the third member chosen by the local master-builders' association, holding office for one year. Such a body can undoubtedly be trusted not to make the building restrictions press too hardly upon property owners, but it is to be feared that its lack of continuity of tenure must render it liable to be too easily swayed by the public opinion of the moment.

A department to administer the building laws is provided, headed by a building commissioner. No building can be erected or altered except upon a permit from the building commissioner, and in conformity with the provisions of the Act, and plans may be required to be deposited.

Classification of Buildings.

Buildings in Boston are classified as follows:—First-class buildings, of fireproof construction throughout; second-class buildings, all not first class whose external and party-walls are of brick, stone, iron or "other equally substantial and incombustible materials"; third class, wooden-frame buildings; composite: part second- and part third-class construction.

The American custom of establishing building limits has been followed in Boston, and the Building Act gives the city power to extend such limits from time to time. Every new building erected within the building limits must be a first- or second-class building, and only a few specified third-class structures used for certain purposes are allowed. Every new building (except armories and churches whose assembly halls are not more than 7ft. above street-level at the principal entrance) which is capable of seating 800 persons or more and also every theatre must be a first-class building. The height of a building in the Boston building laws is given as the distance from the kerb of the street to the level of the highest point of the roof. Every building in the city of Boston erected or raised to over 70ft. in height must be a first-class building, and so also must every building erected or converted for use as an hotel, or a tenement-house for more than two families above the second storey.

Fire Stops.

Every second-class building has to be erected in accordance with specified regulations regarding the provision of what are termed fire stops at each floor of such a building. These fire stops are required to consist of a "solid air-tight cohesive layer at least 1in. thick of tile, brick terra-cotta or like fire-made material, plaster, cement, cinder or ashes, or of a combination of the same, or of equally non-inflammable non-heat conducting materials laid between the upper and under floors or occupying all the spaces between the timbers under the under "floor." Second-class buildings of 45ft. or more in height which are used above the first floor for storage purposes must have, instead of the ordinary fire stops, a tight splined or tongued and grooved under floor of at least 2in. plank with an upper floor 1in. thick; staircases to such buildings must be enclosed in walls or shafts of non-inflammable material, with all openings fitted with iron doors.

No space inside any first-class building may exceed 10,000 sq. ft., or in a second-class

building 8,000 sq. ft., without being subdivided by party-walls.

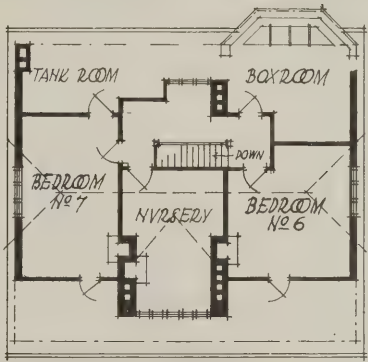
Composite and third-class buildings may only be erected outside the building limits. Fire stops are required to be provided in a similar manner to those in second-class buildings, and no third-class building is allowed to be more than 45ft. in height if a dwelling-house or 55ft. if otherwise, nor to have an external wall nearer than 3ft. or 5ft. respectively to an adjoining lot, unless such wall is built of 12in. brickwork. These requirements do not apply, however, to buildings erected at a distance of 50ft. from any other building and from any other street or way.

The Comparison as regards Height.
These regulations relating to the main outlines of construction, if compared with the few similar provisions existing in our provincial by-laws, appear to touch the extremes of rigour and leniency. While few structures similar to the Boston third-class buildings are allowed to be erected in our provincial towns, yet not even in the Metropolis itself are there such requirements, other than those applicable to public buildings, for the compulsory fireproofing of a large class of new buildings and for special construction to prevent the spread of fire in those of everyday type. No doubt the greater proportion of the best class of buildings in this country are now erected of fire-resisting construction, but entirely at the option of the owners, professional opinion here apparently not having yet reached the point of considering compulsory measures desirable. On the other hand, buildings in Boston can be erected to a greater height than in London, they being allowed to be 2½ times the average width of the street, but in no case more than 125ft. high. Buildings in London in wide streets may be 80ft. to the top of the parapet, with two storeys in the roof—in all about 100ft.

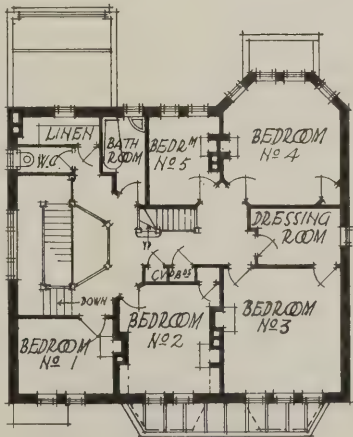
Details of Construction.
When details of construction are touched upon the contrast between American and English provincial legislation, though noticeable, is not of quite such a striking nature. The really essential difference between the Boston regulations of construction in detail and those of the Model By-laws is that, in accordance with the common American practice, tables are given stating the maximum loads that may be put upon various materials, and the existence of this provision enables, without any ill effect, many variations to be made from the detailed regulations familiar to us in our own by-laws. It is possible that the fact of many of the requirements of the Boston building laws being directly based upon scientific principles, and thus open to the investigation of all parties, not only tends to good construction but also to the existence of a more tolerant spirit between architects and surveyors and the municipal officials than is the case where our own hard-and-fast rules prevail. The Model By-laws contain clauses specifying the class of materials to be used, but there is no restriction as to the load which may be put upon any particular material, although it is true that urban authorities who have adopted Part III. of the Public Health Act Amendment Act of 1890 are able to make by-laws regulating "the structure of floors, hearths and staircases."

(To be concluded.)

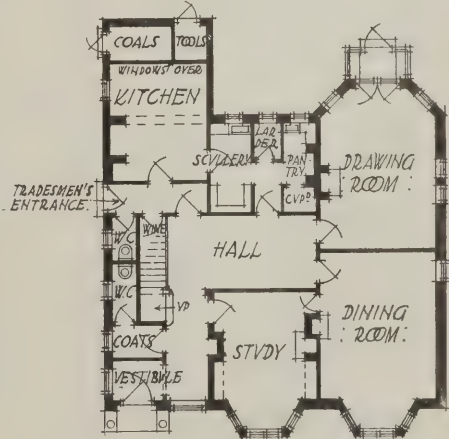
A Branch Library at Townhill, erected by the Carnegie Dunfermline Trust, was opened recently. The style is English Domestic, with half-timbered gables and projecting roofs, the walls being harled, with a base of red facing bricks. The cost was about £4,000, the plans being prepared by Mr. Peter L. Henderson, of Edinburgh.



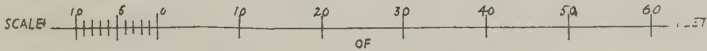
ATTIC PLAN



FIRST FLOOR PLAN



GROUND FLOOR PLAN



This house, which is the residence of the architect, has been built of red brick and Thetton stone, with Welsh grey slates on the roof and white frames to the window openings. The whole of the interior woodwork, including the floors, has been treated with "Carbolium" reduced with paraffin.

HOUSE AT EALING, W. WILLIAM A. PITE, F.R.I.B.A., ARCHITECT.

R.I.B.A.

Two Papers on Leadwork.

A MEETING of the Royal Institute of British Architects was held on Monday evening at 9, Conduit Street, W., the chair being occupied by the vice-president, Mr. Edwin T. Hall.

The death was announced of Mr. William Gibbs Bartlett, a member of the Institute for forty-eight years, who was elected an Associate in 1858 and a Fellow in 1869.

Mr. Maurice B. Adams enquired the reason why the Institute was not represented on the Strand further improvement memorial which had been sent in to the London County Council.

The chairman replied that the Council had decided that it would not be wise for them to take any part in that particular memorial, because they had made their own representations to the London County Council and had only quite recently been in communication with the same body with reference to the matter.

A paper on leadwork was then read by Mr. F. W. Troup, followed by one by Mr. Lawrence Weaver, F.S.A.

Mr. Troup said that as the architect had frequently to decide what metals should be used on a building, it was imperative he should know the peculiar properties of each, and why lead ought to be used in one case, cast-iron in another, and pewter or copper in a third. To bring out the most prominent qualities of lead—namely, its durability at ordinary temperatures, its ductility, its exceptional weight, and its low melting-point—the lecturer compared it with other metals in common use, showing its advantages for open-air purposes over copper, tin, zinc, iron, &c. Lead required, however, great care and judgment in its use. As regards the material as now supplied—milled lead and cast sheet—milled lead is a dull and pasty material compared with lead run out in the old way by casting the molten metal on a sand-bed to the actual thickness required for use. Cast sheet can be had in the open market at the present day at a rather higher price than milled sheet of the same weight. For a flat lead roof, often liable to be walked upon, there is not much to be gained from using cast sheets.

The Surface Texture of the Cast Sheet, however, is worth making some slight sacrifice to obtain, especially if the old-fashioned open roll or flat welt-roll can be used. Either of those joints is preferable to the usual modern roll with its wooden core. The wood roll has to be large, and therefore clumsy, else leaks arise from capillary attraction between the sheets. The open roll has not this defect, but cannot stand under much foot traffic. When lead is used on a spire or turret it is certainly worth while to use cast sheet. Even with a wooden core in the rolls the cast sheets do not cause suction to such an extent as milled lead. The natural surface of the lead as it is cast is the best to use as the exposed surface in a roof or elsewhere.

When there is Ornament of any sort to be cast with the sheet, then the under or sand surface must be exposed. This can be as rough as you like for roof or rain-water heads, and a coarse sand may be then used for the casting bed. But for things which come close to the eye, or which may be handled, a much finer sand should be used. More care is then required in the casting to provide for the escape of the steam formed by the molten metal on the damp sand. For a "repeat" ornament or for casting letters and figures for dates a lead mould can be used. This is easily made and lasts for a long time, but a brass or cast-iron mould is more permanent. For knobs and

finials it is possible with a lead or brass mould to fill it with molten lead, and after two or three seconds empty out the interior unsolidified lead, giving a hollow casting without the trouble and expense of making a core as for a brass or iron casting.

For Decorative Forms

the lecturer counselled restraint; lead was so easy to twist and turn. The designer should never forget his material while designing on paper; even in modelling the finer material must never be lost sight of. It is quite possible to make a casting from a single pattern in several different materials, but to take full advantage of the best that can be got out of each material that original pattern ought to be varied in each case. For a plaster cast, for example, moderately high relief may be had; but it should be soft in contour, and there is no special reason for economy in material. In lead, however, there is reason for economy of material, and one can have finer lines, and can reckon on bending, soldering, or even to some extent bossing up the casting after it is made. There are several other ways of ornamenting lead. It is very easy to make fretwork patterns for ventilating panes in windows, or as a vallance round a leaded dormer or door-hood. This is best done with chisels and gouges on a block of lead. Lead can also be incised and the incised lines filled with various coloured mastics in letters or other shapes. One of the most gorgeous possibilities for decoration in lead is to be had by tinning the metal in some design of ornamental or figure decoration, and then glazing over the tin surface with transparent colours.

In the Middle Ages

the chief method of working lead and using it in buildings was simply to take the plain cast sheets, and after cutting it to the outline as near as might be, and in convenient size for handling, to dress, boss and beat it up to the shape required. Sometimes these forms were carried on wooden cores; at other times on a framework of iron, or were simply fixed by iron hooks and brackets on the timber framing. This art is as dead as Queen Anne. It is a personal art like sculpture—very often it was sculpture—and no amount of designing by another for the craftsman to execute will do much to restore it. The art has been so long divorced from the craftsmanship, and the teaching of tradition so long deserted, that their reunion is hardly a matter to be accomplished in a single generation. We can but live in hope.

Mr. Weaver's Paper.

Mr. Lawrence Weaver took for his subject the earlier lead spires. Lead, he said, had no nobler use than in the covering of spires, for spires were the greatest concession that Gothic architecture had made to constructed beauty and symbolism. The lead spire has a character all its own, and maintains a character of a spiritualized roof more intelligibly than a stone spire can do. The white, almost glistening patina which comes with age on lead, where the air is not befouled with smoke, makes the spire stand like a frosted spear against the sky, and the slight twists which almost every timber spire has taken give a peculiar sense of life. Dealing with the history of

Lead Spires,

and discussing the question of origins, the lecturer quoted the classification of spires given by Mr. Francis Bond in his "Gothic Architecture," and gave his reasons for offering the following classification, based on Mr. Bond's, but corrected:—

Pathless Spires—

- (i) Collar-type, e.g., Ryton.
- (ii) Broach-type, e.g., Braunton, Barnstaple, Godalming, Ickleton, Swymbridge, Almondsbury.
- (iii) Pinnacled type, e.g., Long Sutton, St Nicholas, and Aberdeen.

Parapetted Spires—

- (i) Collar-type, e.g., St. John's, Perth, the tower of which has a heavy over-sailing parapet within which the spire stands.
- (ii) Broach-type, e.g., Hemel Hempstead.
- (iii) Straight-sided type, e.g., Harrow, Chesterfield, Minster, Great Baddow, Much Wenlock, Wickham Market.
- (iv) Spirelets, e.g., East Harling, Wenden Ambo, Swaffham, Hitchin, Sawbridgeworth, and Ash, Kent.

A certain difficulty arises in the definition of lead spires owing to the somewhat loose use of

The Word "Broach."

What the lecturer called the "collar-type" is sometimes called "broach," but incorrectly. The essence of the broach he took to be that the filling-in between the angles of the tower and the diagonal faces of the spire shall be of pyramidal form. The influence of the stone broach on the form of the lead broach may be admitted without suggesting that the lead broach was a slavish or unintelligent copy of the stone broach. It was a question of carpentry. The construction of the collar type is more congenial to wood than is the broach. The octagonal framing calls (but not very urgently) for strutting at the base. In the broach the main framing is strutted by single timbers running through the diagonal faces of the octagon; and this is not so satisfactory as the double strutting of the cardinal faces, which obtains in the collar-type. From the weathering point of view the lecturer considered the stone broach to be as efficient as the collar-type, and he felt strongly that the broach was far the more attractive.

Having given details and brought out the chief characteristics of examples of the different types classified, the lecturer made some remarks by way of constructive criticism. His illustrations, he said, had shown how beautiful lead spires can be and are. The lead gave the architect no trouble: he gained infinite variety of surface by different arrangement of the rolls; he outlined great cartoons on the faces of his spires (as at Chalons-sur-Marne) and blazoned them with gold and colours; he wanted the metal-cased architecture of the poets, and he got it. His difficulty was that he could not keep it. The timber framing was always

Liable to Destruction by Fire.

To-day, however, there is an alternative. Our spires can be built in steel and sheathed in lead, and will defy the flames. Here is one field where steelwork may come into its own, may come faithfully and gracefully, may be the metal bones of a metal architecture. The lecturer claimed for it that it preserved the initial idea of a spire that it is a glorified roof; that the lead surface gives opportunities for colour treatment that a stone spire cannot give. Had the mediæval architect found the material to his hand, we should be pointing to-day to his

Leaded Steel Spires

as notable examples of the Gothic spirit. In conclusion the lecturer showed a design for a leaded steel tower done by Sir Charles Nicholson to illustrate his suggestion.

Lieut.-Colonel L. Prendergast proposed a vote of thanks to the readers of the papers, which Mr. H. V. Lanchester seconded. Sir Charles Nicholson, Mr. Harrison Townsend, Mr. Maurice B. Adams, Mr. E. W. Hudson and the chairman also spoke.

Obituary.

Mr. James Brown, builder, of Dundee, died last week. He was 70 years of age.

Mr. Adam Hunter, of the firm of Porter & Hunter, architects, Colwyn Bay, died recently.

NOTES ON COMPETITIONS.

Holborn new Town Hall.

The following are the names of the six architects selected by the Establishment Committee to submit designs for the proposed new offices of the Holborn Borough Council:—Messrs. Colcutt & Hamp, Mr. Edwin T. Hall, Mr. Gerald C. Horsley, Mr. Henry T. Hare, Mr. A. Brumwell Thomas, and Messrs. Warwick & Hall. At last week's meeting of the Borough Council Mr. Lisle moved to instruct the committee to appoint the assessor, but the motion was rejected as premature.

In view of the varied work with which the foregoing names are associated, this competition should be a very interesting one. Mr. Hare and Mr. Thomas are well-known as town-hall architects, and Messrs. Warwick & Hall have presumably been selected by reason of their success in the Lambeth Municipal Buildings competition; the other names, however, have apparently been included as those of prominent architects within the Holborn area, for Messrs. Colcutt & Hamp are more associated with hotel and commercial buildings, Mr. Edwin T. Hall with hospital and asylum work, and Mr. Horsley with churches and domestic buildings—rather than with town halls.

Swadlincote Free Public Library.

Information has been received from a correspondent which affects all intending competitors for the Swadlincote Free Public Library. The list of replies to competitors' questions which has been sent to him by the promoters does not agree with similar lists which have been sent to other competitors. The discrepancy is of such a nature as to affect materially the positions of the entrance and the rooms, and leaves a doubt as to the wishes of the council in reference to the room to be used as for art classes. This is a very serious matter, and a difficult one to deal with. The correspondent suggests that the assessor ought to ignore all requirements except those set forth in the conditions. This seems rather unfair on the competitors, who act in accordance with the replies to queries which they have received, for the "replies" are always regarded as explanatory of obscure points in the conditions, and as the last word thereon. On the other hand, those who have prepared their plans in ignorance of the fuller information will be under an obvious disadvantage when the assessor comes on the scene. Whether he judges the drawings in the light of the full requirements of the council as set forth in the conditions only—which, by the-by, appear to be lacking in information—or of the conditions plus the "replies," injustice will be done to one or the other set of competitors. The only course which seems possible is that every competitor should write to the promoters stating that discrepancies exist, and refusing to compete unless a printed list of replies be received, with an assurance that an identical list has been sent to every applicant for conditions. As, however, the designs have to be sent in by March 24th it seems rather too late now to do anything.

Wallsend Municipal Buildings.

This was a competition which was open to architects whose offices were situated within a radius of 20 miles from the city of Newcastle-on-Tyne. The assessor has recently made his award as follows:—1, Mr. J. H. Morton, South Shields; 2, Messrs. Shrewbrooks & Hodges, Newcastle-on-Tyne; 3, Messrs. Liddle & Brown, Newcastle-on-Tyne.

A sub-committee which was appointed to consider the plans placed first, second and third by the assessor has decided to accept the one placed third "as the basis of the scheme." The sub-committee appears to have been actuated by what it considered as the

superior attractiveness of the elevations of the third design, and on this score it has disregarded the advice—as inferred in his placing of three designs in their respective order of merit—of the prominent architect engaged by the Corporation to act as assessor, and has set aside a scheme which was generally admitted to be superior to the one selected. Unfortunately for the author of the first design, the Corporation in the conditions reserved full liberty of selection, *i.e.*, they did not "bind themselves to carry out any of the designs sent in or to adopt one of the designs which may have been awarded a premium"; premiums were offered only for the designs placed first and second by the assessor. The danger of such a clause as this is not sufficiently recognized by competitors, who are frequently either too optimistic or too thoughtless to ascertain whether the author of the design placed first by the assessor will be appointed to carry out the work, provided he be a suitable person to do so. Promoters are in the habit of guarding themselves against the contingency of having to appoint an architect who might prove undesirable, but in this case they have gone further—they have definitely reserved full liberty of selection. Nevertheless it is to be hoped they will listen to the protests which it is inevitable they will receive, and that they will carefully reconsider their selection, with the assistance of their assessor, so that justice may be done to the author of the best all-round scheme.

A Golf Clubhouse.

The design of Mr. Charles H. Greig, architect, of 6, York Place, Edinburgh, has been placed first by the assessor in a competition for a clubhouse for the Broomieknowe Golf Club, Edinburgh.

Salford Schools.

Mr. J. H. Woodhouse, F.R.I.B.A., of Manchester, has been placed first in the competition for new schools to be erected facing Bolton Road, Salford, at a cost of about £19,000.

Acton Municipal Buildings.

Writing from Kensington Mr. William G. Hunt says: "In your issue of February 7th you state in an article you are kind enough to style 'The Acton Municipal Buildings Farce' that the lowest tender for these proposed works, 'which were expected to cost some £10,000, has come out at some £60,000.' In the following week's issue you intimated that those figures were incorrect, expressed regret for your error, and made an amended statement to the effect that the lowest tender, which was expected to be some £60,000, has come out at 'close upon £100,000.' This statement is also inaccurate, as the lowest tender only amounted to £80,000 odd; the extra amount being fully accounted for by an extension of the site and of the building, and other matters well known to the Council, who approved this tender as submitted, and accepted it subject to the approval of the Local Government Board. I should also like to say that the Acton Council has in no sense been 'led astray' or misinformed by me in the slightest degree, and I am sure neither the chairman nor any of the councillors would suggest that they had. Your article, which is incorrect in other respects also, has just been pointed out to me with a request that I should correct it, otherwise I would not have troubled you with this letter, which I trust you will find space in your valuable paper to publish."

In reply to the foregoing we have to say that our information was based upon a printed report which read: "The district council of Acton at its last meeting decided not to build the town hall. The chairman of the Council at the meeting referred to explained that 'no one was more surprised than he when they found the lowest tender amounted up to close upon £100,000.' He asserted that the Council had been led astray, and

that there was not a member of the Council who had really intended to spend £100,000." We satisfied ourselves at the time by enquiries that this information was correct. By Mr. Hunt's showing, the excess of the lowest tender over the estimated cost is £20,000, not £40,000 as has been stated. We can only express regret that the sources of our information, which we had every reason to suppose were reliable, have been productive of some data which have not proved strictly accurate.

Competitions Open.

The following is a list of competitions open—

DATE OF DELIVERY.	COMPETITION.
Mar. 24	FREE LIBRARY AT SWADLINCOTE (limited to architects practising within 30 miles of Swadlincote).—Premiums of £25, £15 and £10. Particulars from Mr. W. A. Musson, Clerk, Council Offices, Swadlincote.
" 26	WESLEYAN SUNDAY SCHOOLS AT WILLESDEN.—Particulars from the Rev. M. F. Crewdson, 4, Tavistock Road, Harlesden, London, N.W.
" 31	BIRMINGHAM COUNCIL HOUSE EXTENSION (Sketch Plans).—£1 is. deposit for conditions. Particulars from Birmingham Town Clerk, Council House.
" 31	DWELLINGS AT MILAN EXHIBITION.—Premiums £240 and £80. Particulars from the Exhibition Committee, Milan, Italy.
April 2	PUBLIC LIBRARY AT SOUTHWARK (to cost £7,000).—Premiums of £50, £30 and £20. £1 is. deposit for conditions. Particulars from Mr. J. A. Johnson, Town Clerk, Town Hall, Walworth Road, S.E.
" 14	SCHOOL AT OSSETT.—Premium of £50 (to merge). Particulars from the Secretary at the Education Office, Ossett.
" 15	PEACE PALACE AT THE HAGUE.—Particulars from the office of the Carnegie Foundation, Noordeinde 33, The Hague.
May 31	NATIONAL CONGRESS HALL FOR BRAZIL.—Premiums of 15,000, 10,000 and 5,000 milreis (equivalent to about £1,685, £1,125 and £562 respectively). 5,000 milreis also for designs not premiated but desirable to be acquired. The conditions of the competition can be seen at the offices of the Commercial Intelligence Branch of the Board of Trade at 73, Basinghall Street, E.C.
No date	ISOLATION HOSPITAL AT STONE.—Limited to architects in the district. Particulars from Mr. J. J. Chapman, clerk to the Stone Joint Hospital Board, Stone, Staffs.
Date not stated.	BATHS, FIRE-STATION AND FREE LIBRARY AT REDDISH.—To cost £5,000. Applications by March 31st to Mr. Robert Hyde, Town Clerk, Stockport, for form of instructions to architects. Deposit £1 is.

Enquiries Answered.

The querist's name and address must always be given, not necessarily for publication.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

Unarticled Clerks and Examinations.

NEWPORT.—E. R. J. writes: "Are unarticled clerks in architects' offices allowed to enter for examinations?"

Yes, certainly. Neither the Royal Institute of British Architects nor the Society of Architects raise any objections.

Adjoining Owners and Projecting Mouldings.

QUERIST writes: "A and B are two business premises adjoining. B requests A to remove the return ends of mouldings on new wooden pilaster to shop front, which project on to B's front about 1½ ins., or pay an acknowledgment, as he submits they acquire a right if allowed to remain. Is this so, and if B can compel A to remove the ends of the mouldings can A compel B to remove the projecting cornice over his roof? They are both old buildings, but A has recently put in a new shop front—hence the request."

B is certainly within his legal rights in asking A to remove the portion of the newly-

built pilaster which overlaps his premises; however small the overlap, it forms an encroachment on A's part. Whether A can similarly require B to remove his overhanging cornice depends on the period of time that the cornice has so projected. If it has been in existence for a period of twenty years (practically nineteen years and one day is sufficient) B has acquired a prescriptive right to maintain the cornice as it now exists, and cannot be compelled to remove it (2 & 3 William IV., c. 71, sec. 2). F. S. I.

Cost of Mission Halls, Sunday Schools, &c.

E. S. writes: "What is a fair price for this class of property at per foot cube in the suburbs of London, exclusive of seating; also what is the minimum price for the cheapest class of sound building, and also for buildings with a reasonable amount of finish externally and internally? Also the price per person. I have given an approximate estimate for this class of building, built of brick and plastered internally, with varnished pitch-pine open-timber roof and boarding, which works out at 6d. per ft. cube, but I am informed by my client that similar buildings have been erected for a much smaller sum."

It is impossible to reply very definitely to the above question without knowing particular circumstances, but we may say generally that 6d. per ft. cube is about the lowest for which buildings of this class can be erected at the present time.

Designing Columns and Stanchions.

HORSHAM.—STUDENT writes: "Assuming that the weight to be carried by a column or detached stanchion is 60 tons, and that the length of the column is 10ft., what section would you use? For a column 2 tons to the inch, and for a stanchion $1\frac{1}{2}$ tons, may be assumed the safe weight. Is the following working correct? For a column: If 2 tons per sq. in. is the safe load and 60 tons has to be carried, we require 30 sq. ins. of metal. According to Adams, to carry 2 tons per sq. in. the column must be 20 to 25 diameters. Hence, if height is 10ft. the diameter will be about $\frac{10 \times 12}{20} = 6$ ins. This seems rather an

absurd result, and the safe load given seems insufficient. I should be glad if you would give me a method of calculating stanchions or columns when a safe load such as the above is given."

The safe load per square inch being given as 2 tons per sq. in. for the column, a load of 60 tons will require 30 sq. ins. sectional area. At 2 tons per sq. in. it may be 20 to 25 diameters long, and the height being 10ft., $\frac{10 \times 12}{20} = 6$ ins. to 4'8 ins. diameter; but 20 to 25 30 sq. ins. area will not be reached with less diameter than $6\frac{3}{8}$ ins., which would be the size to adopt for a solid column. Querist apparently misunderstands the table given in "The Practical Designing of Structural Ironwork" (Spon, 8s. 6d.). It is there shown that a cast-iron hollow column 20 to 25 diameters high should not be loaded to more than 2 tons per sq. in., which is very different from saying that a column loaded to 2 tons per sq. in. must be 20 to 25 diameters high. For a check upon the $6\frac{3}{8}$ in. diameter solid column reference may be made to the table, p. 36, in Spon's "Builders' Pocket Book" for 1874, where the safe load on a cast-iron solid column 6 ins. diameter and 10ft. high is given as 50'51 tons, or 1'79 tons per sq. in. For a cast-iron stanchion to carry the same load at $1\frac{1}{2}$ tons per sq. in. the sectional area would be $\frac{60}{1\frac{1}{2}} = 40$ sq. ins., or say a cross-shaped section about 12 ins. by 12 ins. by $1\frac{1}{4}$ ins. thick. But with this section and only 10ft. high a greater stress than $1\frac{1}{2}$ tons per sq. in. could be put

upon it. It appears as if the question has been framed to discredit the tables, but the above explanation should put the matter right.

HENRY ADAMS.

Rights of Light.

BIRMINGHAM writes: "A and B are neighbours. A has recently re-erected buildings at the rear of his property, and about four years ago built on a piece of the yard in front of his old kitchen and erected thereon a room, which is shown as the hall on the accompanying plan (not reproduced). The kitchen was then built on the first floor, the old kitchen was converted into the shop, and the window which in the old kitchen was in the outer wall was converted into a borrowed light for the shop, owing to the hall being built in front of it. B now objects to A's property being seen and overlooking his garden, and wants to raise the wall. A objects, as he knows that the light to the hall will be interfered with, and he claims further that he has a right to the ancient light to the old kitchen window, also to another which has existed in the old building for at least fifty years, and which A has recently rebuilt. Has B the power to raise the wall higher by using his half of the wall, without A's consent? Assuming that B can raise the wall on his half, can A claim compensation for injury to light? There is a clear air-space of 4ft. 6 ins. and 7ft. 6 ins. respectively from the face of A's building to the boundary wall. What is the extreme limit that A could build without hindrance from B?"

A is clearly in the wrong, and should settle his dispute with B as speedily as he can, and on the best terms he can get. A's "ancient light" consisted merely of the one old kitchen window on the ground floor; he appears to have retained that window where it always was, and to have added no fewer than nine other windows, all overlooking B's property. If B chooses to erect an obstruction to all these new windows (taking care he does not block the original one) he is quite entitled to do so, because A's prescriptive right of light is limited to the old window, and only the old window. It is questionable whether B possesses the right to build upon

one moiety of the party-wall, but I strongly advise A to allow him to do so for fear a worse thing befall him.

F. S. I.

Trussed Rafter Roof with Coved Ceiling.

SUFFOLK.—STUDENT writes: "Kindly give your opinion as to the safe and sound construction of the roof shown by the accompanying drawing. The total length of the wall-plates and girder is 18ft. The girder proposed is 10 in. by 5 in. r.s.j. built 9 ins. in brickwork at ends, and with 4 in. by 3 in. plates bolted to web, and the bottom flange bolted to 5 in. by 3 in. head of stud partition. The walls are 11 ins. hollow, with windows in centre. A coved ceiling is to be formed with 11 in. by 1½ in. stuff, cut to curve and spiked to collars and rafters respectively. The collars are to be framed to rafters, the gutter bearers linking two roofs as shown."

The distance apart of the trussed rafters is not stated, but assuming them to be 12 in. centres and allowing loads of 28 lbs. per ft. super. vertical and 28 lbs. per ft. super. normal to slope of roof for wind on one side, the loading will be as shown on frame diagram, Fig. 1, for which Fig. 2 is the corresponding stress diagram. It will be seen that the roof does not form a complete truss, as a king-rod, 9 - 9a, is required in order to complete the stress diagram. If a king-rod is inserted the collar may remain 4 ins. by 2 ins., but if the roof is made as Fig. 3, then the collar should be increased to 6 ins. by 2 ins. to resist the bending moment caused by the curved ties. The outer walls supporting roofs appear to consist of two 4½ in. walls with a 2 in. cavity between. These will not be strong enough. They should be increased to a 9 in. inside wall, 4½ in. outer shell, and 2 in. cavity. The girder carrying the roof-valley will have a distributed load of about 7 cwt. per ft. run, and for a span of 18ft. will require a 10 in. by 5 in. by 35 lb. rolled steel joist, with not less than 1 sq. ft. of bearing surface at each end. The 5 in. by 3 in. head of stud partition should not be bolted to the bottom flange of joist, as the holes will weaken it considerably. A better way will be to use 2 in. by ½ in. clips (as in Fig. 4) screwed to the sides of 5 in. by 3 in. head and turned over the bottom flange of the joist.

HENRY ADAMS.

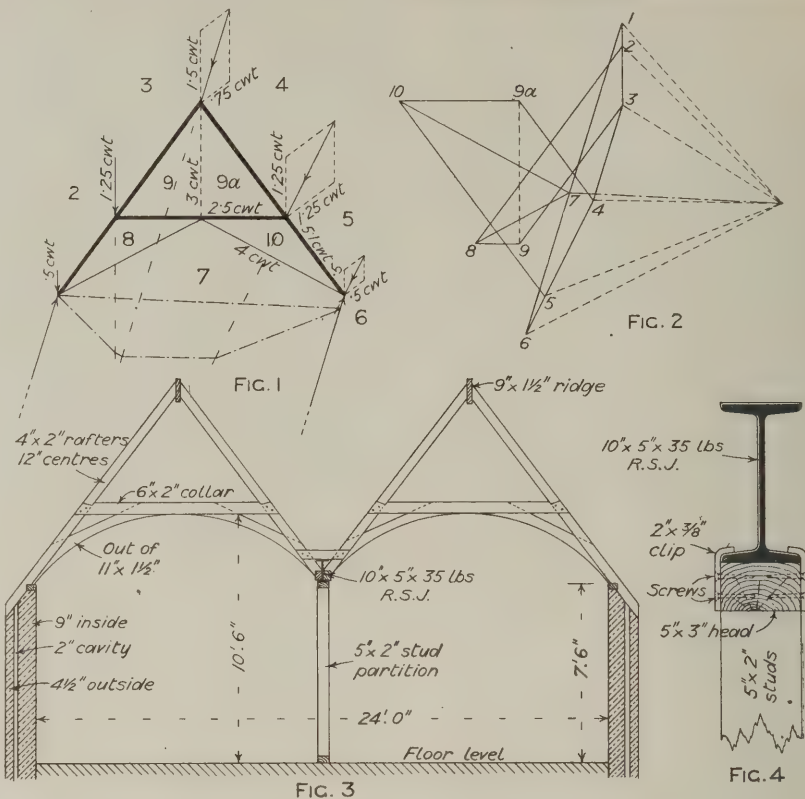


FIG. 3
TRUSSED RAFTER ROOF WITH COVED CEILING.

MORTAR.*

By S. SMITH.

FOR the making of mortar the limes in most general use are those which are obtained from the limestones containing the largest proportion of pure lime.

After being quarried and broken up into small pieces the limestone is burnt or calcined in a kiln. The effect of this burning is to drive off the carbonic acid gas and water, which combine with the lime to form limestone. If the heat be too suddenly applied to the limestone, it becomes "slagged," or covered with a silicious glaze, and is thereby rendered useless for the purpose of making a mortar; on the other hand, if the lime be overburned, that is to say, if the burning is continued after the carbon dioxide has all been driven off, it is difficult to slake, some of the parts only slaking after the lime is in use. Mortar made from an overburned lime is unreliable, and in some cases causes damage through the unslaked particles becoming slaked after a time, then swelling up and bursting the wall. When properly burned the limestone loses all its carbon dioxide and moisture, and is converted into caustic or quick-lime (protoxide of calcium), 100 parts of raw stone yielding on an average from 50 to 60 parts of burnt lime. The caustic lime is next slaked with water (1 volume of water to 3 volumes of lime), when it evolves much heat and crumbles down into a greyish, bluish or brownish coloured powder (calcium hydroxide), according to the original colour of the limestone. When sand and more water have been added to this powder it is converted into a pulp or paste, and in this form is used as a mortar.

Setting of Mortar.

When mortar is exposed to the air it becomes hard, this being what is termed the indurating or setting of the mortar. In the common or air-setting limes, as distinguished from the hydraulic limes, or limes that will harden or set under water, one of the causes of setting is the absorption of carbon dioxide from the atmosphere by the lime, and the formation thereby of a carbonate of lime; that is, reconverting the lime from a caustic or slaked lime back to a limestone. This is assisted to a certain extent by the water which is part of the mortar acting as a solvent for the carbon dioxide. As can be readily understood, this process is a very slow one in the case of mortar used for building purposes. In old buildings where the walls were thick, and a fat or pure lime had been used as the mortar, part of the lime in the middle of the wall has been found to be still in the form of hydroxide, even after the lapse of centuries. It is only within the last century that any investigation has been made into the cause of lime-mortar becoming hard, or set. A German scientist made experiments with mortar, drying it over a hot-water bath, and he found that, after all the water had been evaporated from or dried out of the mortar, there was nothing left but a powder composed of lime and sand; thereby showing that it was not by evaporation of the moisture that the lime became hard.

From further experiments he found that on the addition of carbon dioxide the lime quickly set and became hard. On examination of mortar which has fallen for some distance, such as may be seen on a projecting course, or along the line of the wall of a new building, it will be found that this mortar has set far quicker and is far harder than the mortar that had been built in the wall. The same applies to mortar used in pointing a wall. When the mortar used for pointing is thrown from the trowel into the

joint between the stones it becomes far harder than if it is merely pressed in by the trowel. The increased power of setting possessed by mortar which has fallen from a height, or that has been thrown from a trowel, is caused by the lime in its passage through the air having taken up a considerable quantity of carbon dioxide while the lime was in a sufficiently moist state to act as a solvent of the gas; the crystallization of the particles of the carbonate formed being thereby accelerated. A further practical proof of the action of carbon dioxide in the setting of mortar may be seen in connection with the lime used for plasterwork. In many cases the same lime is used for the plasterwork as has been used in the building of a house, the plaster lime, which is put on in three coats, being as a whole very little more in thickness than some of the layers of mortar in which the bricks or stones are embedded. There is this difference, however: in the one case it is the broad or large surface of the mortar which is exposed, while in the other it is the narrow or thin edge. If the wall of a new building is cut into, the mortar with which it is built will be found to be quite soft and friable, while the plaster has become hard and dry, although the mortar used for the plasterwork has been prepared weeks, and in many cases months, after that used by the builder. The reason for this can be readily understood when it is considered that in the one case the large surface would be exposed to the atmosphere at three successive periods, and would thereby absorb a large quantity of carbon dioxide, whereas in the other only a very small surface of the mortar would be exposed, and therefore a proportionately small quantity of the carbon dioxide would be taken up, and the setting of the mortar would be relatively slow.

When the action of the carbon dioxide is understood a better knowledge of the use of sand in the setting of mortar is obtained. All practical men know that a fat or rich lime never hardens unless it is mixed with sand. If a plasterer were to put on his finishing coat of putty or fine stuff, that has been made up into a pulp with water, without an admixture of sand or plaster-of-Paris, it would dry, but would never become hard as would a coat of putty which had been mixed with clean sharp sand. The particles of sand form channels for the carbon dioxide to filter through, thereby letting it act upon all the particles of lime from all sides at the same time. The sand also serves as a base for crystallization, thus assisting in a practical manner in the formation of carbonate of calcium. Sand, therefore, serves a useful purpose in mortar, in addition to counteracting the shrinkage or contraction in drying which takes place in a mortar made of pure lime. Sand, being mainly composed of silica, also assists in the setting of the mortar by a chemical action taking place between the hydroxide and the silica: the result being the formation of a silicate of lime. This silicate forms a base upon which the crystals of carbonate previously referred to are formed.

Different Kinds of Lime.

It is rarely that what may be termed pure lime is used for the purpose of making a mortar. That which is commonly used, and which is derived from ordinary limestone, contains, in addition to lime, a number of other substances, such as oxide of iron, sand, alumina, magnesia, oxide of manganese, &c. During the operation of burning, some of these substances combine with the lime, and the lime thus acquires properties which it would not otherwise possess, some of these being advantageous and of assistance in the setting of the mortar. Take, for instance, an ordinary lime and make it into a paste with water, then put it into a dish and cover it with water. The mixture will always remain moist and soft,

even although sand be added. The resulting mortar, if treated in the same manner, will always remain soft. There is another kind of lime, however, which if treated as described above, will harden under water more or less quickly, according to the substance of which it is composed. If the lime be mixed with sand and made into a mortar, and then placed in a similar position, it will also become set or hard. If once a lime of this description has been made into a paste and allowed to dry or harden, it cannot be again softened up the same as mortar made from ordinary or common lime. The name "hydraulic" is given to limes of this description.

On slaking lime fresh from the kiln it is considerably augmented in bulk, this augmentation in some cases being such that 1 volume of lime will yield 3 or 4 volumes of slaked lime. The lime which possesses the property of setting or hardening in water does not increase in bulk when slaked, or at least very little. As a general rule the more "hydraulic" a lime is the less it increases in bulk. Till the early part of the nineteenth century the limes which slaked slowly and increased little in bulk were termed "meagre" limes, this term being applied indiscriminately to all limes, whether they possessed the property of hardening under water or not, and the limes which increased largely in bulk on being slaked were termed "fat" limes. About that period the term "hydraulic" lime was adopted for the limes which slaked slowly and hardened in water; "meagre" for the limes which slaked slowly but did not harden in water; and "fat" for the lime which slaked quickly and gave a large increase in bulk. One writer defines them thus:—

When rapidly falling to quicklime they are rich; when falling only after eight or ten minutes they are poor; when they require fifteen or twenty minutes they are medium; when they require an hour or more they are regarded as hydraulic; and when requiring, it may be, several days to break up they are highly or energetically "hydraulic."

Burnell in his book on limes, cements, mortars, &c., gives the following definitions of the various limes and the cause of lime being hydraulic:—

(1) "The pure calcareous rocks, or such as contain only from 1 to 6 per cent. of silex, alumina, magnesia, iron, &c., either separately or in combination, give rich limes on being burned.

(2) "The limestones containing insoluble silica in the state of sand, magnesia, the oxides of iron and manganese in various respective proportions, but limited to between 15 and 30 per cent. of the whole mass, yield poor limes.

(3) "The limestones containing silica in combination with alumina (common clay), magnesia and traces of the oxides of iron and manganese in various respective proportions, but within the limits of from 8 to 12 per cent. of the whole mass, yield moderately 'hydraulic limes.'

(4) "When the above ingredients are present in the proportion of from 15 to 18 per cent., but the silica in its soluble form always predominating, the limestones yield a 'hydraulic lime.'

(5) "When the limestones contain more than 20 and up to 30 per cent. of the above ingredients, but with the soluble silica in the proportion of at least one half of them, the limestones yield eminently 'hydraulic limes.'"

It will be seen from the foregoing descriptions of the materials of which the various kinds of lime are composed that there is a large quantity of silica and alumina in the limes that are eminently hydraulic, the silica being soluble. The first effect of burning a limestone containing these ingredients is to expel the carbonic acid; the second is to effect a combination between

* A paper read before the Architectural Section of the Royal Philosophical Society, Glasgow, January 15th, 1906.

the lime, magnesia, &c., and a part of the silica or the silicate of aluminium. The other portion of the silica remains uncombined until it is brought into contact with lime in the presence of water, when it unites with the lime held in aqueous solution.

The setting of hydraulic limes is the result, therefore, of a combination between these various substances, which commences during the burning or calcination of the limestone and is completed by these compounds becoming hydrated, through being mixed with or being brought into contact with water, with the result that they become crystallized, reacting back to their original form as nearly as possible, namely, that of a stone. When the lime is of an eminently hydraulic nature the assistance of the carbon dioxide is not required during the process of setting. The blue lias lime of England is the main repository of water-setting or hydraulic limes in Great Britain, but available beds also occur among the carboniferous limestones of Flintshire, Northumberland, Lanarkshire (Arden), East of Fife (Blebo), and in the Lothians at Dunbar, Cousland and other places.

The "hydraulic" lime with which, in Glasgow, we are most familiar is that known as Arden lime, and there is also a limestone at Calderwood from which Roman cement was made.

The following is an analysis of the limes got at Arden and Calderwood:—

ANALYSIS OF NATURAL HYDRAULIC LIMES.

	Roman cement.	Arden lime.
Lime	48.44	45.64 to 43.00
Silica	17.90	33.40 " 33.70
Alumina	12.12	6.69 " 6.64
Magnesia	1.92	1.37 " 1.72
Oxide of iron	9.68	2.92 " 2.64
Carbon dioxide	7.15	7.95 " 6.10
Sulphur trioxide	—	1.05 " 2.19
Phosphoric acid	—	.09 " .12
Moisture	.05 to 2.00	.48 " .66

When the buildings of the Andersonian College, Glasgow, were being taken down it was found that a hydraulic lime had been used in the foundations. I had a piece of this analysed and have preserved another part of it. The analysis showed it to be a mixture of Roman cement and sand in the proportion of 1 part of cement to 1 of sand. Alterations were made on these buildings in 1836, and in all probability this lime was got at Calderwood. The mortar of which the remainder of the wall was built was ordinary fat lime mortar, and was very friable and rotten, whereas the hydraulic mortar is in a first-class state of preservation.

Artificial Hydraulic Lime.

While the hydraulicity, or power of setting under water, is natural to some limes, it may be imparted to all (or nearly all) by the artificial addition in proper proportions of clay, oxide of iron, and other ingredients. Smeaton experimented with mixtures of various substances, mixing them together previous to their being made into mortar. Each individual lime requires its own quantities of the various ingredients, but the following may be taken as the quantities of the main ingredients:—

Lime,	50 to 80 per cent.
Clay,	25 to 40 "
Iron oxide,	3 to 14 "

M. Vicat, a French engineer, found as the result of his experiments that the best artificial hydraulic lime was to be had by the grinding-up of the various ingredients together, allowing the mixture to dry, then calcining it and regrinding it to powder; the burning of the various ingredients in this form having the same effect as the burning of a natural limestone composed of these ingredients. M. Vicat established a work near Paris for the manufacture of artificial hydraulic lime. This factory may be said to have been the forerunner of what now

constitutes the important industry of Portland cement manufacture.

[At this portion of his paper Mr. Smith dealt with the details of Portland cement manufacture, tests, &c., but as these particulars have already been given at length in our columns, notably in Mr. Bamber's paper (see issues for January 4th and 11th, 1905), we omit them here.—Ed. B.J.]

Sand and its Substitutes.

As has already been mentioned, sand is essential to the setting or indurating of fat or rich limes. A further process is served by the use of sand in mortar prepared from a rich lime, namely, that of keeping the mortar from shrinking. The pastes of fat lime shrink to such a degree in hardening that they cannot be used as a mortar without an admixture of sand.

Sand is a product of the decomposition of rocks. In a great many cases this decomposition is caused by the action of water on the rock. The sand is carried away by the water, and by the same means is washed clean and free of the clayey matter which also forms part of the rocks. As a result of the geological changes which have taken place at various times on the crust of the earth large quantities of sand have been deposited in places where there are no water-courses or streams at the present time. The sand found in these deposits is termed "pit" sand, to distinguish it from "sea" sand—or sand found on the seashore, and river sand—sand taken from the beds of streams.

As a general rule in pit sand the particles are sharper and not so round in shape as the sand found on the seashore or in the beds of streams or rivers. Where, however, the sand has been deposited by the action of the wind the particles are found to be very fine, nearly as fine as particles of dust, and almost perfectly round in shape. Examples of this latter kind of sand may be seen in the sand-hills on the links that are so plentiful along our coasts. Sea sand, although perfectly clean and what is termed "sharp," should not be used in mortar for house-building purposes because it contains a considerable quantity of magnesium chloride, which is deliquescent and very sensitive to moisture, with the result that walls which have been built or plastered with mortar in the preparation of which sea sand has been used continue to give evidence of being damp. It has been suggested that this may be overcome by the "washing" of the sand in fresh water. Part of the salt will be removed by the sand undergoing the process known as washing, but repeated washings are required before the salt can be wholly taken out of or separated from the sand. This entails considerable expense and is seldom or never done, so that it may be taken as a rule that there should be no sea sand in mortar which is to be used in connection with house building.

The same objections do not apply to the use of sea sand in mortars used for other purposes than house building, and in work such as outside cement work.

River sand, or sand deposited on the beds of streams or rivers by the flow of the water, is, as a general rule, "clean"—that is, free from mud or clayey matter. The same causes, however, which have made it clean have also contributed to the rounding of the edges of the grains or particles of which it is composed. The sharper the sand the stronger or better the mortar. This condition is to be met with in pit sands, especially in sands that are deposited near where they have been formed, and where the action of the water has been sufficient to cleanse them without causing enough friction to make the particles round in shape. In some cases the deposits that have been made subsequent to the deposit of sand have had a deleterious effect on what otherwise fulfils the conditions of a good sand for the purpose of making a

mortar. For instance, there may be a deposit of peat on top of the sand, and the water, percolating to the sand, carries with it a quantity of peaty matter, which covers the particles of sand with a fine film or skin of mud. This skin prevents the air from passing through the mortar as previously described, and also prevents the crystallization of the lime and the formation of the silicate, to which reference has also been made. The deposit also may have been made too near the place of decomposition to allow all the clayey matter to be washed off the grains of sand, with a similar result.

The appearance or colour of the sand is no guide to the quality, as the colour varies according to the kind of rock that has been decomposed.

A rough-and-ready test of the presence of clayey or earthy matter in sand is to take a small quantity of the sand and rub it between the palms of the hands. The clayey matter adheres to the hands, the thickness of the coat of clay adhering being a guide to the quantity of clayey matter in the sand. A better test is to take a glass measuring cylinder, and fill it half full with sand, then add water until the sand is saturated and the water rises in the glass well clear of the sand. Stir the mixture thoroughly, then allow it to settle, when the coarser or heavier grains or matter will be seen at the bottom of the glass, the layers of sand gradually getting finer until at the top a layer of mud is seen and above that clean water. The proportions of the various materials of which the sand is composed can be exactly estimated by this method.

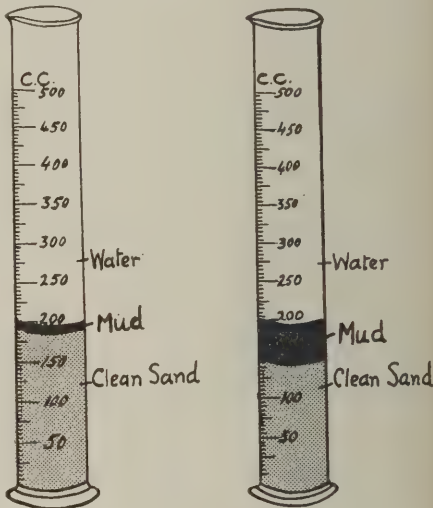


FIG. 1.

FIG. 2.

The proportion of about 5 per cent. of mud shown by Fig. 1 are those of a pit sand in common use in Glasgow.

The sample shown by Fig. 2 is that of a fine pit sand. On being tried by the ordinary method of rubbing a small quantity between the hands it appeared to be perfectly clean. When it was washed the proportion of mud was found to be 28 per cent. The mortar that was made with Arden lime and this sand never set, in consequence of each particle of sand being coated with a fine layer of mud, which effectually prevented the lime from crystallizing on the sand.

It may be stated that although the terms 5 per cent. and 28 per cent. are used in connection with the proportion of clay to sand they are not strictly accurate, as it is by measure that they were determined and not by weight. If they had been determined by weight the percentage would have been very much lower. An American writer recently stated that a mixture of clay to the extent of 12 per cent. was beneficial to the mortar, but quite the contrary has been the experience of

the author, as he has always found that the cleaner the sand the better the mortar.

A sand in which the grains are not of a uniform size is found to give the best result when mixed with lime to form a mortar. The writer had an opportunity recently of examining pieces of mortar taken from buildings which were erected during (1) the eleventh century, (2) the thirteenth century, (3) the fifteenth century, (4) the seventeenth century. Nos. 1, 2 and 4 were built adjoining each other, No. 3 being separated from the others by a distance of about a quarter of a mile. There is a limestone of a rich nature, native to the district, which has been quarried from time immemorial at various points ranging from a mile to a mile and a half distant, so that we may assume that the limes used on all the buildings came from the same place. In 1, 2 and 3 the sand used appears to have ranged in size from pebbles the size of a pea to very fine grains, while in 4 the sand was uniform in size, something like the largest that would be passed by a sieve with 400 meshes to the square inch. In 1, 2 and 3 there were also to be seen small fragments of shells. The mortar in 1, 2 and 3 still serves the purpose for which it was intended, that of binding the stones together, while that in 4 has no cohesion and can be raked out of the beds and joints of the masonry like loose sand.

The author had the experience of the use of a mortar in which the sand used for the mixing of the lime (ordinary rich lime) was almost entirely composed of small shells and particles of shells. The quantities used were from 2 to 3 parts of sand to 1 of lime, the result being a short brittle mortar, which set very rapidly with a hardness and a cohesion equal to that of Portland-cement mortar. The reason for this is, that these shells, being irregular in form and corrugated, would afford every facility for the induration of the lime.

From the foregoing results we may conclude that the best sand to use with rich lime is a clean sharp-grained sand, the grains being of various sizes, preferably having an admixture of shells. The same description and quality of sand will be found most suitable for use also in the preparation of hydraulic lime and cement-mortars.

In cities and in many rural districts great difficulties are experienced in getting a sand suitable for mortar, and various substitutes are used. The Romans used burnt clay, broken into small pieces. In India at the present time old bricks are pounded up and take the place of sand in mortar, with the best of results. In this country engine ashes are largely used, and where the ashes have been burned to a clinker a good mortar can be prepared from a mixture of ashes with lime and sand. At a building the erection of which the author superintended several years ago the mortar was made from what is known as "small" Irish lime, in which there was the refuse or ash from the coal with which the lime was burned, engine ashes and the shivers or refuse from the sandstone used for the building. The mortar was mixed in a mortar mill, the result being a good mortar which set or indurated quickly and became very hard. The author has a piece of lime-mortar composed of 1 part of Arden lime (a ground hydraulic lime), 1 part of engine ashes, and 1 part of white sandstone shivers, all ground up together in a mortar mill. The mortar prepared from this mixture set very quickly, with great hardness and strength. When we look at the composition of the various materials used in these mortars the cause of the improvement in setting is easily explained. The ingredients of coal-ash (Scotch coal) are given as—

Silica	-	-	-	-	37.6
Alumina	-	-	-	-	52.0
Lime	-	-	-	-	3.7
Magnesia	-	-	-	-	1.1
Acids	-	-	-	-	5.02

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The shivers may be taken as consisting of—

Silica	-	-	-	90.5
Iron	-	-	-	3.5
Carbonate of lime	-	-	-	4.8
Water and inorganic matter	-	-	-	2.2
100.0				

The silica in the ashes and shivers would supply the necessary part of sand to counteract shrinkage, while the alumina, iron and magnesia would all assist in forming the conditions requisite to a highly hydraulic or self-setting mortar.

Black sand, or the spent sand from a foundry, forms at times one of the ingredients of a lime-mortar, but is looked upon with suspicion by a great many of those who are connected with the building trade as being likely to lead to the formation of an inferior mortar. These suspicions are not well founded. There is a certain amount of clay mixed with the sand before it is used in the foundry which, if not properly calcined, would have a bad effect on the mortar mixed with it. The clay, however, through coming in contact with the molten metal while in the casting pit becomes calcined, and is brought into that condition which makes it fit to be used in the preparation of a mortar. The sand also gets permeated with a small quantity of the iron, with a beneficial result. The chief objection which the author has to the use of black sand is its uniformity of fineness and its "fatty" nature, which tempts the unscrupulous user to mix with the lime a quantity of sand quite out of proportion to that required, with correspondingly bad results.

Smithy ashes, which contain scales of iron, are also used when a specially hard lime-mortar is required for pointing or such like purpose. Before the time when Portland cement came so largely into use floors were formed with a concrete consisting of smithy ashes and lime-mortar. "Mine dust" or refuse from the ironworks was also put to the same use as smithy ashes; the mine dust, when mixed with lime, making a very hard-setting mortar.

Proportions of Ingredients in Mortar.

A common specification of the relative proportions of lime and sand of which a mortar is to be composed, when the lime proposed to be used is a "fat" lime, is 1 of lime to 3 of sand. These proportions may strike the "happy medium," but in some cases, where the lime, although it may be classed as a "fat" lime, is of a sandy nature, the quantity of sand specified will be too large. On the other hand, where the lime is of a very rich or pure nature, which bulks largely on being slaked, the quantity of sand may be too small.

An American writer (Gillmore) on the subject of limes and cements gives as the quantity of lime in proportion to the sand as the amount of lime that is required to fill up the voids in a known volume of sand plus 45 to 50 per cent. of that amount to allow for shrinkage of the lime. The coarser and the cleaner the sand is, the more lime will be required to fill up the voids, so that it is more economical to use sand which varies in quality of fineness. This may be the accurate method of determining the proportions of sand and lime, but for everyday work the sand, as we have already seen, should be clean and of varying degrees of fineness, and the quantity mixed with the lime should be sufficient to open, or, as it is termed, cut it up, but not enough to make it short and brittle when it is made ready for use. Experience of the various limes will guide the user as to the amount of sand required with the lime to make a good mortar.

In mortars made from hydraulic limes and Portland cement sand is not necessary to the hardening of the mortar, but is used for reasons of economy, and the strength required is the determining factor in the proportions in

which sand is to be used. For ordinary building purposes, sand in the proportions of 2 parts by measure to 1 of hydraulic lime, or 3 parts of sand to 1 of Portland cement, will yield a satisfactory mortar.

Slaking of Lime.

The next step in making a mortar, after having decided on the proportions of lime and sand that are to be used, is the slaking of the lime. The general and most convenient method is to spread out the quicklime in a heap, say 12 ins. in depth, breaking the larger pieces to bring them all to a uniform size. Surround the heap with sand and pour on a sufficient quantity of water to reduce the quicklime to powder, then cover it up as quickly as possible with the sand. This is often done very carelessly, with the following results:—Some of the lime will have got too little water, leaving it still unslaked, and if it be immediately made into a mortar, and used in the building of a wall, it slakes there, in some cases bursting the wall asunder, and breaking the stones with which it is built. On the other hand, some of the lime may get too large a share of the water, with the result that it becomes what is termed "drowned," which has a very bad effect on the strength of the mortar, as will be shown later.

What the author has found to be the most satisfactory method of slaking quicklime is to have the sand and lime lying convenient to the place where it is proposed to slake the lime. In selecting a suitable place for slaking lime a piece of ground as dry as possible should be chosen, and in such a position that water from the surrounding ground or buildings cannot run on to it. More lime is damaged by water getting at it at ground level than by rain falling on top of it. Having selected a suitable place, a layer of lime about 2 ft. wide and from 6 ins. to 8 ins. deep is spread across it, the larger pieces being broken up as mentioned before. Water is sprinkled on this layer, and one of the sides and the two ends are covered with sand; another layer of lime, of the same depth as before, is put on top and the operation of sprinkling repeated, and other layers added and sprinkled in succession until a height of about 3 ft. is reached, when the top is covered with sand. A layer is then put on the ground in front of the last, and so on until the whole of the lime is slaked. Hydraulic limes do not slake readily on the application of water; the more highly hydraulic the lime is, the more difficult it is to slake, therefore the major part of the hydraulic limes are reduced to powder by grinding by the same process as that adopted for Portland cement in preference to slaking.

Rich limes should not be made into a mortar until at least seven days after slaking, to allow the particles of quicklime to become thoroughly slaked. A rich lime may be kept for an indefinite period of time, provided it is kept moist and the air does not get at it to vitiate it by providing carbon dioxide. When lime is not to be used for some weeks or months after slaking, a good method of preserving it is to moisten a small quantity into a paste and cover the heap with this, which will form a smooth skin on the outside and protect the lime from the effects of air and rain.

Hydraulic lime should be used immediately after grinding, as the carbon dioxide which it absorbs from the atmosphere has a deleterious effect on it, tending to bring it into a condition similar to that of a rich lime. All ground limes, however, are not hydraulic limes, or are only feebly hydraulic, and contain a large proportion of pure lime. Limes of this description should be air-slaked for a short time before being used as a mortar, to allow the increase of bulk to be formed. Some builders overcome this difficulty by mixing the lime and sand together twelve hours or so before using.

(To be concluded next week.)

Correspondence.

Action of Plaster-of-Paris on Iron.

To the Editor of THE BUILDERS' JOURNAL.

SIR,—In reference to your comments on my remarks upon the chemical nature of plaster-of-Paris which you were good enough to publish on p. 126 of your issue for March 7th, I must ask to be allowed to make a brief reply to dispel the impression that I deny that iron in contact with this substance is often corroded. Such denial would of course be quite fatuous. My contention, however, remains that this corrosion is not due to the plaster-of-Paris itself, but to other causes such as the presence of air and moisture, and possibly to extraneous substances which various plasters with a base of plaster-of-Paris may contain. I would suggest that you put my contention to the test by keeping under examination some powdered plaster-of-Paris and some selenite or gypsum which has the composition of the slaked plaster-of-Paris in a clean iron box in a dry atmosphere.—Yours truly,

LONDON. ALAN E. MUNBY.

[Our readers will remember that Mr. Munby's original letter was written with the object of defending plaster-of-Paris (and patent plasters using this substance as a base) from the aspersions that Mr. W. W. Kenly cast on it and them. Mr. Kenly gave several practical instances where iron in contact with plaster-of-Paris had been badly corroded. Mr. Munby's defence seems to us somewhat beside the question at issue, which is related to practical conditions. The great power which plaster has for absorbing moisture is well known, and putting aside the question whether this causes gypsum to chemically interact with iron—a matter that seems to us to warrant investigation—we think this power makes it reasonable to hold that plaster can assist in the promotion of rust. The following are our reasons for this statement:—The rusting of iron consists in oxidation of the metal to the condition of hydrated oxide. This, however, does not take place at ordinary temperatures in dry air or in moist air free from carbon dioxide. The combined action of moisture and carbonic acid is necessary. Ferrous carbonate is first formed; this is at once oxidized to ferric oxide, and the liberated carbon dioxide acts on a fresh portion of metal. Once started the corrosion proceeds rapidly, perhaps on account of the galvanic action between the oxide and the metal. Prof. Spencer B. Newbury, an authority of universal reputation on the chemistry of cements, states that water holding carbonic acid in solution rapidly attacks iron. "In lime-water or soda solution the metal remains bright. The action of cement in

preventing rust is now apparent. Portland cement contains about 63 per cent. of lime. By the action of water it is converted into a crystalline mass of hydrated calcium silicate and calcium hydrate. In hardening it rapidly absorbs carbonic acid and becomes coated on the surface with a film of carbonate, cement-mortar thus acting as an efficient protector of iron, and captures and imprisons every carbonic-acid molecule that threatens to attack the metal. The action is, therefore, not due to the exclusion of air; and even though the concrete be porous, and not in contact with the metal at all points, it will still filter out and neutralize the acid and prevent its corrosive effect."

Plaster-of-Paris when set does not thus neutralize any carbonic acid that is contained in the moisture absorbed from the air, and, instead of allowing the moisture to dry away from the metal, keeps it continually in contact, and thus increases the rate of rusting beyond what would be the case with iron without any covering. It thus assists corrosion.—ED. B. J.]

OUR PLATE.

"CROSSLANES" is a house at Frensham, near Farnham. It is built with white rough-cast walls and a local tile roof. The stone in the garden walls came from the inside of the old bridge at Frensham, having been replaced with concrete. The contractors were Messrs. J. H. & E. Dyer, of Alton, Hants, and the architects Messrs. Niven, Wigglesworth & Falkner, of London and Farnham.

LONDON COUNTY COUNCIL.

New Building Recommendations.

AT yesterday's meeting of the London County Council the Building Act Committee reported the following applications under the London Building Act, 1894, their recommendations as to consent or refusal being appended in *italics*:—

Buildings on the south side of Lancaster Road, Norwood, between Chatsworth Road and Dalmore Road, on the further application of C. J. Bentley, on behalf of L. S. Rogers. (*Consent.*)

Retention of an illuminated sign at No. 292, Euston Road, St. Pancras, on the application of A. Monighetti. (*Consent.*)

Retention of two projecting shops at Nos. 17 and 19, Loampit Vale, Lewisham, on the application of Blake & Dannatt. (*Consent.*)

Flight of steps in front of the Southfields Baptist Chapel, Wimbledon Park Road, Wandsworth, on the application of R. H. Weymouth. (*Consent.*)

Bay windows in front of Nos. 20, 26, 28 and 30, Beech-hill Road, Eltham, on the application of J. J. Bassett, on behalf of A. Cameron Corbett. (*Consent.*)

Bay windows in front of Nos. 1 and 7, Glenshiel Road, Eltham, on the application of J. J. Bassett, on behalf of A. Cameron Corbett. (*Consent.*)

Porch to a house to be known as "Dulce Domum," on the western side of Cleanthus Road, Shooter's Hill, Plumstead, on the application of A. A. Beard. (*Consent.*)

Retention of an iron forecourt railing in front of No. 22, Aubrey Walk, Kensington, at less than the prescribed distance from the centre of the roadway of the street, on the application of Selby and Kisingbury, on behalf of A. Withers. (*Refusal.*)

Library building, with projecting porches, on the east side of Holloway Road and south side of Fieldway Crescent, Islington, on the further application of H. T. Hare, on behalf of the Islington Metropolitan Borough Council. (*Consent.*)

Building at the corner of Old Nichol Street and Chance Street, Bethnal Green, on the application of C. R. Peters. (*Consent.*)

Ten one-storey shops at the junction of Horstead Road, Arica Road and Revelon Road, Brockley, on the application of A. H. Kersey, on behalf of the trustees of the late Robert Kersey. (*Refusal.*)

Porch to a proposed new church on the east side of Altenburg Gardens, Clapham Common, on the application of Kelley & Dickie, on behalf of the Rev. G. Grady. (*Refusal.*)

Erection, on the east side of Binstead Street, of an iron and glass shelter to the premises of Waring, Ltd., Oxford Street, St. Marylebone, on the application of R. F. Atkinson, on behalf of Waring, Ltd. (*Refusal.*)

Building on the north side of Grace's Mews, Camberwell Grove, Camberwell, with the forecourt boundary fence at less than the prescribed distance from the centre of the roadway of the street, on the application of A. W. Osborn, on behalf of J. F. Chiverall. (*Consent.*)

Two-storey building at the rear of No. 8, Rochester Square, Kentish Town, to abut upon Rochester Place at less than the prescribed distance from the centre of the roadway of that street, on the application of T. B. Westacott, on behalf of W. Baskwill. (*Consent.*)

Wood and glass roof over a portion of the yard at the rear of No. 52, Mile End Road, Stepney, at less than the prescribed distance from the centre of the roadway of Cecil Street, on the application of W. E. H. Crawley, on behalf of Franks and Simons. (*Consent.*)

Houses on a site on the east side of Elmington Road, Camberwell, with the forecourt fences at less than the prescribed distance from the centre of the roadway of that street, on the application of W. M. Proudfoot, on behalf of S. F. Cope. (*Refusal.*)

Three temporary wood and iron sheds at the borough Council's Callis Yard Depot, Woolwich, at less than the prescribed distance from the centre of Callis Yard, on the application of J. Rush Dixon, on behalf of the Woolwich Metropolitan Borough Council. (*Consent.*)

Iron gangway to connect Hay's Wharf and Willson's Wharf over the public right of way leading from Battle Bridge Lane to Battle Bridge Stairs, Rotherhithe, on the application of the proprietors of Hay's Wharf. (*Consent.*)

Wood and iron chute of a temporary character to connect Hay's Wharf with Willson's Wharf over the public way of Battle Bridge Lane, Rotherhithe, on the application of the proprietors of Hay's Wharf. (*Consent.*)

Modification of the provisions of that section with regard to open spaces about buildings, so far as relates to the proposed erection of a building to be known as No. 8, Frogna Terrace, West End Lane, Hampstead, with an irregular open space at the rear, on the application of R. L. Pearce, on behalf of the Middlesex Building Co., Ltd. (*Consent.*)

Modification of the provisions of that section with regard to open spaces about buildings so far as relates to the proposed erection of buildings on a site at the junction of Horstead, Arica and Revelon Roads with irregular open spaces at the rear, on the application of A. H. Kersey, on behalf of the trustees of the late R. Kersey. (*Refusal.*)

Building on the site of Nos. 132-135, Long Acre, to exceed in extent 250,000 cub. ft., and to be used for the purposes of a motor carriage works, repair shops and showrooms, on the application of W. Woodward, on behalf of Slater & Son and W. H. Eastgate. (*Refusal.*)

Extension of the period within which the erection of an addition to the Grosvenor Hotel, Victoria Station, Buckingham Palace Road, Westminster, was required to be completed, on the application of C. L. Morgan, on behalf of the London, Brighton, and South Coast Railway Co. (*Consent.*)

(Last week's decisions will be found on page xlii of this issue.)

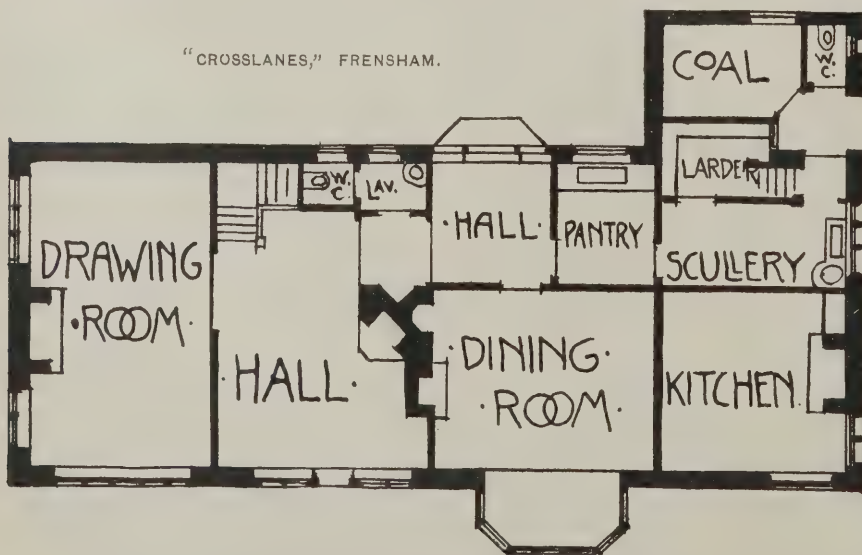
Notes and News.

Mr. T. G. Jackson, R.A., will, we believe, hang the architectural works at this year's Academy.

A Memorial to the late Mr. Alfred Waterhouse, R.A., is being arranged for in the parish church of Yattendon, Berkshire.

Messrs. Yarrow's Works at Scotstoun are to be carried out by Sir William Arrol & Co., who have sub-let the making of the dock basin and the building of the walls of the various shops to Messrs. Morrison & Mason, of Glasgow. The engine shop is to be 210ft. long and more than 150ft. wide, and the boiler shop 300ft. long and of the same width as the engine department, but the chief feature is the roof-covering of the dock, which is to be 320ft. long and 85ft. wide. The roof will be 140ft. wide, so that work may progress in the worst of weather.

"CROSSLANES," FRENTHAM.

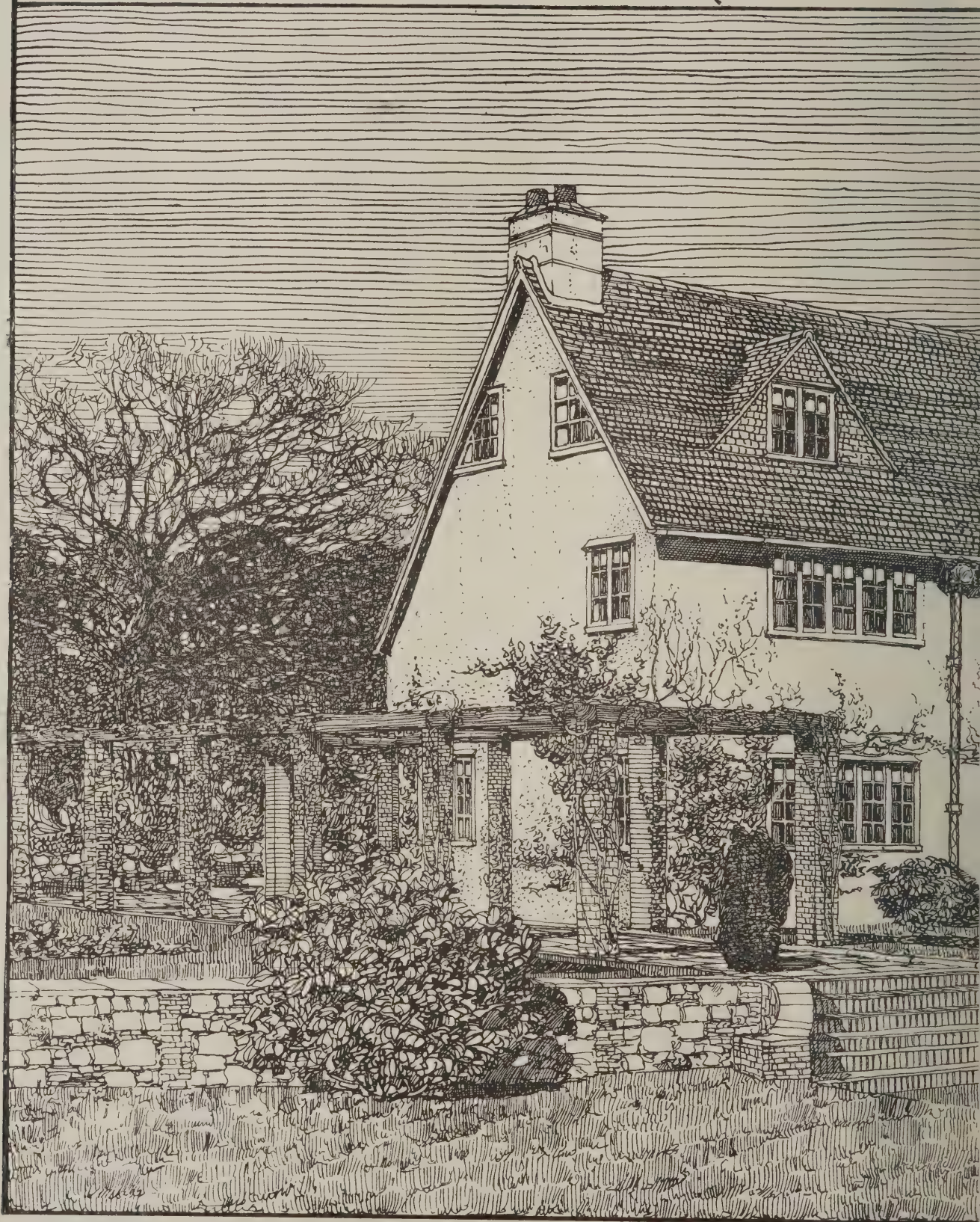


[NIVEN, WIGGLESWORTH AND FALKNER. ARCHITECTS.]

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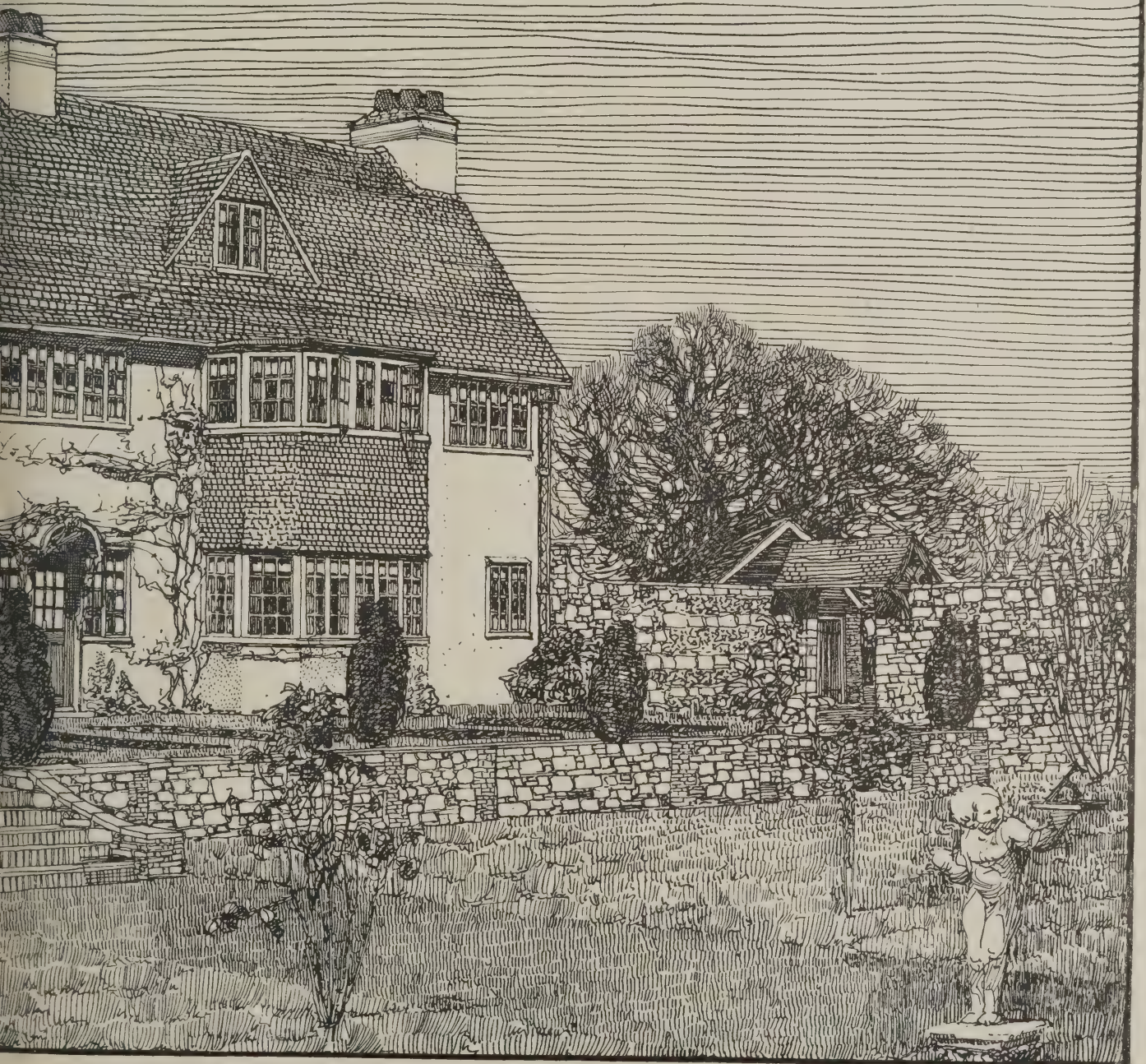
Supplement to
THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD,
Wednesday, March 21st, 1906.

"CROSSLANES" FRENSHA



PLAN FOR MR H.J. BAKER.

NIVEN WIGGLESWORTH & FALKNER ARCHTS



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Aberdeen Society of Architects.—Mr. R. G. Wilson has been elected president of this Society for the current year and Mr. John Rust vice-president.

An Artesian Well has just been bored at Celtic House, Leadenhall Street, E.C., to a depth of 450 ft., from which an electric pump raises the water at the rate of 2,500 gallons an hour.

A new Lunatic Asylum for Renfrewshire is being built at Dykebar, half-way between Hurlet and Paisley. Accommodation is to be provided for 250 patients. The estimate for the brick and mason work exceeds £23,000.

A Scottish Garden City.—Plans have been prepared for a "garden city" on the outskirts of Dundee. Messrs. Charles Ower & Co. have drawn up the scheme. Sixty-one semi-detached cottages will be proceeded with first, but a larger class of villas is also to be designed.

A new County Bridge across the Mersey, to connect Lancashire and Cheshire between Flixton and Carrington, is being erected by Mr. Matthew Hawley, of Hull, at a cost of about £3,600, under the direction of Mr. W. Compton Hall, the Lancashire county bridge-master. The structure will be of Darley Dale stone.

The Work of Restoring Shoreditch Town Hall after the fire of 1904 is now practically complete. It was begun about May last year. The contract has been satisfactorily carried out by Messrs. Killby & Gayford, of Worship Street, under the direction of Mr. Alfred W. S. Cross, F.R.I.B.A. The most conspicuous thing about the new hall is the superabundance of marble and gold.

Proposal to clean the Plaster off the Guildhall.—At last week's meeting of the Court of Common Council it was decided that it be referred to the City Lands Committee to consider and report on the desirability of removing from the walls and columns of the interior of the Guildhall the plaster or stucco with which they have been incrustated and disfigured. The porch has already been thus restored.

Treatment and Weathering of Cement Slabs.—Mr. Hippolyte J. Blanc, R.S.A., of Edinburgh, has been criticizing the use of cement slabs for the roof of the old Corstorphine Church. He does not think the work is successful, and considers that to put cement in imitation of stone is not the legitimate use of cement. Mr. P. Macgregor Chalmers, architect, of Glasgow, is of opinion that the concrete roof, while carried out most successfully, will not weather as they might desire.

Extension of Glasgow Municipal Buildings.—At their last meeting the Municipal Buildings Committee of the Glasgow Town Council had under consideration the plans by the city engineer for the proposed reconstruction of the property in Cochrane Street, to the west of the Sanitary Chambers, at an estimated cost of £99,000. The cost of the section at present proposed to be proceeded with is estimated at £68,000. The city engineer was instructed to get out the detail drawings for this first section.

Billinge Parish Church is proposed to be restored under the direction of Mr. T. G. Jackson, R.A. The north and south galleries are proposed to be removed and the church extended eastwards 40 ft., the extension taking the form of an octagon surmounted by a dome and flanked by short transepts, the present small apse being considerably lengthened and replaced at the east end of the octagon. The present church was built to replace an earlier one in 1717-8, and the galleries were not added until a century later—in 1823-4. The total cost of the contemplated work is £3,000.

Christ Church, Felling, has been restored and enlarged at a cost of £2,916.

A new Administrative Block at the Hackney Workhouse at Homerton is being built under two contracts representing a total of £37,176. The architect is Mr. W. A. Finch.

Putney Hippodrome.—On March 31st Sir Henry Kimber will lay the foundation-stone of the new Putney Hippodrome in Felsham Road. Messrs. Kingerlee & Son, of Oxford, are the contractors. The building will cost £23,000.

New Baths and Washhouses at Newcastle are being built at the corner of Gibson Street at a total estimated cost (including site) of £28,841. The builders are Messrs. J. & G. Douglas, of Heaton; the engineers Messrs. W. C. Dix & Co., of Low Bridge; and the architect Mr. F. H. Holford, the city property surveyor.

The Old Welcome Club at Earl's Court Exhibition, which was partly destroyed by fire last summer, is being entirely rebuilt in permanent form. The new premises will be of brick, rough-cast. An octagonal-shaped reception hall with a domed roof forms the feature of the main entrance. The dining-room, nearly roofed long, will be panelled like the hall in fumed oak.

A new Science School at Dulwich College is being erected at an estimated cost of about £18,000 from designs by Mr. Charles E. Barry, A.R.I.B.A. It is to the north of the present buildings, in red brick and terracotta. On the ground floor there will be provision for the teaching of physics, with a museum, and on the top floor chemistry rooms, with an optical laboratory. Lecture theatres and teaching laboratories will be provided.

A Valuable Manchester "Island."—The proposed demolition of the old church of St. Peter's Church, Peter Street, Manchester, was the subject of discussion at last week's meeting of the Manchester Improvements Committee. St. Peter's is situated on an "island" area—completely surrounded by tram lines. The site has a frontage to four important thoroughfares, and is consequently a very valuable one for commercial purposes. The Corporation, however, are taking powers to prevent its future use as a commercial site, as they consider the place should be left open after the demolition of the edifice.

Messrs. Carter & Co., of the Encaustic Tile Works, Poole, have recently opened the "White Works," Hamworthy, Poole, in order to meet the increasing demand for white-glazed wall tiles. The premises are of considerable extent, and are fitted throughout with the latest and most improved machinery. The Encaustic Tile Works at Poole will in future be devoted more particularly to the manufacture of constructional faience, terracotta, decorative tiles and mosaics, whilst the architectural pottery at Hamworthy will continue to produce every description of floor tiles.

Westminster Bridge.—The Earl of Liverpool, in reply to a question by the Duke of Rutland in the House of Commons recently, gave some interesting facts about the construction of Westminster Bridge. The original stone bridge at Westminster, he said, which ranked next in point of date after London Bridge, was built between 1738 and 1750 from the designs of Labelle. It had fifteen arches, resting on caissons, and alcoves in the parapet with seats for the shelter and rest of passengers. These alcoves could now be seen in Victoria Park. The cost was £218,800, with £170,690 more for the approaches, including Great George Street. In 1846 the piers of the bridge began to give way, and it soon had to be closed for traffic. Then was built the present bridge, with its approaches, at a cost of £553,000.

A Pavilion is to be built on the pier at Weymouth at an estimated cost of £12,500.

Cleaning Stonework with Steam.—The first instance in Edinburgh of the use of steam for cleaning stonework has been in Princes Street, where a large drapery establishment—formerly the Edinburgh Hotel—has been cleaned.

A Roman Villa has been found in Little Lippin Wood, near West Meon Church, Petersfield, Hants. The chief features that have been determined at present are a block of six rooms, with what is thought to have been a gateway on the east side, a double hypocaust in the south-west corner, and a buttress backing the wall to the block of rooms.

The Army Nurses' Home.—Steady progress is being made with the building of the Home for Nurses at the Military Hospital at Millbank, and, in view of the criticisms made some months ago as to the planning of the buildings, it is satisfactory to learn that important alterations have been made in the original plans, conforming with the Nursing Board's recommendations.

White Paint on White House.—A contemporary points out that white paint was formerly an important item in the cost of the upkeep of the White House at Washington. The mansion received a fresh coat two or three times a year, and eventually it came about that there was an extremely thick layer of paint all over it. To the pillars of the portico in front a perceptible accretion of diameter was contributed in the course of eighty years or so. But when, soon after the incoming of the Roosevelt administration, the establishment underwent a thorough renovation and reconstruction, all of this accumulated paint was burnt off by means of a flame-blast, exposing to view the original brown sandstone. Then a fresh coat of white was put on, and the edifice, which might originally have been called the Brown House, became once more, in appearance as well as in name, the White House. Since that time a new policy has been adopted in the treatment of the mansion. It is painted only at long intervals, and instead of a fresh coat of white it gets periodically a thorough washing with soap and water.

Town Houses, Old and New, were dealt with by Mr. W. H. White, F.R.I.B.A., before the last meeting of the Auctioneers' Institute. After referring briefly to the character and development of some of the principal streets and squares of the Metropolis during the seventeenth and eighteenth centuries, Mr. White contrasted the town house of the eighteenth century with that of the present day. The attention of the architect was formerly concentrated upon the reception-rooms and halls, the basement and upper floors being left to take care of themselves. Little care was bestowed on the bedrooms, children's or servants' rooms, which for the most part were low, badly arranged, ill-lighted and unventilated. As a rule the modern architect had successfully dealt with the legacy of defects left by his predecessors when called on to modernize such houses. A little study of the plans of the older town houses filled them with surprise as to how people lived in them. Probably more servants were required in an ordinary town house in the seventeenth and eighteenth centuries than now, and where did they sleep? The conditions were very different now, and were largely responsible for the altered character of the elevations; old ideas as to proportion had been abandoned, and the arrangement of windows to meet the demand for bays and balconies had changed the aspect of the street front. There was, however, a fussiness in modern designs compared with the quiet unobtrusive effect of the older type of front.

Complete List of Contracts Open.

WITH a few exceptions, news of Contracts Open are not repeated after they have been published once in these columns, so that readers will find particulars in our last issue of other contracts that still remain open.

Unless expressly stated to the contrary all deposits required for bills of quantities, &c., are returned on receipt of *bona-fide* tenders.

The words "Fair Wages Clause" inserted in certain paragraphs signify that persons tendering must conform to a fair-wages clause in the contract, which requires them to pay the rates of wages current in the district.

BUILDING.

Mar. 22. Linthwaite.—*Boundary walls* at the new burialground at Christ Church, Linthwaite, near Huddersfield. Plans and specifications may be seen and bills of quantities obtained at the Architects' Office. Sealed and endorsed tenders are to be sent to John Kirk & Sons, architects, Huddersfield and Dewsbury, by 3 p.m. on Mar. 22.

Mar. 22. Gravesend.—*Enlargement* of the "Gravesend and Dartford Reporter" printing premises, Harmer Street. Plans and specifications can be seen at office of the architects, Rayner & Bridgland, 16, New Road, Gravesend, between 9.30 and 5.30. Tenders to be addressed to the Directors of the "Reporter" at the Secretary's Office, 180, Parrock Street, Gravesend, and delivered not later than 10 a.m. on Mar. 22.

Mar. 22. Evercreech.—*Kilns and buildings* near Evercreech New Station for the Evercreech Lime and Stone Co. Plans and specifications may be inspected between 10 and 5 at Stone Yard, Evercreech village. Tenders to be sent in by Mar. 22.

Mar. 22. Brahan.—*Restoration* of Wester Moy farm steading, Brahan Estate. Plans and specifications may be seen with Alex. Campbell, factor, Brahan, and with the architects, Ross & Macbeth, Queen's Gate Chambers, Inverness, with whom sealed tenders must be lodged by Mar. 22.

Mar. 22. Prescott.—*Two additional infirmary blocks* at Whiston Workhouse. Quantities can be obtained at the office of James Gandy, architect, Masonic Buildings, St. Helen's, subject to a deposit of £2. Sealed tenders, endorsed, "Infirmary Blocks," to be delivered to A. F. Mann, Union clerk, Union Offices, Whiston, Prescott, by 10 a.m. on Mar. 22.

Mar. 22. Barnard Castle.—*Shop and business premises* for the Co-operative Society, Ltd. Builders desirous of tendering to send their names to T. Farrow, architect, 7, Market Place, Barnard Castle, on or before Mar. 22.

Mar. 23. Carrick-on-Shannon.—*Repairs and improvements* to County Leitrim Infirmary, according to plans and specifications which can be seen daily on application to Matron at the Infirmary, from 10 to 4 o'clock. Tenders to be sent in to the Committee of Management by Mar. 23.

Mar. 23. Edinburgh.—*New art class rooms* at George Heriot's school. Plans may be seen in the hands of John Anderson, superintendent of works, from whom specifications and schedules of measurement may be obtained. Sealed tenders, marked "Tender for—Work," must be lodged with Peter Macnaughton, S.S.C., clerk, Heriot Trust Offices, 20, York Place, Edinburgh, by 10 a.m. on Mar. 23.

Mar. 23. Bruton.—*Alterations and additions* to Sexey's Trade School, for the Governors. Copies of the plans and specifications may be seen at the school on application to the Headmaster. Sealed tenders, endorsed "Alterations and Additions, Sexey's Trade School, Bruton," to be addressed to Arthur J. Pictor, A.R.I.B.A., architect, Bruton, Somerset, by Mar. 23.

Mar. 23. Manchester.—*Pump-house* at the Withington Workhouse, for the Guardians of the Poor of the Chorlton Union. Plans and sections may be seen and bills of quantities obtained at the offices of Charles Clegg & Son, architects, of 21, Spring Gardens, Manchester, upon payment of £1 rs. Sealed tenders, enclosed in the official envelope, to be delivered to David S. Bloomfield, clerk to the Guardians, Union Offices, All Saints', Manchester, by 5 p.m. on Mar. 23.

Mar. 23. New Tredegar.—*120 houses* at New Tredegar, for the Powell Duffryn Steam Coal Co., Ltd. Plans and specification can be seen and full particulars obtained at the Architect's Offices, Station Road, Bargoed. Sealed and endorsed tenders to be sent to N. Phillips Elliott Offices, New Tredegar, on or before Mar. 23.

Mar. 24. Tylorstown.—*Church* at Cynllwyn-du, Tylorstown, for the Rev. John Rees. Plans may be seen and quantities obtained at the Architect's Office on receipt of £2 2s. Tenders are to be sent to E. M. Bruce Vaughan, F.R.I.B.A., architect Cardiff, by noon on Mar. 24.

Mar. 24. Pontycymmer.—*Vestry* for Tabernacle Church. Plans and specification may be seen at Wellington House, Pontycymmer. Sealed and endorsed tenders to be sent to Thomas Jones, setty., Wellington House, Pontycymmer, by Mar. 24.

Mar. 24. Newquay.—*Three detached residences* at Eistral Road. For full particulars, forms of tender and any other information apply to Cowell & Cowell, architects, Central Chambers, Newquay, to whom sealed tenders, on the forms supplied, must be sent on or before Mar. 24.

Mar. 24. Freystrop.—*Erection of a rectory.* Plans and specifications may be obtained at the office of the architect, Hugh J. Protheroe Thomas, 9, Victoria Place, Haverfordwest, where sealed tenders are to be delivered by Mar. 24.

Mar. 24. Longcliffe.—*Golf pavilion house and workshop* at Longcliffe Golf Links for E. M. P. De Lisle.

Plans may be seen at the office of Barrowcliffe & Allcock, architects, Loughborough, and bills of quantities obtained on deposit of £1 rs. Tenders to be endorsed "Longcliffe Golf House," and delivered to John German & Son, Estate Office, Ashby-de-la-Zouch, by 10 a.m. on Mar. 24.

Mar. 24. Camelford.—*Extension of the Secondary School buildings.* Plans and specification may be seen on application to Lawrence & Pomey, solicitors, Camelford, or at the Architect's Office in Bodmin. Tenders, on the form provided, to be sent to William J. Jenkins architect, Bodmin, by Mar. 24.

Mar. 24. Ibstock.—*School* for the Leicestershire County Council Education Committee. Conditions of contract, quantities, and form of tender, may be obtained from the architect, W. M. Cowdell, Grey Friars, Leicester, on payment of £2 2s. Sealed tenders upon the forms supplied to be sent, in the envelopes provided, to W. A. Brookington, Director of Education, County Education Office, 33, Bowling Green Street, Leicester, by 10 a.m. on Mar. 24.

Mar. 24. Eckington.—*Alterations* at the old police-court, house, &c., for the Parish Council. Plans and specifications may be seen at the Parish Council Offices, 48, High Street, Eckington, any day between 9 and 12 a.m. or 3 and 7 p.m., on deposit of £1 rs. Sealed tenders, endorsed, "Tender for Old Court House," to be sent to Joseph Bolsover, clerk to the Council, 48, High Street, Eckington, by Mar. 24.

Mar. 24. New Ross.—*Parochial house* at New Ross, co. Wexford, for the Very Rev. Canon Kavanagh, P.P., V.F., D.D. Drawings and specifications may be inspected at the Parochial House, New Ross, and at the architects' office. Bills of quantities may be obtained on application to D. W. Morris, 68, Harcourt Street, Dublin. Tenders to be delivered to Dublin, Butler & Donnelly, architects, Dawson Chambers, 12, Dawson Street, Dublin, by Mar. 24.

Mar. 24. Normandy.—*Pair of cottages* at Normandy, near Wanborough Station, for H. Potter. Drawings, specification and conditions of contract can be seen at the office of the architect, A. J. Stedman, Farnham, between 10 and 4. Tenders (which must be sealed up and endorsed "Tenders for Cottages, Normandy") must reach Arthur J. Stedman, architect, South Street Chambers, Farnham, Surrey, by noon on Mar. 24.

Mar. 25. Clough.—*Alterations to Clough Church,* co. Kilkenny, for the Rev. John Roe, F.F. Plans and specifications relating thereto can be seen at the Presbytery, Clough, Castlecomer, or at the office of William H. Byrne, & Son, architects, 20, Suffolk Street, Dublin, by Mar. 25.

Mar. 25. Kiltimagh.—*Additions* to the Convent of St. Louis, Kiltimagh, co. Mayo. The plans and specification relating thereto can be seen at the Convent, or with William H. Byrne & Son, architects, 20, Suffolk Street, Dublin.

Mar. 26. Chard.—*External fireproof staircase* at the Union Workhouse. The work to be carried out under the supervision of M. Larcombe, of Victoria Avenue, Chard, who will furnish further particulars and, if desired, show the building to persons wishing to tender. Tenders in sealed envelopes, endorsed "Staircase," to be sent to F. Gordon Ross, clerk, Union Office, Chard, by 10 a.m. on Mar. 26.

Mar. 26. London, E.—*Scarlet-fever and laundry blocks, porter's lodge, &c.*, on the Isolation Hospital site at Boundary and Roman Roads, East Ham, in accordance with drawings and specifications, which may be inspected upon application to Adam Horsburgh Campbell, M.I.C.E., borough engineer, Town Hall, East Ham, E., and from whom bills of quantities may be obtained upon deposit of £5. Fair wages clause. Tenders to be sent in, addressed to the "Chairman," Public Health Committee, Town Hall, East Ham, E., and endorsed "Scarlet-fever Block," not later than 10 a.m. on Mar. 26.

Mar. 26. Solihull.—*New laundry block* at the Workhouse, according to plans, specifications, details and particulars prepared by W. H. Ward, architect, Paradise Street, Birmingham, from whom all information and particulars can be obtained. Sealed tenders, addressed "The Guardians of the Poor of the Solihull Union" and endorsed "Tender for Laundry," to be delivered to Francis Ladbury Thompson, clerk to the Guardians, Solihull, by 4 p.m. on Mar. 26.

Mar. 26. Scarborough.—*Toll houses* at the north and south entrances to the Marine Drive. Plans and specifications may be seen, and form of tender and bills of quantities obtained, on payment of £1 rs., on application to Harry W. Smith, borough engineer and surveyor, Town Hall, Scarborough. Sealed tenders, endorsed "Tender for Toll Houses," in an envelope provided for the purpose, to be delivered at the office of the Town Clerk by noon on Mar. 26.

Mar. 26. Kingstown.—*Public lavatory* at the Royal Marine Road of Kingstown. Plans, &c., are now lying in the office of the Town Surveyor, and can be inspected between 10 and 4. Any further information can be had on application to the Town Surveyor. Tenders will be received by M. A. Manning, town clerk, Town Hall, Kingstown, up to Mar. 26.

Mar. 26. Armley.—*Alterations and additions* to the cemetery lodge, for the Burial Board. Plans may be seen and particulars obtained at the office of the Board, The Cemetery, Hill Top, Armley, up to Mar. 24. Sealed and endorsed tenders must be delivered to Harry Robertson, clerk, before 2 p.m. on Mar. 26.

Mar. 26. Branton Fen.—*Farm-house* on Branton Fen. Specification and bill of quantities may be obtained on application to the architects. Sealed tenders to be sent to Saunders & Saunders, architects and civil engineers, Newark-on-Trent, by 6 p.m. on Mar. 26.

Mar. 26. Langley Park.—*Sixteen houses* at Langley Park, co. Durham (walls brick), for the Anfield Plain Industrial Co-operative Society, Ltd. Drawings, specifications and conditions of contract may be seen, and forms of tender obtained, at the Architect's Office, 22, Durham Road, Blackhill, co. Durham. Tenders to be sent in, endorsed "Tender for Cottages, Langley Park," to W. R. Pigg, setty., Co-operative Stores, Anfield Plain, R.S.O., on or before 4 p.m. on Mar. 26.

Mar. 27. Houghton.—*Re-roofing and repairing* an existing warehouse and the construction of a new shed, for the Lancashire and Yorkshire Railway Co. Plans can be seen and form of tender and specification obtained on application at the Engineer's Office, Hunt's Bank, Manchester. Tenders, endorsed "Tender for Re-roofing and Repairing Warehouse at Houghton," to be in the hand of R. C. Irwin, setty., Hunt's Bank, Manchester, by 10 a.m. on Mar. 27.

Mar. 27. London, N.W.—*1,412 ft. lineal, or thereabouts, of brick wall* 8ft. 6ins. in height, to the Isolation Hospital grounds at Dog Lane, Neasden, for the Willesden D. Council. Plans and specifications may be seen and all further particulars obtained upon application to O. Claude Robson, M.I.C.E., engineer to the Council, Public Offices, Dyne Road, Kilburn, N.W. The tenders, upon printed forms (to be obtained from the Engineer), and endorsed "Boundary Wall," to be delivered at the offices of the Council not later than 4 p.m. on Mar. 27.

Mar. 27. Yarm.—*New vestry.* Contractors desirous of submitting tenders for the above may see the plans and specification at the church, and at the office of the architects. Bills of quantities may be obtained on application to Wright & Son, surveyors, Lancaster. Tenders to be delivered (under cover) to the architects, Austin & Paley, architects, Lancaster, not later than noon on Mar. 27.

Mar. 27. Litherland and Bootle.—*Station buildings, platforms, &c.*, for "Haltes," at Linacre Road, Litherland, and Captain's Lane, Bootle, on the Aintree and Bootle Branch Railway of the Lancashire and Yorkshire Railway. Plans can be seen and form of tender and specification obtained on application at the Engineer's Office, Hunt's Bank, Manchester. Tenders, endorsed "Tender for Station Buildings, &c., at Linacre Road and Captain's Lane," to be in the hands of R. C. Irwin, setty., Hunt's Bank, Manchester, by 10 a.m. on Mar. 27.

Mar. 28. Harrington.—*New tower,* Harrington Church, for the Vicar and Churchwardens. Plans may be seen, and quantities and specifications obtained, from John F. Curwen, F.S.A., F.R.I.B.A., architect and sanitary engineer, 26, Highgate, Kendal, to whom all tenders must be sent in before noon on Mar. 28.

Mar. 28. Kettering.—*Showyard*, for the Northampton Agricultural Society's show, to be held at Kettering on June 6 and 7. Tenders to be sent to the secretary, A. E. Lovell, Harpole, Northampton, by Mar. 28.

Mar. 29. Cefn-Coed.—*Thirty-nine houses.* Particulars can be obtained from R. Cound Jenkins, architect, Cefn-Coed. Tenders to be sent in by Mar. 29.

Mar. 29. Guildford.—*Portland cement* for the ensuing twelve months, for the Town Council. Specifications and forms of tender may be obtained at the office of the borough surveyor, C. G. Mason, A.M.I.C.E., Tuns Gate, Guildford. No tender will be considered which is not upon the prescribed form. Tenders, endorsed "Tender for Cement," to be sent to F. S. Miller, town clerk, Town Clerk's Office, Bridge Street, Guildford, by noon on Mar. 29.

Mar. 30. Shewsbury.—*Additions to workhouse* consisting of a dayroom, stone-breaking cells, bathroom, iron gangway and staircase, for the Guardians of the Atcham Union. Plans and specifications can be seen at the Union Offices, St. John's Hill, Shrewsbury, and any other information can be obtained from A. B. Deakin, Pride Hill, Shrewsbury, the architect to the Guardians. Tenders, under seal, endorsed "Tender for Buildings," to be sent to Joseph Everest, clerk to the Guardians, Atcham Union Offices, St. John's Hill, Shrewsbury, by Mar. 30.

Mar. 31. Forres.—*Additions and alterations* to the Mechanics' Hall Buildings. Plans and specifications of the works may be seen with the Architect, and offers to be lodged with John Forrest, architect and surveyor, Forres, by noon on Mar. 31.

April 2. Rotherham.—*New business premises* at the corner of Doncaster Gate and Wellgate. Builders wishing to tender must forward their names and addresses, accompanied with a deposit of £3 3s., to J. Platts, architect, &c., High Street, Rotherham, by April 2.

April 2. Banbridge.—Dispensary and dispensary residence for the use of the medical officer of the Crossgar Dispensary District, in the townland of Crossgar, convenient to the village of Dromare, according to the plans and specifications prepared by W. W. Larmor. The Guardians desire that the materials used in the above works shall be, as far as possible, of Irish manufacture. The contractor must undertake to have the whole of the works completed on or before Oct. 31. Sealed tenders, addressed "To the Presiding Chairman," on the special form, and containing the names and addresses of two solvent sureties willing to join with contractor in a joint and several bond for double the amount of the contract, will be received at the Poor Law Office, Workhouse, Banbridge, up to noon on April 2.

April 2. Gunnislake.—Wesleyan church and schoolroom at Chilsworth, near Gunnislake. Plans and specifications may be seen at Delaware Road, Gunnislake. Sealed tenders are to be sent to R. Leverton, secy., by April 2.

April 2. Itchen.—Additions to Boys' County School, for the Southampton County Council. Persons desirous of tendering may see drawings, specification and conditions of contract, and obtain bills of quantities and all necessary information, at the office of W. J. Taylor, county surveyor, The Castle, Winchester, between 9 and 5 (Saturdays 9 and 1). A deposit of £2 2s. will be required for a copy of the bills of quantities. Deposits must be made by cheque, payable to Hants County Council and crossed Bank of England, or particulars will not be sent. Tenders, endorsed "Proposed Additions, Itchen (Sholing) Boys' Council School," are to be delivered to H. Barber, clerk of the County Council, The Castle, Winchester, by 10 a.m. on April 2.

April 2. Thornley.—Small-box hospital, near Thornley, county Durham, for the Easington and Sedgfield Joint Smallpox Hospital Board. Plans may be inspected and specification and form of tender obtained at the office of the Architect and Surveyor, James Stones, Sedgfield, on a payment of £2. Tenders, endorsed "Hospital," must be delivered to J. M. Longden, clerk to the Board, Somerford Buildings, Sunderland, by noon on April 2.

April 3. Guildford.—Enlargement of post-office. Drawings, specification and a copy of the conditions and forms of contract may be seen on application to the Postmaster. Bills of quantities and forms of tender may be obtained at H.M. Office of Works, Storey's Gate, London, S.W., on payment of £1 rs. Tenders must be endorsed "Tender for Guildford Post Office," and addressed, Secretary, H.M. Office of Works, Storey's Gate, London, S.W., by noon on April 3.

April 4. Bradford.—Builders' work in all trades, and for constructional steelwork, required in the extension of the Town Hall (second section). Drawings and general conditions of contract may be seen and bills of quantities and form of tender obtained on application to F. E. P. Edwards, A.R.I.B.A., city architect, Whitaker Buildings, Brewery Street, Bradford. Sealed and endorsed tenders must be sent to Frederick Stevens, town clerk, Town Hall, Bradford, not later than noon on April 4.

April 4. Tatworth.—New infant school at Tatworth, Chard, for the Somerset County Education Committee. Drawings, specification and condition of contract may be seen at the Chard Tatworth Council School, and bills of quantities and forms of tenders obtained from Samson & Cottam, 43, High Street, Bridgwater, on deposit of £1 rs. Sealed tenders, endorsed "Tatworth Infants' School," must be delivered at the County Education Office, Weston-super-Mare, not later than noon on April 4.

April 4. Dublin.—Retaining walls, vaults, foundations and walls, &c., up to the ground-floor level, for the proposed new building about to be erected in Upper Merrion Street, Dublin, for the Commissioners of Public Works. Bills of quantities and form of tender prepared for the purpose can be obtained on application to the Secretary, Office of Public Works, Upper Merrion Street, Dublin, on the payment of £1 rs. The drawings and specification, &c., may be seen at the Offices of the Commissioners between 10 and 5. Tenders to be delivered, addressed to the Secretary, Office of Public Works, Dublin, before noon on April 4.

April 7. Stockport.—First portion of an observation block, at Dialstone Lane Hospital. The general conditions, specifications, &c., will be supplied by the architect, G. H. Brady, Borough Chambers, St. Petersgate, after Mar. 24, on payment before that date of a deposit of £1 rs. Fair wages clause. Sealed tenders, endorsed "Hospital Building Contract," addressed to the Chairman of the Health Committee, must be delivered to Robert Hyde, town clerk, Town Clerk's Office, Stockport, by noon on April 7.

April 9. Cheshunt.—Public library at Turners' Hill, in accordance with the plans and specification prepared by J. Myrle Smith, 8, Trafalgar Square, Chelsea, S.W. Persons desirous of tendering are requested to forward their names and addresses to the Clerk of the Council, Manor House, Waltham Cross, together with a deposit of £5. Forms of tender and bills of quantities will be forwarded, the persons having made such deposit. Plans and specification can be seen at the office of the Architect as above, and also at the offices of the Council, between 10 and 5, Saturdays 10 to 1. Sealed tenders, endorsed "Tender for Public Library," to be addressed to the Chairman, General Purposes Committee, Cheshunt Urban D. Council, Manor House, Waltham Cross, and delivered not later than 4 p.m., on April 9.

April 9. Itchen Woolston.—Additions to St. Mark's Girls' and Infants' Council School, for the County Council. Persons desirous of tendering may see drawings, specification and conditions of contract, and obtain bills of quantities and all necessary information, at the office of W. J. Taylor, county surveyor, The Castle, Winchester, between 9 and 5 (Saturdays 9 and 1). A deposit of £2 2s. will be required for a copy of the bills of quantities. Deposits must be made by cheque, payable to Hants County Council and crossed Bank of England, or particulars will not be sent. Tenders, endorsed "Proposed Additions, Itchen Woolston, St. Mark's Girls' and Infants' Council School," are to be delivered to H. Barber, clerk

of the County Council, The Castle, Winchester, by 10 a.m. on April 9.

No date. South Norwood.—Congregational Church. Apply, George Baines & Son, architects, 5, Clement's Inn, Strand, with references and list of churches erected.

ENGINEERING.

Mar. 23. Leigh.—Water meter house at Pennington Green, Aspull. Specification and form of tender may be had from the Borough Engineer and drawings may be seen at the offices of the Water Department. Sealed tenders to be delivered to Stanley Wilson, town clerk, Town Hall, Leigh, Lancashire, on or before noon on Mar. 23. Envelopes to be endorsed "Tender for Water Meter House."

Mar. 23. Halifax.—Steel and cast-iron work in connection with the construction of a drying-house floor, including a steel calorifier for water heating, at the Workhouse. Apply, W. C. Williams, architect, 29, Southgate, Halifax. Tenders to be sent in by Mar. 23.

Mar. 24. Peterhead.—Cutting and filling tracks, supplying and laying about 1,320 lin. yds. of 10-in. diameter cast-iron pipes, with the necessary valves and fittings, in the duplication of the main supply pipe through the West Den. Plans and specifications may be seen with and schedules of quantities obtained from James Dickie, burgh surveyor, Peterhead, and sealed and docketed tenders to be lodged with David Martin, town clerk, Peterhead, not later than 10 a.m. on Mar. 24.

Mar. 27. Southampton.—Laying a storm-water sewer on the Western Shore. Plans and specification may be inspected and bills of quantities and forms of tender obtained at the Borough Engineer's Office, upon production of the borough treasurer's receipt for a deposit of £1 rs. Tenders on the supplied forms, endorsed "Tender, Storm Water Sewer," must be delivered at the Town Clerk's Office before noon on Mar. 27.

Mar. 27. Crumspall.—Widening of bridge carrying Crumspall Lane over the railway, for the Lancashire and Yorkshire Railway. Plans can be seen and form of tender and specification obtained on application at the Engineer's Office, Hunt's Bank, Manchester. Tenders, endorsed "Tender for Widening Crumspall Lane Bridge," to be in the hands of R. C. Irwin, secy., Hunt's Bank, Manchester, by 10 a.m. on Mar. 27.

Mar. 29. Workington.—Supply and erection of steel-plate girders and curved steel flooring plates, required for the widening of the bridge over the Cleator and Workington Junction Railway; also for the building of the necessary masonry, abutments, wing walls, &c., and for other works, for the Corporation. Drawings and specification may be seen and bills of quantities and form of tender obtained at the office of W. L. Eaglesfield, borough engineer and surveyor, on deposit of £1 rs. Sealed tenders, endorsed "Tender for Girders, Abutments, &c.," are to be delivered to John Warwick, town clerk, Town Hall, Workington, by Mar. 29.

Mar. 30. Bournemouth.—Cliff lift, waiting-rooms, track, &c., for the Corporation. Full particulars can be obtained on deposit of £2 2s. from the Borough Engineer, Municipal Offices, Bournemouth. Tenders to be sent in by Mar. 30.

Mar. 30. Truro.—Two filter beds and accessory works adjoining the waterworks, in the parish of St. Clement. Also for the construction of a covered service reservoir to contain about 500,000 gallons alongside the existing service reservoir in the above parish. Drawings may be seen and copies of the specification and bills of quantities obtained at the office of the engineers, James Mansergh & Sons, 5, Victoria Street, Westminster, on deposit of £2. Early application for particulars is desirable, as only a limited number will be given out. Sealed tenders for one or both contracts, endorsed accordingly, are to be delivered (post paid) at the office of Arthur E. Adams, secy., 31, Lemon Street, Truro, by noon on Mar. 30.

Mar. 31. Chappanslade.—Small service reservoir and the providing and laying of 971 lin. yds. of 3-in. and 4,078 lin. yds. of 2-in. cast-iron mains, with valves, fittings, &c., for works of water-supply. General conditions, bills of quantities and forms of tender may be obtained from and the specifications and drawings inspected on application to W. H. Stanley, A.M.I.C.E., Market House Chambers, Trowbridge. A deposit of £2 2s. is required for a copy of the bills of quantities. Sealed tenders, endorsed "Tender for Chappanslade Water-supply Works," to be delivered to John Callaway, clerk to the Westbury and Whorwells-down Rural D. Councils, Westbury, Wilts, by Mar. 31.

Mar. 31. Greenock.—Heating of the town hall and its vestibules, corridors, &c. Schedules and further information may be obtained on application to Alex. J. Turnbull, C.E., master of works. Sealed offers, endorsed outside "Town Hall Heating," to be lodged with the Town Clerk, Municipal Buildings, Greenock, by Mar. 31.

April 2. Glasgow.—Renewal of bridges on Cleland and Mid-Caldor Line, underbridges at 3 miles 6½ chains, 11 miles 74 chains, and 12 miles 23 chains, and Wishaw and Coltness Line at 86 miles 35 chains (subway, Wishaw South Station), for the Caledonian Railway Co. Drawings may be seen at the office of the Company's District Engineer, 3, Gormiston Street, Glasgow, where copies of the specification and schedule may be obtained on payment of £2 2s. Sealed tenders, endorsed "Tender for Steel Work required in the Renewal of the Superstructure of Four Bridges on the Western District," to be lodged with J. Blackburn, secy., Caledonian Railway Co.'s Offices, 302, Buchanan Street, Glasgow, by April 2.

April 3. Reigate.—Heating of the Workhouse, situate at Earlswood, Redhill. Further information can be obtained from the architect, E. Penfold, A.R.I.B.A., High Street, Reigate, who will supply copies of plans and other particulars. Applications should be made as early as possible, as the schemes must be submitted by April 3.

April 5. Risca.—Two bridges, for the Urban D. Council. Fair wages clause. Particulars from the Surveyor, Council Office, Risca. Tenders to be sent in by April 5.

April 6. Brixham.—Water-supply. Supply, delivery and laying of about 4½ miles of 7-in. and 5-in. cast-iron water-mains, together with the requisite sluice valves, air-valves, meter, wash-outs, and other fittings, the construction of a service reservoir, boundary walls, meter-house and store, and other works in connection with the above undertaking. Drawings may be seen and copies of specification, bills of quantities and forms of tender obtained at the office of the engineer, F. W. Vanstone, C.E., Palace Chambers, Paignton, on payment of £5. Sealed tenders, upon the form provided, endorsed "Brixham Waterworks," are to be addressed to Joseph L. Arlidge, clerk to the Council, Town Hall, Brixham, by April 6.

April 9. Norwich.—Heating and hot-water supply work at the extensions of the City Asylum, Helleston. Plans and specification may be seen and forms of tender obtained on application at the City Engineer's Office. Tenders, on the forms supplied, enclosed in envelopes sealed with sealing wax, endorsed "Asylum Heating," and addressed to the Chairman of the Asylum Committee, must be delivered at the office of Arthur E. Collins, M.I.C.E., city engineer, &c., Guildhall, Norwich, by noon on April 9.

IRON AND STEEL.

Mar. 26. Edinburgh.—667 tons of cast-iron pipes from 2 ins. to 15 ins. in diameter, for the Edinburgh and District Water Trust. The drawings may be seen and copies of specifications and forms of tender may be obtained at the Superintendent of Works' Office, No. 12, St. Giles Street, Edinburgh. Tenders, endorsed "Tender for Cast-iron Pipes," must be lodged with William Boyd, W.S., clerk to the Trust, Water Trust Chambers, 12, St. Giles Street, Edinburgh, by Mar. 26.

PAINTING AND PLUMBING.

Mar. 22. Tavistock.—Water-supply to the showyard for the Devon County Agricultural Association. Plans and specification can be seen by application to A. Kenneth G. Johnstone, local secy., 1, Church Lane, Tavistock, to whom tenders are to be delivered by Mar. 22.

Mar. 24. Barrow-in-Furness.—Painting, papering, &c., at the Cemetery Entrance Lodge, in Devonshire Road. Bills of quantities may be obtained at the Borough Engineer's Office, Town Hall. Tenders to be delivered not later than noon on Mar. 24.

Mar. 26. Gwauncaegurwen.—Painting the interior of the public hall, &c. Specifications may be seen with J. Mark, Post Office, Gwauncaegurwen. Sealed tenders, marked "Tenders for Painting," must be delivered to William D. Evans, Glynteg, Gwauncaegurwen, by Mar. 26.

Mar. 27. Sutton Ford.—Painting, &c., at the Isolation Hospital, for the Rochford Rural D. Council, according to a specification which may be seen at the Clerk's Office. Tenders (marked "Hospital Painting") should be sent to Frederick Gregson, clerk, 46, Alexandra Street, Southend, by 10 a.m. on Mar. 27.

Mar. 30. Salford.—Painting two bridges over the River Irwell. The specification and forms of tender and all other information may be obtained from the Borough Engineer's Office, Town Hall, Salford. Tenders, endorsed "Painting Bridges," addressed to the Chairman of the Building Committee, must be delivered to L. C. Evans, town clerk, Town Hall, Salford, by 10 a.m. on Mar. 30.

Mar. 31. Barking.—Painting of bridge and poles on the Barking and Beconton Light Railway. Specification and form of tender can be obtained on application to H. L. Howard, Electricity Works, East Street, Barking. Fair wages clause. Tenders are to be sent in, endorsed "Tenders for Painting Bridge, &c.," addressed to the Chairman of the Electricity and Tramways Committee, Public Offices, Barking, before noon on Mar. 31.

Mar. 31. Derby.—Painting the outside portions of the Workhouse premises and cleaning and decorating the interior of the Workhouse chapel. Specification and forms of tender can be obtained at the Poor Law Offices, and tenders, on the form and in the envelope supplied, must reach N. Twigg, clerk to the Guardians, Poor Law Offices, Derby, by Mar. 31.

ROADS AND CARTAGE.

Mar. 22. London, N.—Making-up of the under-named private streets, for the Finchley Urban D. Council:—Etchingham Park Road, Seymour Road, Claverley Grove, Windsor Road, Elmfield Road and New Trinity Road, together having a length of about 1,750 yds. The works are to be constructed in accordance with plans and drawings which may be inspected at the offices of the Engineer and Surveyor to the Council, at Church End, Finchley. Copies of the specification and schedules, together with forms of tender, may be obtained from the Engineer on application, accompanied with a deposit of £3. Sealed tenders, endorsed "Private Street Works," to be sent to E. H. Lister, clerk to the Council, Council Offices, Finchley, London, N., by 5 p.m. on Mar. 22.

Mar. 22. Little Woolton.—2-in. machine broken granite macadam and granite chippings at any time up to Mar. 31, 1907. Further particulars and forms of tender may be obtained from the Surveyor, R. Simmons, Grange Lane, Gateacre, near Liverpool. Tenders, endorsed "Tenders for Macadam," and addressed to the Chairman of Works Committee, Little Woolton Urban D. Council, Surveyor's Office, Grange Lane, Gateacre, near Liverpool, to be sent in before 4 p.m. on Mar. 22.

Mar. 22. Rhondda.—Road macadam, viz.:—3,500 tons of granite or basalt road macadam broken to a 2-in. gauge, 400 tons broken to a 1½-in. gauge and 800 tons of ½-in. chippings; 6,800 tons of limestone macadam broken to a 2-in. gauge and 2,000 tons of ½-in. chippings. Specification and forms of tender may be obtained on application to the Surveyor, Public Offices, Pentre, Rhondda. Sealed tenders must be delivered, addressed to the "Chairman of the Roads Committee," at the Public Offices, Pentre, Rhondda, and endorsed "Tender for Granite or Limestone Macadam" respectively, by Mar. 22.

(Continued on p. xiv.)

IN PARLIAMENT.

(By our Press Gallery Representative.)

A War Office Contract.

SOME interesting correspondence appears in the appropriation account of the sums granted by Parliament for the expense of the Ordnance factories relating to a payment of £900 to a firm of contractors as compensation in respect of probable profit on work held back from them. According to the War Office statement of the case, on May 2nd, 1900, the tender of Messrs. Kirk & Randall was accepted for the reconstruction of danger buildings at Woolwich, the work to be paid for by measurement. The contract included the provision for "all labour, materials and transport which might be required for and in the construction of the works shown in the specification and drawings." As the work was very urgent, the drawings were not prepared when the contract was entered into, but it was stipulated in the contract that drawings were to be furnished to the contractors. In a memorandum accompanying the tender, however, the general nature of the buildings required, with their dimensions, was stated, and the drawings were subsequently furnished. The total payment to Messrs. Kirk & Randall for work executed by them under this contract amounted to about £107,000. The firm, however, made a claim that certain work necessary for the completion of the buildings which they were ready to execute and capable of performing was done by the Building Works Department, or by other contractors, and estimated the profit they would have made on the work so withheld from them at £6,150. They contended that most of the work held back from them was of a profitable nature, and if done by them the profit thereon would have practically nullified their actual loss on the contract, which they placed at £6,696. After calculations and an interview between the Superintendent of Building Works and Mr. Randall, the latter agreed to accept £900 in settlement of his claims. It was pointed out that, were payment of this sum withheld, it was most probable that Messrs. Kirk & Randall would press for arbitration in the matter, and in view of the somewhat intricate and contentious nature of the case and the doubtful position of the War Department, it was considered that nothing would be gained by allowing the case to go to arbitration, but that on the contrary the Department would have to pay more to the contractor in addition to some portion (if not the whole) of the costs of the arbitration. The difficulty had arisen in consequence of the general practice of the Building Works Department at the Royal Arsenal executing certain work either directly or by special contractors. An express reservation justifying this position is made in the triennial contracts, and although this was not done in the case of Messrs. Kirk & Randall's contract, the practice was followed in this instance also. The firm were old contractors at the Arsenal, well acquainted with the practice, and there was no occasion to anticipate that the present claim would be raised. The Treasury solicitor had, however, advised that no custom would give a power to deviate from the clear terms of the contract specifications and drawings; consequently the claim could not be altogether resisted.

Such were the circumstances as stated for the consideration of the Treasury officials, who agreed to the payment of the £900. In another communication from the Army Council it was pointed out that it was doubtful whether the War Office had actually lost any money over the transaction, as experience had shown that if a clause were inserted holding back specified items in a contract for work to be paid for by measurement, the effect was to increase the amount

of the tenders by raising or reducing the percentage on or off the district schedule prices for each item. In this particular case the contract rate was 11½ per cent. on the schedule prices, while the next lowest offer was 15 per cent. on the schedule.

Phoenix Park Additions.

In reply to Mr. T. M. Healy, who asked when the Government proposed to throw open to the public the recent additions to the Phoenix Park, Mr. McKenna stated that the additional land referred to was acquired with a view not to increasing the area of the Phoenix Park but to preserving its existing amenities. It was separated from the Park by a public road, and a large part of it, in addition, by an unbridged river. He was not prepared to authorize its inclusion in the Park, as he was informed that the expense of such a measure would be prohibitive.

Ecclesiastical Commissioners' Buildings.

Mr. Stuart-Wortley informed Mr. Herbert Roberts that the total estimated cost of the buildings which the Ecclesiastical Commissioners are erecting at Westminster is about £150,000.

Current Market Prices.

MISCELLANEOUS.

		£ s. d.	£ s. d.
Bricks Stocks, d/d to job	per 1,000	1 14 0	—
Do. Flettons on rail ...	do.	1 4 0	—
Do. Pressed Wire Cuts, d/d to job	do.	1 16 0	—
Do. Blue blinded wire cuts ...	do.	1 1 0	—
Do. wire cuts ...	do.	1 5 0	—
Do. do. pressed facings ...	do.	1 17 6	—
Coke Breeze, into carts			
Do. at gasworks ...	per load	0 2 0	—
Do. d/d to job ...	do.	0 4 0	—
Castor Oil, French ...	per cwt.	1 1 10	1 2 0
Colza Oil, English ...	do.	1 4 3	—
Copperas ...	per ton	2 0 0	—
Lard Oil ...	per cwt.	2 15 0	2 17 0
Lead, white, ground, carbonate ...	per ton	16 0 0	—
Do. red ...	do.	15 0 0	0 19 0
Linseed Oil, barrels ...	per cwt.	1 0 10½	—
Petroleum, American ...	per gal.	0 0 6	0 0 6½
Do. Russian ...	do.	0 0 5½	0 0 5½
Pitch ...	per barrel	0 8 0	—
Shellac, orange ...	per cwt.	9 10 0	9 11 0
Soda, crystals ...	per ton	3 2 6	3 5 0
Tallow, Town ...	per cwt.	1 7 0	1 7 6
Tar, Stockholm ...	per barrel	1 5 0	—
Turpentine ...	per cwt.	2 7 3	—

METALS.

Standard Copper	per ton	80 0 0	80 10 0
Do. Strong sheets...	do.	92 10 0	93 0 0
Lead, Soft Foreign	per ton	16 0 0	16 2 6
Do. English ...	do.	16 7 6	16 10 0
Do. pipes ...	do.	19 0 0	19 2 6
Do. sheets ...	do.	18 10 0	18 12 6
Galvanised Corrugated sheets ...	do.	12 7 6	12 10 0
Spelter G.M. ...	do.	25 0 0	25 10 0
Angles, Scotland...	do.	6 15 0	—
Bars do. ...	do.	7 15 0	—
Marked bars, Staffs	do.	9 0 0	—
Common bars do.	do.	7 5 0	—
Angles, M'boro. ...	do.	6 10 0	6 15 0
Joists do. ...	do.	6 5 0	6 7 6
Angles, Midlands ...	do.	6 15 0	7 0 0
Joists do. ...	do.	7 0 0	7 2 6
Girder plates, Midlands	do.	7 15 0	8 0 0
Angles, Foreign, c.i.f.			
Thames do. do. do.	do.	6 0 0	6 2 6
Tees do. do. do.	do.	6 3 6	6 7 6
Joists do. do. do.	do.	5 8 6	5 12 6
Channels do. do. do.	do.	5 10 6	5 15 0
Nails, Wire ...	do.	9 0 0	9 2 6
Tin, Foreign ...	do.	160 10 0	17 0 0
Do. English ingots ...	do.	167 10 0	168 0 0
Zinc, sheets, Silesian	do.	27 5 0	—
Do. do. Vielle Montaigne	do.	27 0 0	—

TIMBER.

Soft Woods.

Fir, Dantzie and Memel	per load	2 15 0	5 0 0
Pine, Quebec, Yellow	do.	4 2 6	7 10 0
Do. Pitch, American	do.	2 19 0	5 0 0
Laths, log, Dantzie	per cu. fath.	4 0 0	6 0 0
Deals, Kemi, Yellow, 1st & 2nd, 4x11	per std.	11 5 0	—
Do. do. do. 4x9	do.	11 5 0	—
Do. Nederkalix, Yellow, 1st, 4x5	do.	9 10 0	—
Do. Soroka, Yellow, 2nd, 3x11	do.	15 15 0	—
Do. do. do. 2nd, 3x9	do.	14 10 0	—
Do. St. Petersburg, Yellow, 1st, 3x11	do.	13 10 0	—
Do. do. do. 1st, 3x9	do.	12 10 0	—
Do. do. do. 1st, 2nd & 3rd, 3x7	do.	8 15 0	—
Do. Mesane, White, 1st, 3x11	do.	14 5 0	—
Do. do. do. 1st, 3x9	do.	12 5 0	—

Deals, Stockholm, White, Unsorted, 3x10	per std.	8 5 0	—
Do. do. do. do. 3x8	do.	8 10 0	—
Do. Oxelosund, White, Unsorted, 3x9	do.	8 15 0	9 0 0
Do. Gefle, Yellow, 6th, 3x7	do.	7 15 0	—
Do. Langrör, White, Unsorted, 3x7	do.	8 15 0	—
Do. Blankaholm, Yellow, 1st, 2½x7	do.	9 15 0	—
Do. Batskarsnas, Yellow, 3rd, 2½x7	do.	8 5 0	—
Do. Montreal, Red Pine, 3rd, 4x9	do.	10 0 0	—
Do. St. John, Spruce, Unsorted, 1st, 2nd & 3rd, 3x8	do.	8 5 0	—
Do. do. do. do. 3x9	do.	8 15 0	9 0 0
Do. Archangel, Yellow, 2nd, 3x11	do.	13 0 0	—
Do. do. White, 2nd (Walneff's) 3x11	do.	12 0 0	—
Do. do. do. 2nd, do.	do.	10 10 0	—
Do. do. do. 3rd, 3x9	do.	9 10 0	9 15 0
Do. Quebec, Spruce, 3rd, 3x9	do.	9 15 0	10 0 0
Battens, Mo & Domajo, Yellow, 3rd, 2x9	do.	8 15 0	—
Do. Nederkalix Yellow, 1st, 2x8	do.	9 15 0	—
Do. St. Petersburg, Yellow, Unsorted, 2x7	do.	9 0 0	—
Do. do. do. do. 1x5	do.	8 10 0	—
Do. do. do. do. 2x3½	do.	8 5 0	—
Do. do. do. 3rd, 1½x7	do.	8 15 0	—
Do. do. do. 3rd, 1x7	do.	8 15 0	—
Do. do. do. 3rd, 1x6	do.	8 5 0	—
Do. do. do. 3rd, 1x5½	do.	7 15 0	—
Do. do. do. 3rd, 1x5	do.	8 0 0	—
Do. do. do. 3rd, 1x4	do.	7 10 0	—
Do. do. White, 3rd, 3x4	do.	7 10 0	—
Do. Kalmar, Yellow, Unsorted, 2x6	do.	8 0 0	—
Do. do. do. do. 2x3½	do.	7 15 0	—
Do. Sandvik, Yellow, 2nd, 2x5	do.	8 0 0	—
Do. Wartsala, Yellow, 1st & 2nd, 2x4½	do.	8 0 0	—
Do. do. do. do. 2x4	do.	9 0 0	—
Do. do. do. do. 2x3½	do.	8 10 0	—
Do. Raumo, Yellow, Unsorted, 2x4	do.	8 15 0	9 0 0
Do. do. do. do. 2x3	do.	8 10 0	—
Do. Räfsö, White, Unsorted, 2x3	do.	8 0 0	—
Do. Gefle, Yellow, 5th, 1½x9	do.	8 5 0	—
Do. do. do. 5th, 1½x7	do.	8 5 0	—
Do. do. do. 5th, 1½x6½	do.	8 5 0	—
Do. do. do. 5th, 1½x9	do.	8 15 0	—
Do. do. do. 5th, 1½x8	do.	8 0 0	—
Do. Kubikenborg, Yellow, 1st, 1x9	do.	13 15 0	—
Do. do. do. 1st, 1x9	do.	11 5 0	—
Do. do. do. 3rd, 1x9	do.	9 0 0	—
Do. do. White, Unsorted, 1½x9	do.	10 10 0	—
Do. Sandarne, White, 1st & 2nd, 1x11	do.	12 0 0	—
Do. do. Yellow, 3rd, 1x11	do.	10 5 0	—
Do. do. do. 3rd, 1x9	do.	9 15 0	10 0 0
Do. Skutskar, White, Unsorted, 1½x11	do.	11 15 0	12 0 0
Do. Holmsund, White, Unsorted, 1x9	do.	11 0 0	—
Do. do. Yellow, 3rd, 1x9	do.	9 15 0	—
Do. Gothenburg, Yellow, 1x9	do.	7 10 0	—
Do. Archangel, Yellow, 2nd, 1½x7	do.	12 10 0	—
Do. do. 4th, 1½x9	do.	9 5 0	—
Do. do. 4th, 2x8	do.	9 13 0	—
Do. Ingramport, Yellow, Unsorted, 2x9	do.	7 5 0	—
Do. do. do. do. 2x8	do.	8 5 0	—
Do. do. do. do. 2x7	do.	7 15 0	—
Do. do. do. do. 2x6	do.	7 0 0	—
Do. do. do. do. 1x5	do.	7 0 0	—
Flooring Boards, Moas, Yellow, 2nd, 1½x5	per square	0 12 0	—
Do. do. do. 2nd, 1x5½	do.	0 9 9	—
Do. Sandarne, White, 1st, ½x7	do.	0 8 9	—
Do. do. White, 1st, ½x6	do.	0 8 3	—
Do. do. 2nd, ½x7	do.	8 3 0	—
Do. Norrköping, Yellow, 1st & 2nd, 1½x5½	do.	0 11 9	—
Do. do. do. 1st & 2nd, 1½x5	do.	0 8 6	—
Do. Skonvik, Yellow, 1st, ½x4	do.	0 7 0	—
Do. Kubikenborg, Yellow, 1st, 1x7	do.	0 11 9	—
Do. do. do. 1st, 1x4	do.	0 7 0	—
Do. do. do. 2nd, 1x7	do.	0 11 0	—
Do. do. do. 2nd, 1x7	do.	0 10 6	—
Do. do. do. 2nd, 1x5½	do.	0 9 9	—
Do. do. do. 2nd, 1x5	do.	0 9 6	—
Do. do. do. 2nd, 1x4½	do.	0 9 0	—
Do. do. do. 2nd, 1x4	do.	0 8 6	—
Do. do. do. 3rd, 1x7	do.	0 9 9	—
Do. do. do. 3rd, 1x7	do.	0 9 6	—
Do. Johannedal, White, 1st & 2nd, 1x6	do.	0 10 0	—
Do. Gefle, Yellow, Unsorted, 1½x7	do.	0 13 0	—

NEW LONDON BUILDINGS.

AT last week's meeting of the London County Council the Building Act Committee reported the following applications under the London Building Act, 1894, their recommendations as to consent or refusal being appended in *italics* :—

Buildings upon a site abutting upon a new street to lead out of Ebury Street and also upon Grosvenor Garden Mews North, Pimlico, on the application of A. F. Faulkner, on behalf of Willott. (*Consent.*)

Buildings abutting upon Red Lion Court, Fleet Street, City, with external walls at less than the prescribed distance from the centre of Red Lion Court, on the application of Griffin & Woollard, on behalf of A. Rust. (*Consent.*)

Buildings on the north-east side of Wharf Road, Bethnal Green, with external walls at less than the prescribed distance from the centre of the roadway of such street, on the application of M. W. King & Son. (*Consent.*)

Town hall building upon a site abutting on Brixton Hill and Acre Lane, Brixton, on the application of Warwick & Hall. (*Consent.*)

Wall on the western side of Gravel Lane, Southwark, on the application of Nevinston & Newton, on behalf of Stevenson & Howell, Ltd. (*Consent.*)

Projecting one-storey shops in front of Nos. 33 to 45 (odd numbers only) inclusive, High Street, Lewisham, on the application of Kennard Brothers, on behalf of Chieseman Brothers. (*Consent.*)

Projecting sign in front of No. 32A, St. James Street, on the application of R. H. Kerr, on behalf of Sandow, Ltd. (*Consent.*)

Re-erection of Nos. 8, 9 and 10, Paddington Green, Paddington, on the application of Bourdier, Burmester, & Galsworthy. (*Consent.*)

Extension of the period for the erection of a projecting lavatory addition and steps in front of "Seion" Welsh chapel, Southerton Road, Hammersmith, on the application of L. W. Williams. (*Consent.*)

Retention of an iron and glass shelter in front of the porch of the Coburg Hotel, Carlos Place, Grosvenor Square, on the application of E. H. Watts, on behalf of the Coburg Hotel, Ltd. (*Consent.*)

Bay window, five storeys in height, in front of No. 14, Fitzroy Square, St. Pancras, on the application of M. M. Smith. (*Consent.*)

Motor-car shed of a temporary character at the rear of No. 100, Allyn Road, Dulwich, to abut upon South Croxted Road, on the application of J. Harrison and Co., on behalf of Barnett. (*Consent.*)

Retention of a range of luncheon and store sheds at Lord's cricket ground, abutting upon St. John's Wood Road, Wellington Road, and Wellington Place, St. John's Wood, on the application of F. E. Lacey. (*Consent.*)

Building upon a site abutting on Blythe Road and Addison Gardens, West Kensington, on the application of Col. E. Clarke, on behalf of F. Smiths. (*Refusal.*)

Iron and glass porch in front of No. 6, Chesterfield Street, Mayfair, on the application of Hindley & Wilkinson, on behalf of R. G. Behrens. (*Refusal.*)

Retention of a wall in the rear portion of the one-storey shops in front of Nos. 190 to 208 (even numbers only) inclusive, Pentonville Road, on the application of C. E. Pettit, on behalf of T. Lilley and Lilley & Skinner, Ltd. (*Refusal.*)

Projecting lettering in front of No. 56, Charing Cross, on the application of the Liverpool, London and Globe Insurance Co. (*Refusal.*)

Retention of a shed at the flank of No. 17, Bethune Road, Hackney, abutting upon St. Kilda's Road, on the application of H. Willmott. (*Refusal.*)

Warehouse building on the northern side of Tenter Street, Moorfields, at less than the prescribed distance from the centre of the roadway of the street, on the application of Gregg & Detmar, on behalf of Raphael Tuck & Sons. (*Consent.*)

Two studio buildings on the southern side of Logan Place, Kensington, at less than the prescribed distance from the centre of the roadway of Logan Place, and with the westernmost building also at less than the prescribed

distance from the centre of a mews leading out of the southern side of Logan Place, on the application of G. H. Jenkins, on behalf of G. Moira and F. L. Jenkins. (*Refusal.*)

Two houses on the southern side of Mellish Street, Glengall Road, Poplar, and a building on the northern side of Glengall Road, to abut upon the western side of Mellish Street, on the application of J. & W. Clarkson, on behalf of A. E. Ricks. (*Consent.*)

Wood and iron cart-shed upon a site on the south-west side of Eastcote Street, Lambeth on the application of J. Harrison and Co., on behalf of Cornell. (*Refusal.*)

The Theatres and Music Halls Committee also reported the following :—

Plans, submitted by J. E. Franck, on behalf of the Council of the Metropolitan Borough of Hammersmith, showing the proposed erection of public baths on the west side of Lime Grove, Hammersmith. (*Consent.*)

Plans, submitted by A. O. Collard, showing (a) a proposal to rebuild in brick the temporary building which was formerly occupied by the Welcome Club at the London Exhibitions, Earl's Court, and which was partially destroyed by fire in June, 1905; and (b) the arrangements with regard to the proposed "Austrian Salt Mine" in connection with the Royal Austrian Exhibition, 1906. (*Consent.*)

Plan, submitted by C. E. Hewitt, showing the proposed arrangement of a new parochial hall to be erected in Allardyce Street, Brixton. (*Consent.*)

Extension of the period within which the erection of a music-hall building on the site of the Putney Baths, Putney Bridge Road, was to have been commenced on the application of A. J. Read. (*Consent.*)

Plan, submitted by Smees & Cobay, showing a proposal to construct a heating chamber in the stage basement, and the provision of four radiators on the stage of the Royalty Theatre, Dean Street, Soho. (*Consent.*)

Plan, submitted by E. Stephens, showing certain alterations proposed to be carried out in connection with the exits from the Royal Victor Hotel (late Royal Victoria Music Hall), Old Ford Road, Bethnal Green. (*Consent.*)

Coming Events.

Wednesday, March 21.

BUILDERS' FOREMEN AND CLERKS OF WORKS' ASSOCIATION.—Ordinary Meeting at 8 p.m.

Thursday, March 22.

JUNIOR INSTITUTION OF ENGINEERS.—Visit to the Works of Messrs. Fraser & Chalmers, Erith, at 6.15 p.m.

WORSHIPFUL COMPANY OF CARPENTERS.—Sir H. Maxwell, Bart., M.P., on "The Neglected Resources of our British Woodlands," at 8 p.m.

Friday, March 23.

INSTITUTION OF CIVIL ENGINEERS.—Mr. F. K. Stevens on "Waves," at 8 p.m. (Students' Meeting.)

ARCHITECTURAL ASSOCIATION.—Mr. A. W. Soames, M.P., on "The London Club House of Last Century," at 7.30 p.m.

GLASGOW TECHNICAL COLLEGE ARCHITECTURAL CRAFTSMEN'S SOCIETY.—Mr. William Gilfillan on "Marbles," at 8 p.m.

Saturday, March 24.

ARCHITECTURAL ASSOCIATION.—Fifth Spring Visit to Flats in High Street, Kensington. Meet in Hornton Street at 1.30 p.m.

ROYAL SANITARY INSTITUTE.—Discussion on "Cremation," at 11 a.m. Provincial meeting, Town Hall, Leicester.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Visits to new offices of the North British and Mercantile Insurance Co., and the new premises of the Professional and Civil Service Supply Association, Ltd.

SOCIETY OF ARCHITECTS.—Visit to Central Criminal Court, Old Bailey, at 2.30 p.m.

Monday, March 26.

SURVEYORS' INSTITUTION.—Ordinary General Meeting at 8 p.m. Discussion of Mr. Woodward's paper on "The Means of Locomotion and Transport in London."

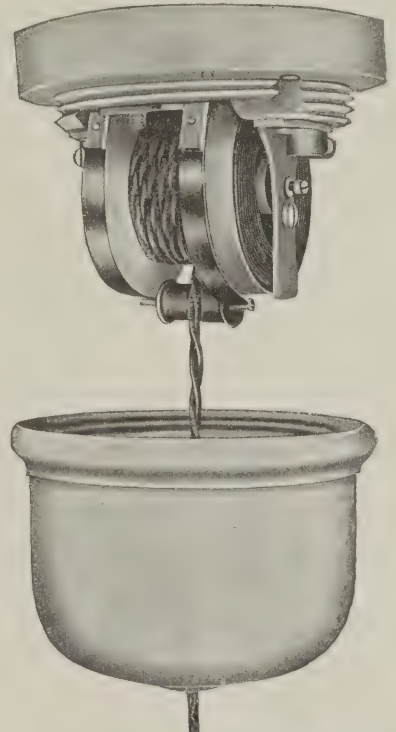
Wednesday, March 28.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Mr. J. Roxburgh Sharman on "Steel Building Construction: A Comparison of British and American Methods," at 8 p.m.

Trade and Craft.

A "Wind-up" Ceiling Rose.

The Edison & Swan United Electric Light Co., Ltd., have just put on the market a very ingenious "wind-up" ceiling rose. By the illustration below it will be seen to comprise a spring drum on which the length of wire coils as the light is raised to any desired height, but the special point to note about it is that whereas in other devices of a similar description which have been placed upon the market from time to time it has been necessary to have a fitting of a specified



weight sufficient to balance the strength of the spring drum, this particular "wind-up" ceiling rose of the Edison & Swan Co. works without any such balance weight, and can be used with fittings of varying weights with equal effect, as it is not upon the weight of the fitting that the working of the article depends but upon the band-break arrangement which can be clearly seen in the illustration. Unlike other types, the entire mechanism is enclosed in porcelain, and perfect electrical contact is made.

Guaranteed
Door Springs.

Guaranteed
Gearing and
Fittings.

DOOR SPRINGS.

ROBERT
ADAMS,

3 & 5, EMERALD STREET,
THEOBALD'S ROAD,

(New Address)

W.C.

FANLIGHT OPENERS & GEARING.

Metal Sashes.

Panic Bolts.

Weather Bars.

Reversible
Window

Fittings, &c.

New Catalogue
Post Free on Application

(Continued from p. xiii.)

Mar. 22. Peterborough.—*Broken granite, edging, &c.*, and Portland cement during the twelve months ending Mar. 31, 1907. Specifications and tender forms may be obtained at the City Surveyor's Office. Tenders, properly endorsed and written on the prescribed forms only, to be sent to the Town Clerk on or before Mar. 22.

Mar. 23. Higher Broughton.—*Asphalting, paving, &c.*, of the playgrounds at the Devonshire Street Council School. Plans may be inspected and specifications obtained at the office of the architects, C. K. & T. C. Mayor, 41, John Dalton Street, Manchester, between 10 and 5, on payment of a deposit of £1 is. Sealed tenders, endorsed "Tender for Asphalting," and addressed to the Chairman of the Elementary Education Sub-committee, must be delivered to L. C. Evans, town clerk, Town Hall, Salford, by noon on Mar. 26.

Mar. 23. Manchester.—*Severing, draining, paving, &c.*, North Street, from Lord Street to George Street, Openshaw, South Manchester; Manila Street, Beswick, North Manchester; Ray Street, Arcoats, North Manchester; passage behind 2 to 22, Grey Street, and adjoining 22, Grey Street, Newton Heath, North Manchester. Forms of tender may be obtained on application to the Paving, &c., Department (surveyor's office), and must be returned to the Chief Clerk, Paving, &c., Department, Town Hall, Manchester, before 10 a.m. on Mar. 23.

Mar. 23. Troutbeck.—*Widening* of a portion of Holbeck Lane, near Kilns Cottage, consisting of excavating, grubbing of trees, and the building of a fence wall and retaining wall. Plan and specification may be seen on application to George Browne, Town End, Troutbeck, who will show the work. Tenders to be sent so as to reach William Dawson, highway surveyor, Westfield, Kendal, not later than Mar. 23.

Mar. 24. Chertsey.—*Supply of the following materials for the Rural D. Council*:—Granite (coarse and fine); flints, gravel (coarse and fine) and shingle; chalk and kerbing. Forms of tender and the description of the various materials and the estimated quantities that may probably be required may be obtained of W. Durrant, surveyor, Spinney Hill, Addlestone. Sealed tenders, endorsed "Tenders for Road Materials," must reach the Clerk's Office, 20, Guildford Street, Chertsey, by noon on Mar. 26. Samples are required of the various materials tendered for, and must be sent to the Board Room, Union Workhouse, Ottershaw, Chertsey, so as to reach there by noon on Mar. 26.

Mar. 24. Driffield.—*Road materials*, for the Rural D. Council as follows:—About 6,000 tons of whinstone; about 1,000 tons of slag; about 900 tons of sea cobbles; about 300 tons of sea gravel; about 250 tons of tarred chips. Particulars and forms of tender can be obtained on application to T. Casson Beaumont, C.E., surveyor, Driffield, to whom tenders, endorsed "Tender for Materials," are to be sent not later than Mar. 24.

Mar. 24. Derby.—*Team labour*, for the County Council. Form of tender and conditions of contract may be obtained at the Surveyor's Office or from the under-mentioned district surveyors, and will be forwarded through the post on receipt of a stamped addressed foolscap envelope:—Alfreton district: B. Comb, Ashgate Road, Chesterfield. Ashbourne: J. F. Bamforth, Mayfield Road, Ashbourne. Bakewell: J. E. Blackwall, Bakewell. Belper: D. Robinson, Duffield, near Derby. Chapel: H. T. Hughes, Chapel-en-le-Frith, via Stockport. Derby: W. F. Perry, Repton, Burton-on-Trent. Eckington: R. Watson, Norton Woodseats, near Sheffield. Tenders are to be delivered to J. W. Hopton, county surveyor, County Offices, St. Mary's Gate, Derby, by Mar. 24.

Mar. 24. Ramsey.—*800 tons of broken granite* (300 tons X size, 400 tons XX size, and 100 tons XXX size), to be delivered to the stations at Ramsey (G.N. or G.N. & G.E. Joint) from April to Dec. next. Tenders, accompanied by samples, to be sent (carriage paid) to Richard F. Serjeant, clerk to the Council, Ramsey, Hunts, by Mar. 24.

Mar. 26. Romford.—*1,400 tons of blue Guernsey granite* broken to 1½ in. cube. Tenders, with samples and marked "Tender for Granite," to be sent, on forms to be obtained from the Surveyor, to Charles T. King, clerk, Council Offices, Romford, by Mar. 26.

Mar. 26. Hale.—*Making-up Leicester Road*, for the Urban D. Council. Plan and specification can be seen and bill of quantities and forms of tender can be obtained, on the payment of a deposit of £1 is., at the office of the Council's Surveyor, F. E. Boaz, any day during the office hours. Tenders are to be received by J. G. Whyatt, clerk to the Council, Council Offices, Ashley Road, Hale, Cheshire, by noon on Mar. 26.

Mar. 26. Perth.—*Causewaying of carriageway in Caledonian Road with new whinstone setts, and the causewaying of carriageway in St. Catherine's Road with old setts* supplied by Town Council. Plans can be seen, and specifications and schedules of quantities obtained at the office of Robert McKillop, burgh surveyor, 16, Tay Street, Perth. Tenders to be lodged in the hands of John Begg, town clerk, Perth, not later than noon on Mar. 26, sealed and endorsed "Tender for Causewaying Caledonian Road and St. Catherine's Road."

Mar. 26. Shifnal.—*Granite and slag*, for the Rural D. Council. Further particulars may be obtained on application to G. H. Stevenson, district surveyor, Shifnal. Sealed and endorsed tenders to be sent to H. Revell Phillips, clerk to the Council, Shifnal, by 11 a.m. on Mar. 26.

Mar. 26. Penarth.—*Supply of road metalling and gravel* up to the 31st Mar. 1907, for the Urban D. Council. Tenders to be marked "Tender for Broken Stone and Gravel." Forms of tender and further particulars may be obtained on application from Edgar J. Evans, A.M.I.C.E., surveyor, District Council Offices, to whom samples and sealed tenders are to be sent not later than noon on Mar. 26.

Mar. 27. Gateshead.—*Cement path work* in position on various roads or streets as may be required for one year. Tenders are to be sent in sealed and endorsed "Cement Path Work," to W. Swinburne, town clerk, Gateshead, by 2 p.m. on Mar. 27.

Mar. 26. Skegness.—*Laying of sewers*, with all appurtenances thereto, in the following streets:—Franklin Avenue, Ocean Avenue, Derby Avenue and Clifton Road, for the Urban D. Council. Plans and specifications can be seen at the office of Ralph Hudson, Surveyor to the Council, Skegness; and copies of the bills of quantities and forms of tender obtained on deposit of 10s. 6d. Separate tenders to be sent in for each street. Sealed tenders, endorsed "Tender for Private Street Works," must be delivered to Gilbert J. Dasher, clerk to the Council, Council Offices, Skegness, by noon on Mar. 26.

Mar. 26. Ashford.—*Haulage of rock* from Great Chart Quarry, Earl's Quarry, Aldington and Brett's Quarry, Willesborough, for the East Ashford Rural D. Council. Form of tender, with conditions, to be obtained of T. W. Pullen, surveyor, Kennington. Sealed tenders to be addressed to the Chairman and delivered at the workhouse, Willesborough, by 9 a.m. on Mar. 26.

Mar. 27. Rushden.—*Granite and slag* during the year, for the Urban D. Council. Specification and forms of tender may be obtained on application to the Surveyor. Tenders, endorsed "Road Materials," must be delivered to W. B. Madin, C.E., engineer and surveyor, Vestry Hall, Rushden, Northants, by Mar. 27.

Mar. 27. King's Lynn.—*Road materials*, for the Corporation. Particulars can be obtained on application to J. H. Webb, borough surveyor, to whom sealed tenders, on forms to be supplied, must be delivered not later than Mar. 27.

Mar. 27. London, N.W.—*Road-making and paving works* in the following roads:—Briar Road, Cricklewood; Crownhill Road, Harlesden, for the Willesden D. Council. Plans and specifications may be seen and all further particulars obtained upon application to O. Claude Robson, M.I.C.E., engineer to the Council, Public Offices, Dyne Road, Kilburn, N.W. The tenders, upon printed forms and endorsed "Private Streets," to be delivered at the offices of the Council not later than 4 p.m. on Mar. 27.

Mar. 27. Colwyn Bay.—*Making-up Highfield Road* and the passage leading therefrom to Grove Park, for the Urban D. Council. Plans, specifications, &c., may be seen and bills of quantities obtained on application to William Jones, A.M.I.C.E., Engineer and Surveyor, Council Offices, Colwyn Bay. Sealed tenders endorsed "Highfield Road Contract," addressed to the Chairman of the Highways Committee, to be delivered at the Council Offices by noon on Mar. 27.

Mar. 27. Poole.—*Supply of materials, also for haulage and horse hire* during the year ending Mar. 31, 1907, for the borough council, as follows:—Granite, quartzite, Mendip stone, coarse gravel, fine gravel, horse hire in Branksome District, haulage of granite from Borough Wharf to Branksome Depot. Further particulars and forms of tender may be obtained on application to S. J. Newman, F.R.I.B.A., borough surveyor, Borough Offices, King Street, Poole, to whom sealed tenders are to be delivered before 9 a.m. on Mar. 27.

Mar. 28. Cranbrook.—*Road materials* for the Rural D. Council as follows:—No. 1—900 tons of broken Guernsey granite. No. 2—460 tons of broken Cherbourg Quartzite. No. 3—770 tons of unbroken rag by rail. No. 4—2,380 yds. of unbroken rag to be supplied and delivered on roads at the parishes of Cranbrook, Frittenden, Benenden and Goudhurst. Tenders for any other sort of material will not be considered. Forms of tender and full particulars may be obtained of the clerk. Applicants must state which form of tender (1, 2, 3, 4) they require. Tenders must be sent to T. H. Crampton, clerk, Cranbrook, Kent, by Mar. 28.

Mar. 28. Ramsgate.—*Private street works*. Plans and specification can be seen on application to the Borough Engineer at his office between 10 and 4. Tenders, endorsed "Tender for Private Street Works," and addressed to the Chairman of the Works Committee, are to be delivered at the Borough Engineer's Office before noon on Mar. 28.

Mar. 28. London, S.W.—*Making-up the carriage-way of Woodlawn Road, Section IV*. Plans and specifications of the works may be seen and any information obtained from Francis Wood, M.I.C.E., F.G.S., borough surveyor, Town Hall, Fulham, S.W. The contractors are to attend personally or be represented at the Council meeting on Mar. 28 at 7 p.m., to deliver their own tenders, together with a £10 note and a schedule of prices, upon which the value of any extras or omissions shall be based, and to make a declaration that they pay the trade union rate of wages, observe such hours of labour as are generally accepted as fair in their trade, and that all unskilled labour shall be paid the minimum wage of 7d. per hour.

Mar. 29. Guildford.—*Road materials*, for the Corporation. Forms of tender may be obtained on application to the borough surveyor, C. G. Mason, A.M.I.C.E., Tuns Gate, Guildford. No tender will be considered except upon the prescribed form. Tenders, endorsed "Tender for Road Materials," are to be sent to F. S. Miller, town clerk, Town Clerk's Office Guildford, by noon on Mar. 29.

Mar. 29. London, S.E.—*Paving with natural mineral rock compressed asphalt* (exclusive of concrete foundation) the carriageways of certain streets, for the Lambeth Borough Council. Specification and forms of tender, together with any requisite additional information, can be obtained at the office of Henry Edwards, C.E., borough engineer, 346, Kennington Road, S.E., between 10 and 4 (Saturdays excepted). The Council is unable to state specifically the area of carriageways which it is prepared to pave with asphalt for the duration of the contract, but particulars as to the average quantity of asphalt paving laid in past years can be obtained from the Borough Engineer. Sealed tenders, endorsed "Tender for Asphalt Paving," must be delivered at the office of Henry J. Smith, town clerk, Lambeth Town Hall, Kennington Green, London, S.E., by noon on Mar. 29.

Mar. 29. West Hartlepool.—*Road material and leading* same as per particulars from W. Burton, road surveyor, Billingham, via Stockton-on-Tees. Tenders to be endorsed and delivered to George Kilvington, clerk to

the Rural D. Council, Union Office, West Hartlepool, by noon on Mar. 29.

Mar. 29. Castleford.—*Works of improvement* in Eastfield Lane, in accordance with plans and specifications prepared by W. Green, surveyor to the Council, from whom full particulars can be obtained. Sealed tenders in plain envelopes, endorsed "Eastfield Lane," to be sent to H. H. Broadbent, clerk to the council, Council Offices, Castleford, by noon on Mar. 29.

Mar. 29. Newmarket.—*One thousand tons of the best broken granite metalling*, broken to pass all ways through a ring 1½ ins. in diameter, for the Urban D. Council. Forms of tender can be obtained on application to S. J. Ennion, clerk to the Council, Deva Chambers, Newmarket, to whom tenders must be delivered, together with samples, not later than noon on Mar. 27, endorsed "Road Metalling."

Mar. 31. Uttoxeter.—*Granite, limestone, slag and team labour*, for the Rural D. Council. Full particulars are contained in the form of tender, including places for delivery of materials, estimated quantities, and names of parishes for team labour. Tenders to be sent in on forms to be obtained from the Surveyor, G. E. Mullah, New Street, Uttoxeter, to F. S. Hawthorn, clerk to the Council, Uttoxeter, by Mar. 31.

Mar. 31. Bredwardine.—*Hauling materials*, for the Rural D. Council. Forms and particulars can be obtained from the surveyor, H. B. Hamar, Bricklands, Hay. Tenders must reach Charles Griffiths, clerk to the Council, Hay, Breconshire, by Mar. 31.

Mar. 31. Chester.—*Carving macadam* and other materials for the main roads, for the year, for the County Council. Forms of tender and particulars of material to be carted can be obtained at the County Surveyor's Offices, Chester Castle, between 10 and 5, and on Saturdays between 10 and 1. Tenders, to be endorsed "Tender for Carting," to be delivered at the said office on or before Mar. 31.

Mar. 31. Sandwich.—*425 tons 1½ in. broken granite and 25 tons chippings* of the following:—Guernsey, Norway and Quenast, at per ton, to be properly broken and clean; 1,055ft. lineal 6 by 12 Norway edge kerb, at per foot lineal, to be properly dressed ready for laying; 655ft. lineal 12 by 6 Norway channel, at per foot lineal, to be properly dressed ready for laying. All broken granite will be weighed on the Sandwich Quay weighbridge. The weight of granite so weighed and the weight as certified for by such will be conclusive and the basis on which payment will be made. No other weights accepted. No forms of tender issued. Sealed tenders, marked "Tender for Road Material," to be delivered at the Town Clerk's Office (also samples, carriage paid) not later than Mar. 31.

Mar. 31. Croft.—*Supply of broken and unbroken whinstone* during the next twelve months at the following stations:—Croft, Eryholme, Picton, Fighting Cocks, Barton and Piercebridge, for the Rural D. Council. Tenders should be sent to Charles H. Leach, clerk to the Council, Union Offices, Darlington, by Mar. 31.

Mar. 31. Chelmsford.—*Norway granite herb and setts, and York stone edging*, for the County Council. Forms of tender, with the special envelope in which the tenders are to be delivered, and all other information and particulars, can be obtained at the Chief Surveyor's Office at Chelmsford. Tenders to be delivered to Percy J. Sheldon, M.I.C.E., chief surveyor, Chelmsford, by Mar. 31.

Mar. 31. Pocklington.—*Supply of best blue stone and slag* for repairing the roads, for the Rural D. Council. Forms of tender, with particulars, can be obtained from T. Robson, clerk, Pocklington, to whom tenders must be sent by Mar. 31.

April 2. Beckenham.—*Making-up* the following roads, viz.:—Studdall Road (68 yds. in length), Christ Church Road (50 yds. in length), Westfield Road (200 yds. in length), for the Urban D. Council. The works comprise about 700 lineal ft. of Norwegian kerb, 850 lineal ft. of three-set Aberdeen or Guernsey channel, 180 cub. yds. of hardcore, 300 cub. yds. of flints, 650 sq. yds. of red-brick paving, and 420 sq. yds. of limestone tar paving, together with the remodelling of 318 lineal yds. of roadway and other works incidental thereto. Plans and sections may be seen and bills of quantities, specifications and form of tender obtained on application to John A. Angell, surveyor, on the production of a receipt from the collector (who attends his office daily from 9 to 1 only, except on Tuesdays, when his hours are from 9 to 1) for a deposit of £1. Fair wages clause. Tenders, duly sealed and endorsed "Tenders for Street Works," to reach F. Stevens, clerk to the Council, by 4 p.m. on April 2.

April 3. Bromley.—*2,200 yds. of Norwegian granite edge kerb* and 470 tons of Guernsey granite setts, to be delivered as required at the Corporation Siding at the Bromley North Station, in accordance with the specification prepared by the Borough Engineer, which may be obtained on payment of 10s. 6d. Tenders, endorsed "Tender for Kerb, &c.," must be delivered to Frederick H. Norman, town clerk, Bromley, Kent, by April 3.

April 3. Epsom.—*Supply of materials*, carting of materials and for watering during the year ending 31st March 1907, for the Rural D. Council. Particulars and forms of tender may be had on application to T. E. Ware, surveyor to the Council, Waterloo Road, Epsom. Sealed tenders, endorsed "Tender," are to be delivered to W. O. Reader, clerk, "Lonsdale," Epsom, by April 3.

April 4. Woodhall Spa.—*450 tons of granite (XX)*, to be delivered at Kirkstead or Woodhall Spa Railway Stations during the months of July, August and September next in such quantities and at such times as the Urban D. Council or their surveyor shall require. Tenders to be received by J. E. Chatterton, clerk to the Council, Church Lane, Horncastle, by April 4.

April 4. Ticehurst.—*Materials for the Rural D. Council*, for one year, as follows:—900 yds. or tons broken Cherburg quartzite, or other approved granite; and about 1,920 yds. broken Sevenoaks stone. Forms of tender may be obtained upon forwarding stamped addressed envelope to the surveyor, W. N. Wood, Ticehurst, Sussex. Sealed tenders, endorsed "Tender for

Material," and samples of material, should be forwarded (carriage paid) to reach J. C. Lane Andrews, clerk to the Council, Council Offices, Wadhurst, Sussex, not later than April 4.

April 7. Magor and St. Mellons.—Broken limestone and gravel, for the Rural D. Councils. Specifications and forms of tender, with statement of quantities required, may be obtained on application at the Union Offices, Newport. Sealed tenders, endorsed "Tender for Metalling" to be received by Ithel Thomas, clerk, Union Offices, Queen's Hill, Newport, Mon., not later than April 7.

April 7. Wrotham.—Stone and cartage, for the Urban D. Council. Conditions of contract may be inspected and forms of tender obtained upon application to A. J. H. Powell, Surveyor to the Council, Borough Green, Sevenoaks. Tenders, which must be on the forms supplied, sealed and endorsed outside "Tender for Road Material or Cartage," must be sent to George F. Carnell, clerk of the Council, 130, High Street, Sevenoaks, by April 7.

April 10. Ashford.—Supply and delivery of gravel, surface-picked flint and Kentish rag-stone, for the parishes of Bethersden, Great Chart, Little Chart, Charing, Egerston, Hothfield, Kingsnorth, Pluckley, Smarden, Shadoxhurst and Westwell, and for the haulage of granite from Headcorn, Pluckley, Hothfield, Charing and Ashford Railway Stations; also from Great Chart Siding. Full particulars and forms of tender may be obtained from the Surveyor's Office, Charing. Sealed tenders, endorsed "Highway Materials and Haulage," addressed to the Chairman of the Rural D. Council, are to be delivered at the Union House, Westwell, Ashford, not later than April 10.

April 11. Helmsley.—Supply of whinstone and slag for repaving the roads, for the Rural D. Council. The stone to be delivered in such quantities and at such times as the Council may order. Forms of tender, with estimated quantities and particulars, can be obtained from Robert Pearson, clerk, Helmsley, to whom tenders must be sent by April 11.

SANITARY.

Mar. 24. Nelson.—Revolving screening apparatus, for the Sewage Works. Plans and particulars may be obtained from B. Ball, A.M.I.C.E., borough engineer, Nelson. Tenders, endorsed "Screening Apparatus," must be sent to J. H. Baldwick, town clerk, Town Hall, Nelson, by Mar. 24.

Mar. 26. Pontypridd.—Construction of gin. and 12 in. stoneware pipe sewers at Pwllgwaun (800 yds.) and gin at Treforest (420 yds. and 200 yds.), Hawthorn (85 yds.), and Upper Boat (160 yds.), together with the necessary manholes and other works in connection therewith, for the Urban D. Council. Plans and specifications may be seen and bills of quantities and form of tender obtained on application at the office of P. R. A. Willoughby, A.M.I.C.E., engineer and surveyor to the Council, upon deposit of £1 rs. Tenders, on the prescribed form, sealed and endorsed "Sewer Extensions," must be received by J. Colenso Jones, clerk to the Council, District Council Offices, Pontypridd, by Mar. 26.

Mar. 27. London, N.W.—Collection, removal and disposal of house-refuse for a period of one year, for the Willesden D. Council. Specifications and forms of tender may be obtained, upon receipt of 5s. for each tender form, upon application to O. Claude Robson, M.I.C.E., engineer to the Council, Public Offices, Dyne Road, Kilburn, N.W. Tenders to be delivered to Stanley W. Ball, clerk to the Council Public Offices, Dyne Road, Kilburn, N.W., by 4 p.m. on Mar. 27.

Mar. 27. London, N.W.—791 ft. lineal, or thereabouts, of 3 ft. brick barrel surface water culvert near Gladstone Park, Willesden, N.W., with manholes and all other works incidental thereto, for the Willesden D. Council. Plans and specification may be seen and all further particulars obtained upon application to O. Claude Robson, M.I.C.E., engineer to the Council, Public Offices, Dyne Road, Kilburn, N. Tenders, upon printed forms to be obtained from the Engineer and endorsed "Culvert, Gladstone Park," to be delivered at the offices of the Council not later than 4 p.m. on Mar. 27.

Mar. 28. Northallerton.—Laying of about 415 yds. of 9 in. sanitary pipe sewer and 110 yds. of 6 in. sanitary pipe sewer, together with the construction of the necessary manholes, ventilating shafts and interception tanks in the village of Brompton, near Northallerton. Plans and specifications can be seen at the clerk's office between 10 and 4. Tenders, endorsed "Tenders for Brompton Drainage," to be sent to W. Fowle, clerk to the Council, Northallerton, by noon on Mar. 28.

Mar. 29. Chippenham.—Sewage pumping plant, consisting of two oil engines and two centrifugal pumps at the sewage pumping station, for the Urban D. Council. Particulars may be obtained from A. E. Adams, A.M.I.C.E., borough engineer, Chippenham, Wilts, upon payment of £1 rs. Tenders to be sent in not later than Mar. 29.

Mar. 30. Hull.—Sewer along the north side of the Town Hall, between Lowgate and Quay Street. Forms of tender and other particulars may be obtained at the City Engineer's Office. Tenders, endorsed "Tender for Sewer," are to be addressed to the Chairman of the Works Committee, and delivered at the Town Clerk's Office before noon on Mar. 30.

Mar. 31. Barrow-in-Furness.—Alterations and improvements required at the Thwaite Street and Rawlinson Street school conveniences. Bills of quantities may be obtained at the Borough Engineer's Office, Town Hall. Tenders to be delivered not later than noon on Mar. 31.

Mar. 31. Greetland.—Bacteriological tanks, filters, carriers and other appurtenant works. Drawings may be seen and copies of the specification, bill of quantities and form of tender may be obtained at the office of the Engineers, R. E. W. Berrington & Son, Bank Buildings, Wolverhampton, or at the Council Offices, Greetland, upon payment of £5 ss. Sealed tenders, upon the forms supplied, endorsed "Tender for Sewage Tanks and

Filters," must be delivered at the office of A. T. Longbottom, clerk to the Council, 4, Carlton Street, Halifax.

April 2. Burley-in-Wharfedale.—Alterations and additions to the sewage-disposal works, including the building of a pumping station fitted with oil engines, centrifugal pumps, liquefying tanks and continuous filters, in accordance with the plans and specifications prepared by the engineers, Haller & Machell. Plans and specifications may be seen and form of tender and bills of quantities obtained at the offices of the Engineers, Corporation Chambers, Dewsbury, on the payment of a deposit of £2 2s. Seated tenders, on form supplied, and endorsed "Sewage-disposal Works," must be delivered at the Clerk's Office, 5, Ramsey Terrace, Otley, not later than noon on April 2.

April 3. Leigh.—9 in. stoneware pipe sewer, about 233 yds. in length, near the Green, Leigh, Tonbridge. Drawing and specification may be seen at the clerk's office. Sealed tenders, and endorsed outside, must be sent to George F. Carnell, clerk of the Rural D. Council, Sevenoaks, by April 3.

April 4. Watford.—Re-drainage of houses, 1-47, Fearnley Street, for the Watford Urban D. Council. Persons desirous of tendering for the work may see the drawings and specification, &c., at the offices of the Council, 14, High Street, Watford. Sealed tenders, endorsed "Tender for Fearnley Street Drainage," must be delivered to H. Morten Turner, clerk to the Council, Council Offices, Watford, by April 4.

April 7. Monmouth.—Works of drainage, with necessary manholes, &c., at the union workhouse, for the guardians of the poor of the Monmouth Poor Law Union. Plans, specification and conditions of contract may be seen and form of tender obtained at the Union Offices, Monmouth, or at the offices of Ernest G. Davies, M.S.A., Hereford and Monmouth, architect to the Guardians. Sealed tenders, which must be on the form obtainable as above and endorsed "Union Drainage," to be sent to T. A. Williams, clerk to the Guardians, Union Offices, Monmouth, by April 5.

April 7. Allerton Bywater.—Drainage, for the Tadcaster Rural D. Council.—Providing and laying of glazed earthenware pipe sewers, with manholes, &c., the erection of a pumping station, with storage tank, and cast-iron rising main; and the laying-out of about five acres of land, and the erection of contact filters thereon, for the sewerage and sewage-disposal of Allerton Bywater, in accordance with plans and specifications prepared by J. Simmons, M.I.C.E., Bank Chambers, Doncaster. Plans and specifications may be seen and forms of tender obtained at the offices of the Engineer on payment of £2 2s. Sealed tenders, endorsed "Tender for Allerton Bywater Drainage," to be delivered to G. A. Bromet, clerk to the Council, Tadcaster, by noon on April 7.

April 30. Middleton.—Three circular tanks, catchpits, conduits, &c., at the Sewage Outfall Works at Rhodes, for the Corporation. Plans may be seen and specifications, quantities and form of tender (which includes a fair wages clause) obtained, on and after April 5, by applying to W. Welburn, borough surveyor, at the Town Hall, between 9.30 and 10.30 a.m., on depositing £1 rs. Tenders, endorsed "Tender for Tanks," are to be addressed to the Chairman of the Surveyor's Committee, and delivered to Frederick Entwistle, town clerk, Town Hall, Middleton, by April 30.

MISCELLANEOUS.

Mar. 24. Gateshead.—Supply of the following materials for one year, for the Borough Council:—Whinstone macadam, Whin setts, Whin chips, Whin curb, Whin channel, Whin wheelers, limestone macadam, Freestone and Caithness flags, metal gullies, manhole covers, &c., shovels, picks, scavenging brooms, lime and cement. Specification and form of tender can be obtained at the office of N. Percy Pattinson, borough surveyor, Town Hall. Tenders are to be sent in, sealed and endorsed "Tender for Materials," by Mar. 24.

Mar. 24. Heywood.—Supply of the following materials, for the Corporation, for a period of twelve months:—Setts, flags and curbs (flagrock); earthenware pipes, bends, junctions and taper pipes; traps and gullies; pitch and creosote oil; limestone chippings; hand-broken granite and granite chippings; Portland cement (British manufacture); waste-water closets. Samples and specifications may be seen and form of tenders obtained on application to J. Ainsworth Settle, A.M.I.C.E., borough engineer. Applications should be made before Mar. 22. Fair wages clause. Sealed tenders, endorsed in accordance with the specification, must be delivered to G. G. Bouchier, town clerk, Municipal Buildings, Heywood, by Mar. 24.

Mar. 26. Chatham.—Supply of the following materials, for the Town Council:—1,300 tons of 2½ in. broken granite or other hard stone for macadam, 200 tons ½ in. granite chippings, 2,000 cub. yds. 2½ in. surface-picked flints, 200 tons 6 in. Kentish rag stone headers, and 500 super. yds. of 2½ in. best tooled Yorkshire paving. Also for the supply of 370 yds. lineal continuous unclimbable wrought-iron fencing (with gates). Specifications, stipulations, schedules and forms of tender can be obtained, samples of the granite chippings and Kentish rag stone headers seen, and drawings of the fence inspected on application to Charles Day, the borough surveyor, Town Hall, Chatham. Sealed tenders, on the forms supplied, endorsed "Tender for Road Material" or "Fencing," as the case may be, to be delivered at the Borough Surveyor's Office, Town Hall, Chatham, before 10.30 a.m. on Mar. 26.

Mar. 26. Cleckheaton.—Fireclay goods for the Urban D. Council, as follows:—Retorts, 22ins. by 15ins. by 10ft.; bricks best fire at per 1,000; bricks, best Silica at per 1,000; bricks, best specials at per 1,000; best ground fire clay at per ton. Alternative prices to be given for delivery at the Lancashire and Yorkshire Railway Station, Cleckheaton, or at the Council's Gas Works, Dewsbury Road, Cleckheaton. Sealed tenders endorsed "Tenders for Fire Clay Goods," to reach John H. Linfield, clerk to the Council, Town Hall, Cleckheaton, by noon on Mar. 26.

Mar. 26. Nuneaton.—Supply of the following materials, for the Rural D. Council:—Blue bricks, kerbs, &c.; disinfectants; earthenware pipes, &c.; granite kerbs and setts; iron castings and Portland cement. Conditions of contract and forms of tender may be obtained on application to F. C. Cook, surveyor, Council Offices, Nuneaton, to whom sealed tenders, endorsed "Tenders for Supplies," should be delivered by noon on Mar. 26.

Mar. 26. Little Hulton.—Supply of the following material, for the Urban D. Council:—Broken granite, granite and grit setts, granite and limestone chippings, grit curbs, artificial flags, stoneware pipes and gullies, cement, steam-rolling and scarifying, disinfectants, pitch and oil. Forms of tender and particulars can be obtained from J. H. Heyes, clerk, Council Offices, Little Hulton, any day between 9 a.m. and 5 p.m. Tenders, sealed and endorsed "Tender for —," are to be delivered at the Council Offices not later than 4 p.m. on Mar. 26.

Mar. 26. London, N.—Supply of the following materials, for the Southgate Urban D. Council:—3,000 tons (more or less) of granite, and carting. Also for the supply and delivery of such of the following goods as may be required from time to time to the 31st day of March, 1907:—Glazed stoneware socketed pipes; glazed stoneware sewer pipes with special watertight joints; Portland cement; cast- and wrought-iron goods; brooms, tools and ironmongery; paints and oils. Specifications of each class of goods required, forms of tender and any other particulars may be obtained on application to C. G. Lawson, C.E., the Council's surveyor. Separate sealed and endorsed tenders must be delivered to W. M. Ellenor, clerk to the Council, Council Offices, Palmer's Green, N., by noon on Mar. 26.

Mar. 26. Frome.—Supply of the following stores, for the Urban D. Council:—Portland cement; lias lime; broken granite; broken limestone; picks, shovels, forks and other tools; manhole covers and street gratings; pennant kerbing; Keinton channelling. Specifications, forms of tender and further particulars may be obtained on application to F. W. Jones, surveyor, the Public Offices, Frome. All tenders to be sent in on the forms provided, and sent addressed to the Chairman of the Sanitary Committee, the Public Offices, Frome, and endorsed "Tender for —," by noon on Mar. 26.

Mar. 27. Belfast.—Plumbing work and electric lifts at the Technical Institute. Plans and specifications may be obtained on application to the architect, S. Stevenson, 83, Royal Avenue, on payment of a deposit of £2 2s. for each set. Tenders to be endorsed "Tender for —," and lodged in the Town's Clerk's Office before noon on Mar. 27.

Mar. 27. Sowerby.—Supply of the following material, for the Urban D. Council:—Setts, Lancashire or Yorkshire; kerbs, Lancashire or Yorkshire; flags, Lancashire or Yorkshire; pitch; brooms; team labour; general repairs. Forms of tender can be obtained on receipt of a stamped and addressed foolscap envelope from the Engineer. Tenders to be sent to C. L. Whitehead, C.E., engineer, Council Offices, Sowerby Bridge, Yorks, by Mar. 27.

April 2. Bognor.—Flints, gravel, cement, road rolling and timber, for a period of twelve months from 31 Mar. 1906, for the Urban D. Council. Specifications and all information may be obtained from Oswald A. Bridges, council surveyor, Bognor. Tenders, accompanied by samples, and endorsed "Tenders for Supplies," to be delivered to Henry Layton Staffurth, clerk to the Council, Council Offices, Bognor, by April 2.

April 2. Manchester.—Supply of the following stores, for the Lancashire and Yorkshire Railway:—Brushes; colours; crucibles; gas and water fittings; iron castings (water pipes); lead; paper-maché panelling; screws; signal and telegraph fittings; signal, telegraph and electric light wires; springs (spiral); steel cotters and pins; steel plates (Siemens); steel (sheets, &c.); steel tubes for boilers; steel tubing (cold and hot drawn weldless); wire; wire rope, way materials; crossing timber; fencing (arch); sleepers. Further particulars and forms of tender may be obtained on application to Duffin, Stores Department, Osborne Street, Manchester, where parties are requested to call and examine the samples before tendering. The sample-room will be open for this purpose from Mar. 19 to Mar. 31 inclusive, between 10 and 4; Saturdays 10 to 12. Contractors cannot be allowed to tender to their own patterns, nor can the Company's patterns be sent away for inspection, all being sealed and exhibited at Osborne Street. Tenders, properly endorsed and addressed to the Directors, must be lodged with the Secretary not later than 10 a.m. on April 2. Separate forms of tender will be provided for each contract; parties applying are therefore requested to state the particular contract for which they propose to submit tenders.

April 2. Newburn.—Erection of about 600 cub. yds. of concrete walling at Bell's Close, together with about 180 lineal yds. of cement coping thereon. Erection of about 180 yds. of strong iron palisading at Bell's Close, and about 1,200 yds. of light palisading at Lemington and Newburn. Particulars may be had from Thomas Gregory, the engineer to the Council, at his office, Newburn. Tenders to be endorsed "Tender for Wall" or "Tender for Rails," as the case may be, and sent to George Wilkinson, clerk to the Council, 1, Mosley Street, Newcastle-on-Tyne, by noon on April 2.

April 4. Glasgow.—Supply of the following stores, for the Tramways Committee of the Corporation:—Axles, steel tyres and steel wheels; bolts and nuts, dog spikes, &c.; chilled iron brake blocks, car wheels, &c.; brushes; paint brushes; cartage; cast-iron castings; malleable iron castings; cast-steel castings; engineers' furnishings; fireclay goods; glass; granite and whin chips; ironmongery; iron and steel; lime and cement; oils; paints, &c.; pitch and pitch oil; plumbers' material; sand; timbers; tie-bars; wrought-iron tubes and fittings; varnish, and galvanised wires. Samples, where specified, can be seen at the Purchasing Department, 46, Bath Street, Glasgow. Specification and form of tender for any of the above can be obtained on application to James Dalrymple, general manager, 46, Bath Street, Glasgow. Sealed offers, marked "Tramways—Tender for —," must be lodged with A. W. Miles, town clerk, City Chambers, Glasgow, by 10 a.m. on April 4.

Tenders.

Addressed postcards on which lists of tenders may be stated will be sent post free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Fetter Lane, E.C. Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Bury St. Edmunds.—For the erection of a house, Fornham Road, Bury St. Edmunds, for Mrs. Golding. Messrs. Rutter, Sons & Lloyd, architects, 30, Abbeygate, Bury St. Edmunds. Quantities by Mr. Sidney Naish, Bury St. Edmunds.

F. Tooke	£1,844	0	0
F. Newton, Hitchin	1,580	0	0
H. G. Frost	1,492	0	0
H. J. Linzell, Newmarket	1,431	0	0
J. G. Cowell, Soham	1,415	0	0
Hinnels & Son*	1,385	10	0

* Accepted. [Rest of Bury St. Edmunds.]

Dartford.—For the erection of a girls' school, in York Road, for the Education Committee. Mr. William Harston, A.M.I.C.E., architect, 8, Hythe Street, Dartford:—

W. Pollock, Eltham	£8,778		
F. Johnson, Chelmsford	7,654		
R. Ayard, Maidstone	7,595		
W. J. Adcock, Dover	7,506		
Thomas & Edge, Woolwich	7,420		
Mattock & Parsons, London, W.C.	7,399		
J. & M. Patrick, Wandsworth, S.W.	7,390		
W. H. Archer & Sons, Gravesend	7,389		
W. Smith & Sons, Croydon	7,257		
F. & G. Foster, Norwood Junction	7,226		
Gough & Co., Hendon	7,184		
Friday & Ling, Erith	7,150		
W. F. Bay, Dartford	7,050		
J. Ellingham & Sons, Dartford	7,000		
J. Gutteridge, Peterborough	6,985		
Gunn & Co., Whitstable	6,967		
J. Lonsdale, Swanley Junction	6,948		
G. E. Wallis & Sons, Maidstone	6,838		
J. E. Johnson & Sons, Leicester	6,769		

Deptford.—For improvements at Clifton Hill school, for the London County Council:—

Enness Brothers, Erith	£10,788	0	0
J. Longley & Co., Crawley	9,792	18	0
F. & H. F. Higgs, Loughborough Junction	9,741	0	0
W. H. Lascelles & Co., Ltd., London	9,703	0	11
H. Lovatt, Ltd., Wolverhampton	9,533	0	0
H. L. Holloway, Deptford	9,525	0	0
W. Harris, North Woolwich	9,309	0	0
Clarke & Bracey, London	9,297	0	0
J. Appleby & Sons, Lambeth	9,271	0	0
Kirk & Randall, Woolwich	9,198	0	0
W. Downs, London	9,100	0	0
E. Lawrence & Sons, London, E.C.	9,098	0	0
Treasure & Son, Upper Holloway	8,985	0	0
T. G. Sharplington, Nunhead	8,984	0	0
J. & C. Bowyer, Upper Norwood	8,687	0	0
G. E. Wallis & Sons, Ltd., Maidstone	8,664	0	0
T. D. Leng, * Czar Street Works, Evelyn Street, Deptford	8,631	0	0

* Recommended for acceptance. [Architect's estimate, £10,253.]

Devizes.—For the erection of twelve cottages and offices, &c., in Gain's Lane, for the Urban District Council. Mr. F. G. Billingham, borough surveyor, architect. Quantities by Mr. F. G. Billingham:—

G. Drew, Cirencester	£3,533	3	9
Bosher, Sons & Co., Chorley	3,439	4	0
W. Webb, Bromham	3,230	10	0
Bigwood & Co., Melksham	2,987	8	0
G. Moore, Trowbridge	2,846	0	0
Butcher & Sons, Warminster	2,770	0	0
A. J. Bell, Swindon	2,758	0	0
A. J. Colborne, Swindon	2,700	0	0
R. Linzey, Trowbridge	2,690	0	0

T. Stone	£2,530	0	0
M. R. Moody, Trowbridge	2,520	0	0
L. Maslen	2,420	0	0
H. Ash	2,320	0	0
W. E. Chivers*	2,227	0	0

* Accepted subject to the approval of the Council and the Local Government Board.

Enfield.—For proposed additions and new storey to the children's receiving wards at the workhouse, Enfield, for the Guardians of Edmonton Union. Mr. Stuart Hill, architect, 105, Cannon Street, E.C. Quantities by Messrs. D. Campbell & Son, 4, Finsbury Circus, E.C.:

J. Stewart	£3,584	0	0
Pollard & Brand	3,450	0	0
Concrete Homes Syndicate	3,441	0	0
Banyard & Son	3,420	0	0
Martin, Wells & Co.	3,400	0	0
W. Shumour & Sons	3,390	0	0
Mattock & Parsons	3,373	0	0
A. E. Symes	3,325	0	0
A. Monk	3,320	0	0
Lane & Harvey	3,284	0	0
Pavey & Son	3,252	0	0
Rowley Brothers	3,230	0	0
W. Lawrence & Son	3,194	0	0
F. W. Mason	3,102	0	0
H. Knight & Son	3,187	0	0
Allen, Fairhead & Son	3,170	0	0
Myall & Upson	3,120	0	0
J. Thomas	3,100	0	0
L. & W. H. Patman	3,100	0	0
Fitch & Cox*	2,994	10	0

* Accepted subject to modification.

Holmer.—For the erection of the Holmer Council School. Mr. J. Parker, city surveyor, Hereford:—

J. Charles, Newport	2,087	0	0
R. L. Friend	1,850	0	0
J. C. Vaughan	1,835	0	0
Turford & Southward, Ludlow	1,833	0	0
E. R. Dyke, Colwall	1,825	0	0
H. Smith, Kidderminster	1,815	0	0
Pugh & Son, Cradley Heath, Staffs	1,808	0	0
Davies & Co.	1,799	5	9
C. Cooke	1,775	0	0
W. C. Bolt	1,765	0	0
W. Bowers & Co.	1,688	0	0
W. Powell	1,669	10	0
E. W. Wilks*	1,555	10	0

* Accepted. [Rest of Hereford.]

Kingston-on-Thames.—For the erection of London and Provincial Bank. Mr. A. Mason, architect, Victoria Road, Surbiton. Quantities by Mr. Ardeing Bond Buzzard, 22, Surrey Street, Strand:—

R. Scase & Son, Surbiton	£3,200		
Babbs Brothers, Surbiton	3,163		
Messon & Sons, Twickenham	2,879		
W. H. Gaze & Sons, Surbiton	2,772		
J. Dorey & Co., Brentford	2,760		
W. Irwin, Islington	2,738		
C. Wall, Ltd., London	2,680		
F. Hawley, Surbiton	2,525		

Leith.—Accepted for works in additions and alterations at Bonnington Road School, for the School Board. Mr. George Craig, architect, 85, Duke Street, Leith:—

Mason—Melrose & Thomson, Edinburgh	£5,851	12	8
Electrician—Stewart & Bucher	425	0	0
Painter—P. & J. Gordon, Edinburgh	307	17	4
Cement—J. Sutherland	722	19	0
Plasterer—J. Sutherland	580	15	0
Ironwork—Redpath, Brown & Co., Edinburgh	731	10	9
Tiler—Clunas & Co., Edinburgh	653	0	0
Slater—W. McLean	216	14	2
Plumber—Collier & King	676	0	0
Joiner—J. & W. Hamilton	4,248	0	0
Heating—McKenzie & Moncur, Edinburgh	731	0	0

[Rest of Leith.]

Leith.—Accepted for additions and alterations at North Fort Street Public School, for the Leith School Board. Mr. George Craig, architect, 85, Duke Street, Leith:—

Mason—W. Findlayson	£1,756	15	0
Joiner—J. & W. Hamilton	999	0	0

Heating—M'Kenzie & Moncur, Edinburgh	403	0	0
Plumber—Knox & Son, Edinburgh	280	0	0
Steel—Mather & Son, Edinburgh	217	11	0
Electrician—Malcom & Allan, Edinburgh	202	19	5
Tiler—Clunas, Edinburgh	134	13	5
Plasterer—Scott & Davie	128	10	0
Cement—W. Finlayson	127	8	0
Painter—J. & P. Gordon, Edinburgh	99	19	0
Slater—A. Ogilvie	53	0	0

[Rest of Leith.]

* Recommended for acceptance.

London, W.—For the renovation of and addition to Welsh C.M. Chapel, Hammersmith. Mr. L. Wynne Williams, architect, Connaught Road, Liverpool:—

W. Falkner	£4,255		
J. W. Falkner & Son	4,083		
L. W. & R. Roberts	3,946		
G. Parker	3,888		
J. Dorey & Co.	3,748		
J. P. Williams	3,657		
S. N. Soole & Son*	3,600		

* Accepted.

(Continued on p. xvii.)


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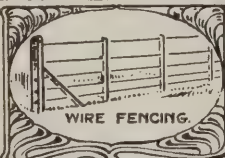


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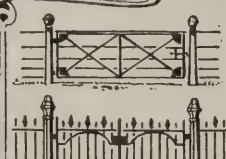
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TENDERS *cont. from p. xvi.*

London, N.E.—For the proposed reconstruction of a portion of the first section of the northern tramways in Kingsland Road, for the County Council:—

Steel, Peech & Tozer, Ltd., Sheffield	£3,640	14	0
P. & W. MacLellan, Ltd., Glasgow	3,640	3	0
Frodingham Iron & Steel Co., Ltd., Frodingham, near Doncaster	2,750	1	0
(Estimate (comparable with tenders), £2,914 12s.)			

Lydney.—For additions to the Lydney Secondary School, for the Forest of Dean Education and Lydney Institute Committee. Mr. R. S. Phillips, architect, Shire Hall, Gloucester. Quantities by Messrs. Vale & Kingsford, George Street, Gloucester:—

W. E. Lewis	£4,479	0	0
T. Griffiths	4,362	15	0
A. S. Cooke	4,222	16	10
W. Jones	4,157	0	0
Woodley & Son	4,000	10	0
Saunders & Sons	3,950	0	0
A. J. Dolman	3,860	0	0
J. Byard & Son	3,826	10	0
Orchard & Peet	3,789	0	0
E. Walters & Son,* Bristol	3,762	0	0

* Accepted.

Reading.—For the erection of University College. Messrs. W. Ravenscroft & C. S. Smith, joint architects, Reading:—

J. Norris & Sons	£17,967	0	0
Margetts & Son	15,868	10	0
Collier & Catley†	15,599	0	0
McC. Fitt	15,460	0	0
Kingerlee & Sons	15,362	0	0
Lewis & Brother	15,033	0	0
R. Curtis*	13,944	0	0

* Accepted. † Foreign steel, £77 13s. 10d.

Romford.—For demolishing existing brick bridge and building a new brick and steel bridge, with other appurtenant works, over the River Rom, in High Street, for the Romford Urban District Council:—

W. Fasey, West Ham	£1,510	0	0
Tilbury Contracting and Dredging Co., London	1,396	17	5
A. Fasey & Son, Leytonstone	1,356	0	0
G. Bell, Tottenham	1,297	0	0
R. H. B. Neal & Co., Plymouth	1,276	0	0
J. Strachan, Wembley	1,250	0	0
Wilson, Border & Co., Romford	1,190	10	0
D. T. Jackson,* Barking	1,125	0	0

* Accepted.

St. George.—For the erection of St. Aidan's vicarage, St. George, Bristol. Messrs. J. P. Sturge & Sons, architects, Bristol:—

R. F. Kidd	£2,397		
R. Wilkins & Sons	2,378		
H. W. Pollard, Bridgwater	2,353		
W. & J. Bennett	2,250		
W. Cowlin & Son	2,190		
E. Walters & Son	2,187		
Stephens, Bastow & Co.*	2,148		

* Accepted. (Rest of Bristol.)

Swansea.—For the erection of Sketty Parish Hall. Mr. Glendinning Moxham, F.R.I.B.A., architect, Swansea:—

C. Marles	£1,120		
Bennett Brothers	1,100		
H. Billings	1,050		
J. Davies	1,028		
Lloyd Brothers	1,027		
P. Gwyn	1,015		
J. & F. Weaver*	1,000		

* Accepted. [All of Swansea.]

Swansea.—Accepted for the erection of a residence, Killay Road, near Swansea. Mr. Glendinning Moxham, F.R.I.B.A., architect, Swansea:—

J. Davies, Swansea	£1,400		
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Swansea.—Accepted for the erection of a residence, Olchfa Hill, near Swansea. Mr. Glendinning Moxham, F.R.I.B.A., architect, Swansea:—

J. Davies, Swansea	£1,685		
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Swansea.—Accepted for the erection of residence and stables, Penyrheol. Mr. Glendinning Moxham, F.R.I.B.A., architect, Swansea:—

J. Davies, Swansea	£2,150		
--------------------	--------	--	--

Toddington.—For the erection of a new Council school. Mr. R. S. Phillips, architect, Shire Hall, Gloucester:—

W. Jones	£1,615	0	0
A. Estcourt & Sons	1,522	0	0
T. Hopkins	1,498	0	0
A. S. Cooke	1,465	19	4
Espley & Co., Ltd.	1,425	0	0
Orchard & Peet	1,417	0	0
Collins & Godfrey,* Tewkesbury	1,398	0	0

* Accepted with reductions and omissions.

Weybridge.—For the erection of new bottling depot and warehouse, for Messrs. F. S. Stowell, Ltd. Mr. Herbert Beeny, architect, Clinton Place, Weybridge:—

W. Greenfield,† Weybridge	£900		
W. H. Gaze & Sons, Walton	561		
Sycamore Works, Ltd., Wimbledon	516		
G. R. Wells,* Weybridge	510		
F. Deakin & Son, Addlestone	492		

* Accepted. † Withdrawn.

Bankruptcies.

(Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.)

DURING THE WEEK ending March 16th twenty-six failures in the building and timber trades in England and Wales were gazetted.

L. P. BARKER, stonemason, Bedford. R.O. March 7th.
J. P. WOOLCOCK, builder, Penryn. Deficiency £376.
G. TOWNSEND, builder, Barnes. R.O. March 6th.
H. M. COX, contractor, Brixton. Adj. March 6th.
W. THEOBALDS, architect and surveyor, London. Liabilities £346; assets £10 10s.
E. J. COX, window-glass merchant, London. Liabilities £1,008; assets £481.
T. H. HARDING, builder and contractor, Derby. Liabilities £14,573; assets £856.
W. R. & J. H. WALKER, builders, Smethwick. Liabilities £719; assets £12.
H. GALLETT, builder and contractor, Wyde Green. Deficiency £311.
J. BLAND, builder and contractor, Appleby. Adj. March 6th.
T. B. LAMB, builder and contractor, Fulwood. Gross liabilities £11,671; to rank £1,735; assets £1,242.
T. EMUSS, builder, Droitwich. Gross liabilities £1,183; expected to rank £545; assets £75.
C. H. FLACK, architect and surveyor, London. R.O. March 9th.
J. READING, builder and contractor, Barnes. R.O. March 6th.
M. H. PEART, surveyor, &c., Tottenham. Adjourned examination, Edmonton C.C., March 6th, at 11.30.
G. H. SANDERS, contractor, London. P.E., London Bankruptcy Court, April 10th, at 11.
J. H. G. FOSTER, timber merchant, London. P.E., London Bankruptcy Court, April 26th, at 11.30.
A. HOOKHAM, builder and decorator, Willesden Green. First meeting, London Bankruptcy Court, March 26th, at 12. P.E., same, May 3rd, at 11.30.
J. PENNINGTON, builder and contractor, St. Helens. First meeting, O.R.'s, Liverpool, March 22nd, at 11.30. P.E., Liverpool C.C., March 26th, at 11.
F. W. TURNER, painter and decorator, Horsforth. First meeting, O.R.'s, Leeds, March 21st, at 11. P.E., Leeds C.C., April 2nd, at 11.

PRICE & REES, painters and house decorators, Swansea. First meeting, O.R.'s, Swansea, March 23rd, at 12. P.E., Swansea Town Hall, April 20th, at 11.30.

C. E. NICHOLLS, builder, Barlow Grange (late Cuthorpe). First meeting, Angel Hotel, Chesterfield, March 23rd, at 12.15. P.E., Chesterfield C.C., April 20th, at 2.

The Journal of the Institute of Sanitary Engineers, Vol. IX., Part I., January to June 1905, has just been issued. The council of the Institute has decided to publish the journal at half-yearly intervals, instead of annually as hitherto, and after the proceedings of last year have been dealt with the regular issues of the journal will be in January and July, each dealing with the transactions of the preceding half-year. This year also two other numbers will be issued in June and October. The price of the journal is 1s. It is obtainable at the office of the Institute, 19, Bloomsbury Square W.C.

Bournemouth Municipal Buildings.—At last week's meeting of the Bournemouth County Borough Council considerable discussion took place in regard to the proposed scheme for municipal buildings, of which Messrs. C. E. Mallows and F. W. Lacey are the joint architects (see BUILDERS' JOURNAL, Nov. 22nd, 1905). The architects had been requested to alter their scheme so as to reduce the cost. An amendment that the matter should be referred back to committee to bring up a report as to the feasibility of an open competition for the work was ruled out of order, and the committee's recommendation of the revised scheme (inclusive of the dome but not furniture) to be carried out at a cost not exceeding £100,000 was adopted by 22 votes to 6.

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ADVERTISER (30) desires RE-ENGAGEMENT in architect or consulting engineer's office. Fifteen years' London experience in heavy construction work and preparation of specifications. Quick and accurate draughtsman. Highest references.—E. HOFF, 245, Barcombe Avenue, Streatham Hill. 1715

ADVERTISER requires position as Manager to a firm of Builders and Contractors.—Box 1700, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

ARCHITECT'S ASSISTANT, good draughtsman, steady and reliable, satisfactory references; moderate salary.—"Nonconformist," Box 1712, BUILDERS' JOURNAL Office, 6, Great New Street, E.C.

ARCHITECT'S ASSISTANT desires RE-ENGAGEMENT, 9 years' varied experience. Design, perspectives, surveying, levelling, &c. Salary £125.—Box 1688, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

ARCHITECT'S JUNIOR ASSISTANT, 3½ years' experience. Good knowledge construction, details.—C., 15, Blenheim Street, Chelsea. 1705

ARCHITECT and SURVEYOR (Young) is prepared to assist in the preparation of contract and competition drawings; also surveys for dilapidations and alterations, &c. 10 years' London experience. Terms moderate.—E. C., 100, Archway Road, N. 1685

ARCHITECTURAL ASSISTANT (27) desires re-engagement. Nine years' varied London and Provincial experience. Design, details, working drawings, perspective, &c. Excellent testimonials. Moderate salary.—Address Box 1716, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

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BUILDER'S CLERK (23) seeks engagement; 6 years' experience general office routine; salary moderate; town or country.—Box 1695, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

BUILDER'S CLERK or ASSISTANT (40) DISENGAGED, long experience; drawing, quantities, measuring-up, levelling, supervision of work, &c.; country preferred.—L. J. G., 88, Adelaide Road, Shepherd's Bush, London. 1721

BUILDERS—ELECTRICAL WIRING WORK WANTED, carcass or otherwise, by competent workman. Hour, day, or job.—E. ARNOLD, 30, St. James Road, Bermondsey, London. 1732

CLERK OF WORKS, age 34. Town or country. Thoroughly experienced in all branches, abstainer, moderate salary. Good references and testimonials.—R., 103, Colworth Road, Leytonstone, N.E. 1690

FOREMAN OF PAINTERS AND DECORATORS seeks engagement. Head or working. Good manager. Steady, practical, and reliable. Colourist. Age 36. Town or country.—T., Market House, Fleet, Hants. 1731

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SAWYER and SAW SHARPENER (all round) wants job; used to gutting machine.—Address A. E. C., 103, Mallinson Road, Clapham Junction. 1705

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WOOD CARVER, young, seeks employment. Good experience in Gothic.—Address S. R., c/o 13, Northcote Terrace, Kirke White Street, Nottingham. 1689

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AND ARCHITECTURAL RECORD.

March 28, 1906. Vol. 23, No. 581.

6, Great New Street, Fetter Lane, E.C.

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Reinforced Concrete. OUR regular readers will recollect that we were among the first in this country to realize the possibilities of reinforced concrete construction, the innovation and exploitation of which was due firstly to the French, and secondly to the Americans and Germans. We have devoted considerable space to the subject, and we are glad to say that at last our efforts, and those of other workers in the field, have attracted the attention of the Institute, which, at the instance of its Science Standing Committee, has just appointed a joint committee, formed of members of the Institute and other bodies interested, to draw

up rules for the guidance of architects in the use of reinforced concrete. The committee, which is presided over by Sir Henry Tanner, is made up as follows:—Representatives of the R.I.B.A.: Messrs. A. T. Walmisley, William Dunn, Max. Clarke, H. D. Searles Wood; District Surveyors' Association: Messrs. Thomas Henry Watson and E. Dru Drury; Institute of Builders: Messrs. Benjamin I. Greenwood and Frank May; Incorporated Association of Municipal and County Engineers: Messrs. A. E. Collins and W. Cockrill; War Office: Colonel C. B. Mayne and Major E. M. Paul, R.E.; other members: Prof. W. C. Unwin and Mr. Charles F. Marsh. There are a good many points for this committee to consider, and we trust that they will seek the assistance of the firms who have been pioneers in this work, and not rely upon the theoretical investigation which a few members of the committee are known to have made. Without acquaintance with actual conditions and actual work no practical conclusions can be hoped for. There is in the possession of the specialist firms a vast amount of knowledge which the members of the committee do not possess, and this knowledge is necessary to an adequate understanding of the subject. It is true some of the most eminent French engineers have written books which have been translated into English, and received accretions of knowledge which have thrown light on the details of the subject, but it is not too much to say that all the books, however recent, are somewhat behind the best practice. Apart from the question of calculating reinforced concrete members, there are a good many points of practical interest that it is important to have settled—for instance, the amount of concrete which it is necessary to place below the reinforcing rods to give full protection against fire. Then again there is the question of the protection of the enclosed steel from corrosion and disintegration. It is generally accepted without question that steel is protected by concrete. This is true if the concrete is good, but the question for settlement is, what precautions must be taken to ensure that the steel is protected under certain conditions? Portland-cement is made of several ingredients, and it is important to know the proportions which ensure protection and the proportions which do not. The slag cements and foreign natural cements on the market are very unreliable, and it is most important that we should, by testing, be able to discover whether any particular cement is suitable for reinforced concrete. Again, what would be correct in ordinary situations in buildings of ordinary character might be quite wrong for those exposed to such adverse influences as obtain in chemical works, where there are acids, or at works throwing off steam, and in positions where sea-water may come into contact with them, as pavilions on piers or the piles and decking of jetties, &c. Our

attention has just been called by Mr. C. J. Dawson, F.R.I.B.A., to the decking at the shore end of Southend Pier, which was constructed about fifteen years ago of small joists embedded in breeze-concrete. This was recently taken up, and it was found that the joists had been badly rusted. The reason, however, may have been that the cement was poor and perished by the action of sea water, or that the concrete, being composed of breeze without any filling material for the pores, such as sand, was porous, and let water and carbonic acid in solution penetrate to the steel; or the breeze may have been cracked on the under side of the joists by excessive deflection due to overloading. Such practical experiences as these require fuller investigation, but they serve to point out that there are conditions which may cause a very different result to that anticipated. Other points which the committee should investigate are the reinforcement of beams against shear, and the advantage to be gained by the rigid attachment of the stirrups or shear members to the bottom bars; the effect of temperature and moisture in the atmosphere upon the setting of cements; and the properties of the various aggregates, and the proportions for concretes to meet various requirements.

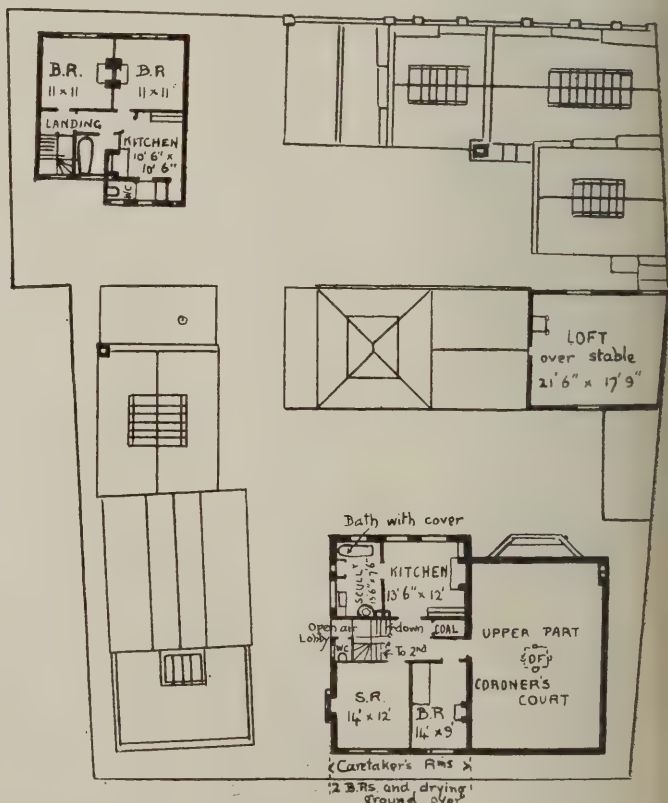
A Breach of Faith. We understand from sources which leave no doubt as to their reliability that the Office of Works proposes to still further interfere with the late Mr. Brydon's fine design for the new public offices in Whitehall, by abandoning the construction of the other three towers. Whether this is due to some parsimony on the part of the Government or to an abrogation of taste by some official we do not know, but it is scandalous that there should be any further meddling with the work of an eminent architect to whose memory it is only due that we should carry out his design in its entirety. His interest in this building and the energy he devoted to it undoubtedly shortened his life, and it is not right to thus slight his memory by shearing his design of such prominent features as these towers would be. The action of the Office of Works in this matter seems to be farcical, for not only has almost all the stone for these towers been worked, but it is actually delivered, the scaffold has been erected, and a new hoist purchased for the carrying out of the work. The builders' profit will have to be paid, and it is stated that the cost of carting and storing the stone will be more than that of constructing the towers.

ROYAL ACADEMY EXHIBITION, 1906.

THE sending-in day for architectural works is Friday next, March 30th, from 7 a.m. to 10 p.m. as hitherto. Will architects who have not already forwarded their drawings let us have them at once.



WATSON - STREET



WATSON STREET

Ground-floor Plan.

First-floor Plan.

SELECTED DESIGN FOR CORONER'S COURT, MORTUARY AND DISINFECTING STATION AT DEPTFORD, LONDON, S.E.
HORACE T. BONNER, A.R.I.B.A., ARCHITECT. (For particulars see p. 166.)

THE ARCHITECTURAL ASSOCIATION.

Mr. Soames on the London Club-house of Last Century.

A MEETING of the Architectural Association was held at 18, Tufton Street, Westminster, on Friday evening, the chair being occupied by the president, Mr. E. Guy Dawber, F.R.I.B.A.

The president announced the house list for the session 1906-07, the president-elect being Mr. R. S. Balfour, and the vice-presidents Messrs. Walter Cave and A. Needham Wilson. The elections will take place on April 27th.

The president also announced the resignation by Mr. A. Maryon Watson of the honorary secretaryship owing to ill-health, and the thanks of the Association were accorded to him for his past services.

Mr. W. Kaula was elected a member of the Association, and the following further donations to the Building Fund were announced:—

	£	s.	d.
Horace Cheston	-	5	0
Walter Gilbert (further donation)	-	2	2
F. Dare Clapham (double subscription)	-	1	1
A. T. Bolton	do.	0	10
W. Millard	do.	0	10
D. Newman	do.	0	10
H. Y. Boreham	do.	0	10

Votes of condolences to relatives of the late Mr. Zephaniah King, Mr. Lancelot Simmons and Frank Whittingham were passed.

A paper on "The London Club-house of Last Century," by Mr. A. W. Soames, M.P., was then read by the secretary, Mr. D. G. Driver, Mr. Soames being abroad.

In this paper a brief list was first given of the chief social clubs that had been founded in the metropolis, beginning with the Bread Street Club, originated by Sir Walter Raleigh, then going on through the eighteenth and nineteenth centuries, and concluding with the Conservative Club (1840), which may be said to terminate the earlier period of club building, as in the next quarter of a century comparatively few new clubs were founded; indeed, the bulk of the newer clubs belong to the last twenty years of the century.

The Innovation of the Smoking-room.

The evolution of the club-house, as might be expected, reflects changes in our social habits. Two, at any rate, of the older club-houses—the Athenæum and the United University—when built contained no smoking-room. It was not until 1857 that Thackeray succeeded in persuading the committee of the Athenæum to allow smoking on the premises. In the case of the United University (1822) it was found necessary to add a third floor in order to provide a smoking-room. This house, which was built by Wilkins, the architect of the National Gallery, has lately been pulled down, and a new club-house is being erected on the site by Mr. Reginald Blomfield, A.R.A.

The Growth of Bedrooms.

The greater facilities for travelling have had their effect on the clubs, which have not only increased in number but also in size, and within the last few years it has become usual for clubs to provide bedrooms for members, which was only the case in a few of the old clubs, where perhaps a dozen might be found. The modern political club, such as the National Liberal or the Constitutional, with its 108 bedrooms, is really more like an hotel than the old-fashioned club. Consequently we find that, whereas the Carlton Club (1832) and Conservative Club (1840) have only one floor above the ground floor, the Constitutional runs into six storeys; moreover, the last-named cost £200,000, while the Travellers' (1819) was built for the modest sum of £23,160 and the Athenæum (1824) cost no more than £34,239.

Ubiquitous Stucco.

Two circumstances may be noticed which had a considerable influence on the early clubs, the one beneficial and the other adverse. The removal of Carlton House, which faced the bottom of Waterloo Place, gave some excellent sites, now occupied by the United Service (Senior), Athenæum, Travellers', Reform, &c., but, unfortunately, the period was one when exteriors were almost invariably rendered in stucco or cement, and this detracts seriously from the appearance of nearly all the older clubs.

The Staircase.

Given a well-lighted and sufficient site, the planning of a club-house, of the earlier type at any rate, is not a very complex problem, and it is one that affords excellent opportunities to the architect. The hall and staircase naturally play an important part in the design, but, with a few notable exceptions, the designers of our club-houses have not made the most of their opportunities in this respect. In many cases we find a spacious hall with an ample staircase, but the effect of the whole completely destroyed by the approach being at one side of the hall and not opposite the staircase. A notable instance is the United Service Club. The Army and Navy, too, has a large florid staircase, similarly placed and planned, except that the central flight, instead of descending in an unbroken line to the ground floor, branches right and left shortly before reaching the ground, with a questionable effect. In the Conservative Club also the effect of a somewhat remarkable hall and staircase is diminished by a side approach in one corner of the hall.

The treatment of the stairs in the National Liberal Club is somewhat unusual, the stairs ascending round an oval well; the result, however, is not particularly happy.

The Most Successful Treatment

of the hall and staircase is found in the Athenæum. The plan is both simple and effective. The site is a regular oblong, about 103ft. by 79ft. This space is divided into three portions by walls parallel to the shorter sides, of which the middle part, occupied by the hall and stairs, is considerably the largest, being roughly two-fifths of the whole. The entrance hall, which is only one storey in height, is divided by irregularly-spaced colonnades somewhat in the manner of a basilica, with a low segmental coffered ceiling over the nave and flat ceilings to the aisles. At the end of this hall, which is somewhat dimly lighted by windows at the side of the main entrance, is seen a broad and lofty flight of stairs, branching right and left and returning on both sides, the whole flooded with light from above. This plan of lighting is very pleasing, and the effect of the whole is very good.

Lighting.

The lighting of large rooms 20ft. high or more is a matter of some little difficulty. The older architects for the most part frankly gave up any attempt to produce a window that would reach anywhere near the top of their rooms, and took refuge usually in a coved ceiling. As these clubs mostly occupy positions where there is a good light, and their rooms are not very wide, Mr. Soames said he was not sure that they were not right. Certainly the elevations gained in solidity and dignity by having sufficient wall-space, where it is not frittered away or overloaded, and the attempt to use very large windows in the New University, Junior Constitutional, National Liberal Club, &c., is not so successful as to be likely to induce anyone to follow their example.

The majority of the large club-rooms are, of course, lighted from the side, but the coffee-room at the Oxford and Cambridge (65ft. 10ins. by 32ft.) is lighted by lofty

windows at both ends; this method of lighting, however, does not give a pleasing effect.

Some of the earlier clubs, e.g., the Athenæum and United Service, have the ground floor very little raised above the street level, but it was a very usual practice in later houses to raise the ground floor a few feet higher, and so get a fairly well-lighted mezzanine to provide lavatories and offices.

Alcoves.

One of the principal objects of the designer of a club is to provide three or four rooms on a large scale which shall have some architectural character and look comfortable withal. Mr. Soames held, then, that the ideal room for a club, whether it be coffee-room, drawing-room, library or smoking-room, is one which provides a considerable number of nooks or recesses, where little coteries can assemble or where a quiet table for reading or writing can be placed. Nothing gives an air of less comfort to a coffee-room than a bare space of straight wall with an interminable row of little tables set against it, all of the same size and shape. For that reason the room should be broken into bays, with columns and antæ of ample projection. An excellent instance of this is the library at the Travellers'—

the most Charming Room

in any club in London. The dimensions are 65ft. by 22ft. 6ins. The central bay is lighted by three grouped windows, and the end bays by one each. Slender coupled shafts stand well away from the antæ on pedestals connected to them, and 7ft. or more from the side walls. The entablature is returned across the room over these shafts, and the effect is most happy.

In Barry's later house, the Reform, we find a similar arrangement. Here the coffee-room and library are each about 117ft. by 27ft. and 20ft. high, and are divided again into three bays and recesses at each end. But here, instead of a single entablature crossing the room, Barry has separated his bays by two entablatures about 10ft. apart, with a soffit between at a lower level than the ceiling, and carried in the one room on single columns in antis and in the other on coupled shafts on pedestals standing boldly away from the walls. This arrangement gives additional nooks for small tables, and somewhat disguises the excessive length of the room in proportion to the width. Both rooms are very successful, the library being second only to that in the adjoining house.

The L-shaped Room

was not employed in any of the older houses, but it is not to be despised for a club. A more sociable method of entertaining strangers is to allow them the use of the smaller arm of such a room, instead of relegating them to a badly-lighted and stuffy little back room, as is so often their unhappy lot in the older and less spacious club-houses. The Union has recently made an alteration to its coffee-room, and adopted this plan, and two good examples of L-shaped rooms are to be found at the Junior Carlton.

The Reform Club.

As a piece of architecture Mr. Soames put the Reform Club, by Barry, first in order of merit. The plan is very simple. The main building is a rectangle 120ft. by 105ft., and in the interior is a covered courtyard 56ft. by 51ft., surrounded by a colonnade of Ionic pillars on unmoulded pedestals supporting a gallery, above which a Corinthian colonnade carries the roof. This arrangement gives a perfectly symmetrical, dignified and spacious interior, but the effect is a little marred by the interlacing cove lantern light, apparently of cast-iron. The use also of scagliola for the columns and wall-surface is to be regretted. The plans of the ground floor and first floor are almost identical. On the south there is on both floors a room about 117ft. by 27ft.; on the west one of 50ft. by

25ft., plus a 7ft. recess; and on the north or entrance side and east or staircase side smaller rooms.

The Other Clubs.

Following the Reform, Mr. Soames dealt with the numerous other clubs—the Travellers' (also by Barry), the Pall Mall elevation of which was said to have been suggested by the Pandolfini Palace, at Florence; the Athenæum, by Decimus Burton, ruined beyond redemption by the unfortunate addition of a third floor set-back 7ft. or 8ft. inside the main walls of the building (the continuous balcony at the first-floor level is one of the rather unusual features of this building); the Oxford and Cambridge Club, by Robert and Sydney Smirke, built in 1836-7 at a cost of no more than £26,743 (though it cannot be considered particularly happy either in plan or elevation); the Conservative Club, a building of some dignity, with one of the most successful fronts (the plan gives a fine room to the front, and there is a spacious coffee-room behind); the United Service Club, which, though not of any striking originality, has a massive air and is not inappropriate to a club of warriors; the Junior United Service, with its main entrance boldly placed out of the centre of the façade, thus securing a fine room with a large bay on the east (the impression, however, of the whole is one of heaviness without dignity, and the end elevation to Regent Street, with its windows of varying heights and shapes, is particularly unfortunate); the Army and Navy Club, by Parnell & Smith, completed in 1851 at a cost of £54,000 (owing some of its features to the Palazzo Rezzonico, on the Grand Canal in Venice and its upper storey to Massuri; the exterior is not unimposing, but one could have wished for a little more plain surface for the eye to rest upon); the Carlton Club, an elaborate one—somewhat too elaborate, in fact, the surface being worried and cut up till there is hardly a square foot of plain work to give repose to the eye (the polished granite columns, too, afford an unpleasant contrast to the stone, especially as the surface of the stonework is now unfortunately disintegrating badly); the Junior Carlton, a building which, originally designed by David Brandon and opened in 1860, has been completely remodelled by Mr. Macvicar Anderson (the elevations, however, are wanting in style, and of no particular interest); and the Garrick, designed by F. W. Marrable and opened in 1864.

The More Recent Buildings.

Of the huge buildings that have been more recently erected for political clubs Mr. Soames said it was difficult to speak in terms of much commendation. The National Liberal Club has certainly more architectural character than the Constitutional or the Junior Constitutional, but, while fully admitting that the site was a difficult one, Mr. Soames said it was impossible to avoid feeling that more might have been made of it.

The Constitutional Club occupies perhaps an even more awkward site, and it has not been successfully dealt with. Terra-cotta, too, is a poor material for a building on so large a scale, though even a better material would not have redeemed it. The Junior Constitutional cannot, however, be said to suffer from a poor material, nor does the frontage to Piccadilly offer any difficulties, but a marble front will not carry off a poor design, and this one is quite wanting in breadth and dignity.

With regard to all these three, the question arises whether buildings so lofty and on so large a scale can be satisfactorily treated with gables. Mr. Soames said he was inclined to doubt it. He thought more emphasis to the horizontal lines was required than could be obtained with such a treatment.

DEPTFORD CORONER'S COURT, MORTUARY, &c.

THE design of Mr. Horace T. Bonner, A.R.I.B.A., for coroner's court, mortuary and disinfecting station at Deptford (illustrated on p. 164 of this issue) has been selected in a limited competition, two other architects besides Mr. Bonner having been invited to submit designs. The arrangement of the buildings gives complete classification and entire isolation to the several departments, effecting economy and convenience in working. Special attention has been devoted to the coroner's requirements and direct access is given for the jury's "viewing." All the mortuary buildings are lighted from the north and none are overlooked—an important point. The coroner's court is spacious and lofty, being 34ft. by 21ft. by 23ft. high—ample height being essential in such a court in order to avoid any "stiffness." The coroner's seat and desk are placed on a raised dais or bench, similar to that in a court of law, with witness box to the right and jury to the left. The coroner's room adjoining is 16ft. by 12ft., with lavatory and w.c. opening out of it. The witnesses' room is placed at the front of the building, affording convenient access to the court and so saving witnesses, when called, having to struggle through a crowd. There is a lavatory for women adjoining this room and sanitary conveniences for men close by, but entered from outside the building. A special passage-way for jurors is provided to enable them to pass direct to and from the jury box to the mortuary to "view." The caretaker's apartments are placed over, on two floors, comprising six rooms, namely, sitting-room 14ft. by 12ft., kitchen 13ft. by 12ft., scullery and bathroom 13ft. by 7ft., two large bedrooms, one small bedroom, with pantry, coal store and w.c. There is an asphalted flat over the top floor.

The public mortuary buildings are entirely detached, having a convenient mourners' or waiting room, a spacious viewing lobby with air-tight window, mortuary and post-mortem room.

The mortuary is 25ft. by 20ft., and is lighted from the north (thus keeping out the sun's rays and so maintaining a cool temperature). It is proposed to be faced with glazed tiles or bricks, and has an open iron roof with lantern light; the doors are placed at an angle so as not to be seen from the entrance gate. The post-mortem room adjoining measures 23ft. by 16ft. 6ins., and is lighted from the top and from windows in the north wall, with surgeons' room and lavatory opening out of it. The mortuary for infectious cases is placed apart and has separate viewing lobby with air-tight window. The disinfecting department is on the back frontage, in Baildon Street, and has wide gates for vans or carts. It is so arranged that articles to be disinfected are received at the south end and passed out at the north end. The receiving room is 31ft. by 20ft., separated by a solid wall (with air-tight window) from the disinfecting chamber—which is 27ft. by 20ft., top lighted and ventilated, and fitted with two "Equipex" or other approved disinfectors, and a steam boiler of about 15 to 18-h.p., with small brick chimney. The delivery-room is proposed to be finished in Parian cement and enamelled white; roofs and ironwork being similarly finished. The stable is in a convenient corner of the yard, containing one stall and one loose-box, harness-room, store-rooms, w.c. and urinals. Adjoining is the van shed, providing accommodation for two large vans as well as hand ambulances. The isolation shelter consists of two separate flats, on the ground and first floors respectively, with separate entrances and yards to each. The cost of the buildings is put at about £4,000.

NOTES ON COMPETITIONS.

Proposed new School, Colchester.

A striking illustration of the troubles which befall promoters and competitors when the services of a professional assessor are dispensed with has been afforded by the proceedings of the Borough Council of Colchester as exemplified at a recent meeting. The council invited plans in what, it is to be presumed, was a limited competition, and three sets of designs were submitted. The Education Committee appears to have cherished the idea that a professional assessor was unnecessary, in view of the fact that the plan they proposed adopting would have to be approved by the Board of Education. Consequently they set to work with a light heart, and after wavering between the respective merits of two of the schemes, ultimately made a selection. Then the anger of the unsuccessful competitors was aroused and they both wrote protesting against the award, maintaining that the selected design did not comply with the requirements and was ill adapted to the site, and requesting that the services of an independent school expert should be requisitioned to assist the committee. A lively tussle ensued in council during the consideration of the Education Committee's recommendation that the selected plan be adopted, and an amendment that the three sets of plans be submitted to the judgment of an independent assessor was well supported, but not sufficiently to prevent the committee's recommendation being adopted. Of course there ought to have been an assessor, but this should have been looked to by competitors before the designs were assessed, and not after. It is hardly sportsmanlike to take part in a game the chances of which are known, and then to complain of being a loser. Competitions of this sort are always games of chance, although unfortunately for the rash ones who play and lose the stakes are high. *Experientia docet*; but competitors are stubborn pupils.

Proposed Baths, Jarrow.

This is another competition in which the elements of chance appear to play a large part. The whole of the conditions are comprised on a single sheet of foolscap. There is no mention of an assessor. The requirements are briefly stated as a swimming bath 75ft. by 30ft., twelve or fifteen slipper baths, provision for caretaker, necessary heating, washing and drying accommodation, and any special arrangements at the discretion of the architect. The council do not bind themselves to accept the cheapest scheme. There are no premiums, but the successful competitor will be appointed to carry out the work at the usual rate of remuneration. The building is to cost £3,000. It is to be hoped that the customary remuneration may be taken as 5 per cent., although, if the usual practice obtaining in the North is taken into account, there is room for doubt upon this point. In any case, the competition does not appear a desirable one to take part in, unless it can be ascertained that a competent assessor is to be appointed.

Proposed Infectious Diseases Hospital near Leuchars, St. Andrews, Fife.

There is a considerable element of chance also in this competition, inasmuch as no minimum of cost has been fixed, and the revised information to architects states that "it is proposed to remit the plans selected to a skilled assessor (measurer or architect)." There is an ominous look about all this. In the first place the plans selected are to be submitted to adjudication. There is no information as to whom they are to be selected by, but the conclusion is that this will be done by the Hospital Committee. They are then to be submitted to a "measurer or architect." A measurer is the Scotch term

for a quantity surveyor. What a measurer knows about hospital plans, goodness knows, but as he is mentioned in precedence to an architect, it is to be assumed that his services will be sought. St. Andrews is apparently relying upon the Local Government Board's memoranda as its safeguard, in the same way that Colchester hoped to shift its responsibility upon the shoulders of the Board of Education. In fact, the conditions for the hospital consist chiefly of the Local Government Board's memoranda as to the plans of hospitals for infectious diseases, and a list of additional information to architects issued by the Hospitals Committee. A contemporary journal recently stated, anent unsatisfactory conditions, that one rubs one's eyes and wonders whether it is really the year 1906, and whether the Competition Reform Society really exists. Truly, the lack of enlightenment shown by promoters of competitions, as well as of those who participate in them, is a cause for wonder, but one fails to see how the Competition Reform Society can prevent the issue of bad conditions; it can only endeavour to obtain their revision.

Elementary Schools at Sutton Coldfield.

Messrs. Crouch, Butler & Savage have been awarded the first place in the competition for new elementary schools in Victoria Road, Reddicap Heath and Green Lanes, Sutton Coldfield, and their design has been accepted by the Education Committee. Twelve sets of designs were submitted in the competition.

New Law Courts at Cape Town

Dissatisfaction with the award in the large competition for new law courts at Cape Town seems to exist in some quarters, for memorials on the subject have been addressed to the Government by the Cape, the Transvaal and the Natal Institutes of Architects. The complaint is that the design awarded the first place does not show its front entrance in Victoria Street, whereas this was particularly stipulated by the conditions. We understand, however, that the fullest consideration was given to the designs submitted, and that the award made is the right one. Mr. Mervyn Macartney, the assessor, acted in conjunction with a Government committee.

Competitions Open.

The following is a list of competitions open:—

DATE OF DELIVERY.	COMPETITION.
Mar. 31	BIRMINGHAM COUNCIL HOUSE EXTENSION (Sketch Plans).—£1 rs. deposit for conditions. Particulars from Birmingham Town Clerk, Council House.
" 31	DWELLINGS AT MILAN EXHIBITION.—Premiums £240 and £80. Particulars from the Exhibition Committee, Milan, Italy.
April 2	PUBLIC LIBRARY AT SOUTHWARK (to cost £7,000).—Premiums of £50, £30 and £20. £1 rs. deposit for conditions. Particulars from Mr. J. A. Johnson, Town Clerk, Town Hall, Walworth Road, S.E.
" 14	SCHOOL AT OSSETT.—Premium of £50 (to merge). Particulars from the Secretary at the Education Office, Ossett.
" 15	PEACE PALACE AT THE HAGUE.—Particulars from the office of the Carnegie Foundation, Noordeinde 33, The Hague.
May 31	NATIONAL CONGRESS HALL FOR BRAZIL.—Premiums of 15,000, 10,000 and 5,000 milreis (equivalent to about £1,685, £1,125 and £562 respectively). 5,000 milreis also for designs not pre-empted but desirable to be acquired. The conditions of the competition can be seen at the offices of the Commercial Intelligence Branch of the Board of Trade at 73, Basinghall Street, E.C.
No date	ISOLATION HOSPITAL AT STONE.—Limited to architects in the district. Particulars from Mr. J. J. Chapman, clerk to the Stone Joint Hospital Board, Stone, Staffs.
Date not stated.	BATHS, FIRE-STATION AND FREE LIBRARY AT REDDISH.—To cost £5,000. Applications by March 31st to Mr. Robert Hyde, Town Clerk, Stockport, for form of instructions to architects. Deposit £1 rs.

Enquiries Answered.

The querist's name and address must always be given, not necessarily for publication.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Correspondents are particularly requested to be as brief as possible.

The Clock Tower, Westminster.

Referring to the enquiry about this tower on p. 107 of our issue for February 21st, Mr. E. L. Schneider, of Upper Tooting, writes: "If querist will refer to the 'Building News' for December 31st, 1858, and to the 'Builder' for January 31st, 1857, he will find some useful illustrations reproduced from the working drawings of Sir Charles Barry's clock tower."

Construction of Steel and Concrete Floor

BRIGHTON.—R. G. writes: "Is the construction of a fireproof floor as shown by sketch (not reproduced) the best I could use for a span of 29ft. 6ins. between supports? I am rather pinched for headroom, and do not want the floor to be more than 15ins. overall, but according to my working out the floor would be 2ft. thick. Could I use smaller r.s.s.?"

If the floor below is to be kept clear of any obstruction by columns, then the main girders will have to be 18in. by 7in. by 75 lb. rolled steel joists, but, instead of resting the small cross-joists on the top flange, a considerable saving in headroom may be effected by constructing the floor as shown by Figs. 1 and 2. If there is no objection to a row of columns down the centre of the room below, then the main girders may be 10in. by 6in. by 42 lb. rolled steel joists, and the floor will then be as in Figs. 3 and 4. The cast-iron columns will each have to carry a load of about 18 tons, and, assuming them to be 14ft. long, they should not be less than 7ins. diameter and 3/8in. metal. It will be simpler to make the concrete with a 6in. parallel thickness, as shown, instead of arching it between the cross-joists as suggested. The floor-boards must not be laid until the concrete is perfectly dry unless some waterproof sheeting is interposed. Short pieces of angle instead of one continuous angle may be used to support the cross-joists.

HENRY ADAMS.

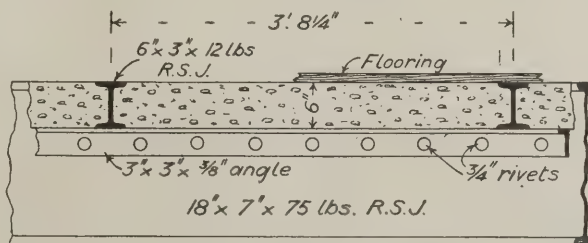


FIG. 1

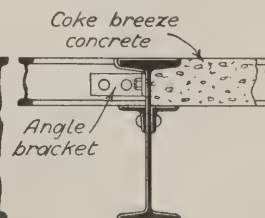


FIG. 2

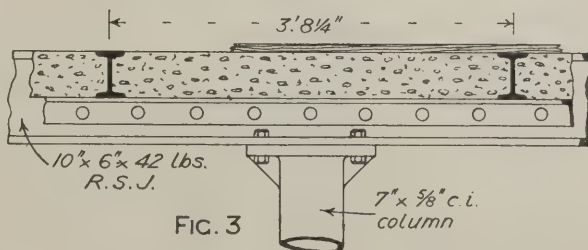


FIG. 3

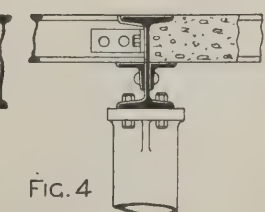


FIG. 4

STEEL AND CONCRETE FLOOR.

Books.

TAUNTON.—W. B. J. writes: "Which is the best text-book on undertaking?—I mean a book concerning funerals and how they are carried out, and prices also."

We endeavour to oblige all querists, though some of the questions they send are, to say the least, strange. But we must draw the line somewhere, and we draw it at funerals. We would refer "W. B. J." to the "Undertakers' Journal": but in putting his question elsewhere he would do well to make his last sentence less ambiguous, otherwise there may be a misunderstanding as to whether he wants to know the prices of funerals or of the books dealing with them.

Claim in respect of Specification Clauses.

ALLTWN writes: "(1) I have been erecting a small house by contract, and there is a clause in my specification which reads as follows: 'Supply and fix in sitting-room register grate and mantle p.c. £3 5s. (fixing extra) selected by the owner or the architect, and supply all necessary firebricks, &c., and mortar for setting same.' I am claiming an extra on the above in consequence of the two words in brackets, namely, fixing extra. The owners took upon themselves to purchase the grates and mantles without mentioning the matter to me, although the above clause say that I must 'supply, &c.' (2) 'Supply and fix to all openings requiring them red deal lintels 1in. deep for every foot span, but in no case less than 3ins. with 6in. bearing on walls at each end.' Do you consider a lintel a right and proper thing to specify over an opening 11ft. in the clear when there is a floor above and a gable over that of 16ft span? (3) What constitutes a girder, also a lintel?"

(1) (a) Words in a specification such as you quote undoubtedly mean that the contractor is to include in his tender the cost of fixing, and you are not justified in claiming "fixing" as an extra. The contractor is also to pay £3 5s. for a stove and mantelpiece. (b) The architect often purchases grates, &c., in the circumstances mentioned, and sends the bill to the builder for payment. (2) A red deal lintel for an 11ft. opening is not an unreasonable thing to require, and I am of opinion that in such a position a pair of 1in. by 3in. deals will form a more lasting job than the usually flimsy iron joists often used for such a purpose. (3) A "lintel" covers the top of a door or window opening. A "girder" carries a weight in any position. F. S. I.

Wesleyan Chapels.

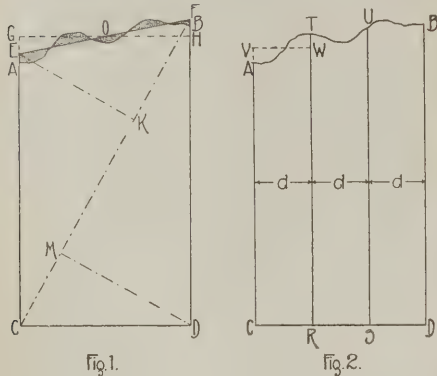
In reference to the recent enquiry of "G. W. C.," Nottingham, Mr. C. R. Thickpenny, of Watford, writes: "Querist will find

illustrations and particulars of cost, &c., of recent Wesleyan chapels in the annual report of the Wesleyan Chapel Committee, printed by Messrs. Hayman, Christy & Lilly, Ltd., 113-115, Farringdon Road, E.C."

Computing Area of Irregular Plots.

SKEGNESS.—PYLON writes: "Kindly explain how to compute the area of a plot of land as shown by sketch by 'averaging' the side A B."

There are two ways of computing the area of irregular plots of land which might be described as "averaging." In the first method a fine black thread EF, Fig. 1, is stretched



over the carefully plotted plan and carefully adjusted so that the shaded area above EF is equal to the shaded area below EF. Then, if the angles ACD and BDC are right angles, bisect EF at O and draw GON parallel to CD. The area of the plot is equal to CD × DH. If the angles ACD and BDC are not right angles, then join BC, and from E and D drop the perpendiculars EK and DM on to BC. The area is then equal to $\frac{1}{2} BC(EK + DM)$. The line EF is called a "give and take line." The second method is as follows:—Divide the plot up into any convenient number of strips of equal width d , as shown in Fig. 2. Now if CV and RW be made each equal to $\frac{CA + RT}{2}$ it will be seen that the area of the strip ACRT will be approximately $\frac{CA + RT}{2} \times d$. Similarly the areas of the strips TRSU and USDB are approximately $\frac{RT + US}{2} \times d$ and $\frac{US + BD}{2} \times d$ respectively, whence by adding the three areas together the area of the whole plot will be $\frac{1}{2}(AC + BD + RT + US) \times d$, or, expressed as a general formula, total area = $\frac{1}{2}$ sum of first and last ordinate plus sum of intermediate ordinate × common width of strips. Only four ordinates have been taken in Fig. 2 for the sake of clearness, but greater accuracy may be secured by taking a greater number of ordinates. H. Y. M.

Cutting to Arches.

LONDON.—A SIX YEARS' READER writes: "What amount of cutting would there be in the following arches separately:—

	Openings.	Face.	Soffit.
	ft. ins.	ft. ins.	ins.
Semis	5 0	1 1½	4½
	3 6	1 1½	4½
	3 0	1 1½	4½
	2 6	1 1½	4½
Camber	2 0	0 9	4½

We take it that "Six Years' Reader" is a sub-contractor, and the results below are based on this assumption. For this reason fair cutting round the semi-arches is not included, nor skewbacks to the camber:—

Semi 5ft. oins.,	Face equals	-	roft. roins.
	Soffit	"	- 2ft. 1rins.
" 3ft. 6ins.,	Face	"	- 8ft. 2ins.
	Soffit	"	- 2ft.
" 3ft. oins.,	Face	"	- 7ft. 3ins.
	Soffit	"	- 1ft. 9ins.
" 2ft. 6ins.,	Face	"	- 6ft. 5ins.
	Soffit	"	- 1ft. 6ins.
Camber,	Face equals	-	2ft.
	Soffit	"	- gins.

Junior Draughtsmanship under Government.

GUILDFORD.—DRAUGHTSMAN writes: "Where can I get information about junior draughtsmanship (civil engineering) under the Government? What are the opportunities of a young man in such a position?"

There is only one appointment for junior draughtsmen open to competition, viz., that of temporary draughtsman in the office of the Inspector-General of Fortifications. Particulars of this examination can be obtained from the Civil Service Commissioners, Burlington House, London, W. The post of temporary draughtsman without an examination is to be obtained in the War Office and Admiralty; but there are already so many names of gentlemen who are waiting to fill vacancies upon the books of these departments that the possibilities of obtaining one of these appointments is very remote. Some five years ago the prospects of a draughtsman in the Admiralty were good, for the post of assistant civil engineer might have been taken by examination, but at present this department is so full of young men that even the possibility of another examination for one of these appointments within the next year or two is quite remote; and much more remote are the chances of promotion in this department. S. O. F. H.

Drawings of Vaulting.

In reference to the enquiry under this head on p. 129 of our issue for March 7th, Mr. Harry Hems, of Exeter, writes: "Some short reference to the vaulting at Salisbury Cathedral will be found in Bond's admirable book, 'Gothic Architecture in England' (1905), as well as a fine illustration, from the north-west, of that in its Lady Chapel (p. 173). The piers in the nave, with their central cylinders composed of small square stones, are touched upon (p. 246), and a sketch is given (p. 249) of the clustered supporting shafts, annulets and copper bands to piers. The groining at Bath is briefly mentioned (p. 240) as retaining the vaulting shaft in the piers, as at Worcester, Rochester, Chester, St. Saviour's, Southwark, York and Lichfield. There is no reference in the book to the vaulting at Manchester."

Construction of Stable.

PINNER.—STABLES writes: "At the rear of a street I have a vacant piece of land about 45ft. by 20ft. on which I desire to erect a stable, arranged for carriages on the ground floor, with hack horses on the first floor, and hayloft above; height from floor to ceiling, both for carriages and horses, 9ft. What would be the probable cost of the floor upon which the horses will stand, and what are the materials to be used?"

The usual method of constructing such a floor as you describe is by means of iron joists placed parallel and at from 4ft. to 8ft.

intervals. Between these joists cement-concrete arches are turned, and the whole is braced together by suitable iron tie-rods, and carried on stout brick walls, strengthened if necessary by piers. The cost should be about £6 per square (depending somewhat on local circumstances), and to this should be added the cost of the brick or other paving which is employed for the stalls, &c. F. S. I.

Determining Width of Flange.

WHITLEY FAY.—STUDENT writes: "Kindly give a formula for getting the width of a flanged plate girder when such width is not fixed by special conditions, such as the width of the wall the girder is supporting."

The conditions determining the width of flanges in plate girders will be found at page 40 of "The Practical Designing of Structural Ironwork" (Spon. 8s. 6d.). They are generally from $\frac{1}{20}$ to $\frac{1}{30}$ of the span in width. Steel girders are dealt with in "Designing Ironwork," 2nd Series, Part I. (Spon. 1s. 6d.). When the width of the compression flange is less than $\frac{1}{20}$ of the span, the working load per square inch should be reduced, to prevent risk of buckling, by the formula $s = s(1.2 - \frac{l}{100f})$, where s = standard stress

per square inch, l = length of span in inches, f = width of flange in inches, s = reduced stress per square inch to prevent buckling. The unsupported width of the flange plate beyond the angles should not exceed eight times the thickness, and there are other conditions to be complied with.

HENRY ADAMS.

Ventilating Floor Joists.

BIRMINGHAM.—X. writes: "In a case like that shown by the accompanying sketch, where the wooden joists of a floor run parallel to the only sides from which air could be admitted for ventilation, in what way should this be done, and is it absolutely necessary to ventilate the floors of upper storeys?"

As the fir joists run parallel with the only two walls through which ventilation can be obtained, no provision for air passage will be possible at the ends of joists, as is usually the case. The best arrangement will be as in Figs. 1 and 2, where 9in. by 3in. air-bricks are shown directly opposite the ends of the rolled steel joists. The air-bricks should be inserted close under the top flange of the joists. All floors should be ventilated, but this is practically impossible in upper floors with a single set of joists. Brandering on the underside will give a small space through which air may pass, but ceiling joists at right angles to the floor joists provide ample space. There should in all cases be air-bricks on opposite sides, to get a through draught.

HENRY ADAMS.

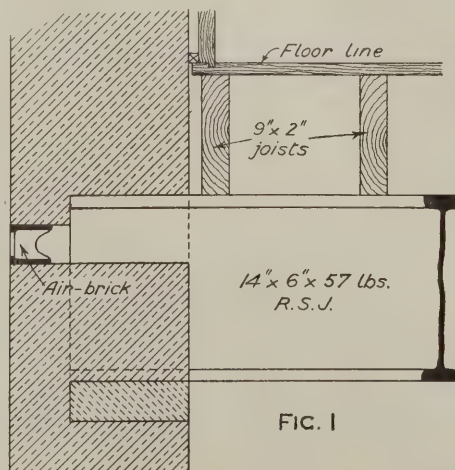


FIG. 1

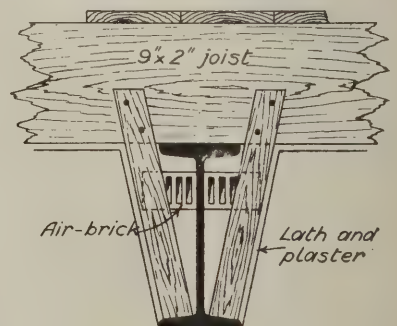


FIG. 2

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Garden Front.



Approach Front.

MAIDS MORETON RECTORY, BUCKS. E. SWINFEN-HARRIS, F.R.I.B.A., ARCHITECT.



Garden Front.



Approach Front.

HOUSE AT MAIDS MORETON, BUCKS. E. SWINFEN-HARRIS, F.R.I.B.A., ARCHITECT.

LIBRARY
OF THE
UNIVERSITY OF ILLINOIS

NEW LONDON BUILDINGS.

AT yesterday's meeting of the London County Council the Building Act Committee reported the following applications under the London Building Act, 1894, their recommendations as to consent or refusal being appended in *italics*:—

Buildings on the northern side of Stanstead Road and western side of Ravensbourne Road, Lewisham, on the application of Norfolk and Prior, on behalf of J. Watt. (*Consent.*)

Extension of the periods within which the erection of buildings at Nos. 2 to 5, White Lion Street, Pentonville, was required to be commenced, on the application of S. H. Watson. (*Consent.*)

Extension of the periods within which the erection of an institute building for the Beaufoy Charity on the site of Nos. 65 to 71 (inclusive), and of eight houses on the site of Nos. 56 to 64 (inclusive), Princes Road, Kennington was required to be commenced and completed, on the application of F. D. Powell. (*Consent.*)

Extension of the periods within which the erection of a building on a site abutting upon the east side of High Street and north side of Limes Groves, Lewisham, was required to be commenced, and completed, on the application of W. Stephen. (*Consent.*)

Projecting oriel window in front of No. 16, James Street, St. Marylebone, on the application of Forsyth and Maule, on behalf of H. Friedeberg. (*Consent.*)

Additions in front of Nos. 49, 51, 53 and 55, Mansell Street, Whitechapel, on the application of Selby and Kislbury, on behalf of S. Harris. (*Consent.*)

Extension of the periods within which the erection of a two-storey building on land at the rear of Nos. 20, 22, 24 and 26, St. John's Road, Battersea, was required to be commenced, and for a deviation from the plan approved on 11th July, 1905, for the erection of the said building, so far as relates to the erection of an addition on the eastern side of the building, on the application of E. S. Barr, on behalf of Hillier & Parker. (*Consent.*)

Iron structure upon the forecourt of No. 205, Clapham Road, Brixton, on the application of J. H. Doughty. (*Consent.*)

Underground cellars in the forecourt of No. 13, Euston Road St. Pancras, and to a deviation from the plan approved on 4th July, 1905, for the construction of underground cellars in the forecourts of Nos. 15, 17, 19 and 21, Euston Road, St. Pancras, so far as relates to the omission of the steps in front of No. 15, Euston Road, on the application of W. Fleckhart, on behalf of Dr. Pavy. (*Consent.*)

Conservatory over the porch in front of No. 3, Albert Road, Regent's Park, on the application of E. C. Macpherson, on behalf of Mrs. Desmond. (*Consent.*)

Horticultural showhouse on the western side of Trinity Road, Wandsworth, to abut upon Magdalen Road, on the application of A. Southam, on behalf of R. Neal. (*Consent.*)

Bay windows in front of Nos. 9 & 11, Glenshiel Road, Eltham, on the application of J. J. Bassett, on behalf of A. Cameron Corbett. (*Consent.*)

Addition at the western end of Christ Church, Christ Church Street, Chelsea, on the application of the Rev. J. P. Thompson. (*Consent.*)

Projecting balconies at the southern end of the ward block of the Bolingbroke Hospital, Wandsworth Common, to abut upon Belleville Road, on the application of Young & Hall, on behalf of the Council of the Bolingbroke Hospital. (*Refusal.*)

Building on the southern side of Webber Street, Southwark, to abut upon Barron's Place, and to exceed in height the width of that street, on the application of A. E. Chasemore, on behalf of Mr. Sumption. (*Consent.*)

Addition to the London Hospital, Whitechapel Road, Whitechapel, at less than the prescribed distance from the centre of the roadway of East Mount Street, on the application of R. Plumbe, on behalf of the Committee of the London Hospital. (*Consent.*)

Two external iron gangways, over the roadway of Pump Court to connect Nos. 114 to 118, with Nos. 120 to 128, Union Street, Southwark, at the second floor and roof levels, and the erection of two iron balconies and two iron ladders at the rear of Nos. 114 to 118, Union Street, on the application of R. J. Lovell, on behalf of the General Electric Co., Ltd. (*Consent.*)

Addition at the rear of No. 57, Cadogan Gardens, Chelsea, to abut on Draycott Place, on the application of G. L. Wilson, on behalf of P. Holland. (*Consent.*)

Retention of a greenhouse in front of No. 229, King Street, Hammersmith, on the application of L. G. Brumby, on behalf of T. Grant. (*Consent.*)

Deviation from the plans approved on 23rd May, 1905, in connection with the rebuilding of No. 32, Rupert Street, and No. 6, Upper Rupert Street, St. James, so far as relates to an alteration in the position of an air duct, on the application of R. H. Kerr. (*Consent.*)

Amended drawings submitted by the Kensington and Notting Hill Electric Lighting Co., showing the details of the construction of the bunkers and other steelwork in connection with the proposed erection of a generating station on a site eastward of the generating station of the Central London Railway Co., and approached from Wood Lane, Hammersmith. (*Consent.*)

Amended plans submitted with the application of the City of London Electric Lighting Co., Ltd., for the construction of additions to the western power house of the Summer Street and Bankside generating station, Southwark. (*Consent.*)

New street for carriage traffic on the Summerfield estate, Catford, to lead from Ravensbourne Park Road to



NEW LIBRARY FOR ACCRINGTON. W. J. NEWTON, ARCHITECT.

The new Carnegie library at Accrington shown by the above illustration (for which we are indebted to the "Freston Guardian") is to be built on the Willow House site from designs by the borough engineer, Mr. W. J. Newton. On the ground floor there will be a newsroom fronting St. James's Street, with lending library at the rear, librarian's room, mending-room, boys' room, &c. The reference library is on the first floor, over the lending library, and is reached from the central hall by a well-lighted staircase; accommodation is provided for seventy persons, with book-stacks and shelving for 11,360 volumes. At the front on the first floor, over the news-room, is placed a large lecture-room. The walls of the building are to be of stone, faced with ashlar, the staircase of stone, floors to rooms laid with wood blocks, and hall, landings and corridors of mosaic or terrazzo. The cost of the library is estimated at £8,000. Building operations will be commenced shortly.

Ravensbourne Park, and in connection therewith the widening of portions of Ravensbourne Park Road and Ravensbourne Park, on the application of A. W. Ostorn, on behalf of J. Watt. (*Consent.*)

Deviation from the plans approved on 24th October, 1899, for the formation of Glenilla Street and Howitt Road (late Howitt Street), Hampstead, so far as relates to an alteration in portions of the boundaries of the said streets, on the application of C. J. Bentley, on behalf of J. C. Hill. (*Consent.*)

Addition on the half-landing between the first and second floors at the rear of No. 43, Cambridge Street, Hyde Park Square, on the application of Thurgate & Cope, on behalf of J. Asher. (*Refusal.*)

Uniting of No. 31, Westbourne Terrace with No. 19, Craven Road, Paddington, by an opening at the first-floor level on the application of Macey & Sons, Ltd. (*Consent.*)

The Theatres and Music Hall Committee also reported the following:—

Plan, submitted by the Town Clerk of the Royal Borough of Kensington, showing a proposal to provide a gas-heated plate warmer on the landing of the gallery staircase of the Kensington Town Hall. By the proposed arrangement the landing will be reduced in width from 7ft. to about 5ft. 6ins. The minimum width of the staircase will not, however, be reduced by the proposed alteration, and an undertaking has been given by the Town Clerk to the effect that the plate warmer shall only be used on occasions when dinners are being held in the large hall. (*Consent.*)

Plans with regard to the proposed arrangements of certain of the side shows in connection with the forthcoming Imperial Royal Austrian Exhibition to be held at the London Exhibitions, Earl's Court. The arrangements shown on the plans appear to be satisfactory. (*Consent.*)

Plans, submitted by A. O. Collard, of a proposed "Helter-Skelter Lighthouse," to be erected at the London Exhibitions, Earl's Court, in connection with the Imperial Royal Austrian Exhibition, and plans showing the construction of a tower and gateway in the portion of the Exhibition grounds known as "Elysia." (*Consent.*)

Obituary.

Mr. James Farquharson, builder, of Nairn, died recently.

OUR PLATES.

THE house at Maids Moreton, Bucks, was built about twenty-five years ago, as also the rectory at the same village, from the designs and under the superintendence of Mr. E. Swinfen-Harris, F.R.I.B.A., of London and Stony Stratford. The garden fronts of each of these houses have a south aspect, and command, in clear weather, fine views of the distant Chilterns. Both are near to the interesting old parish church, which has been frequently illustrated, with its unique western tower and vaulted west porch.

MORTAR.

By S. SMITH.

(Concluded from p. 159, No. 580.)

Mixing.

THE main object in mixing mortar is to get the sand and the lime thoroughly incorporated together, and to bring these ingredients to a thoroughly plastic state. It is necessary to add a further quantity of water to ensure this. The ancients said that "good mortar should only be tempered with the sweat of the mason." Hard work on the part of the man who is mixing the mortar improves it; the oftener the mortar is turned over and mixed together the less water is required to bring the mortar to a plastic state, and the more carbon dioxide is absorbed by the lime, with a beneficial or better-setting result. This difficulty is got over to a great extent by grinding the lime and sand together in a mortar mill.

There is one disadvantage of ground mortar, as compared with mortar mixed by hand: it is that the sand is all ground to the same degree of fineness, with a corresponding loss of strength to the mortar, as previously stated. Vicat recommended the use of a "stamping" machine for the mechanical mixing of mortar, in preference to a grinding machine such as is in common use.

Opinions are pretty nearly unanimous as to the bad qualities of a mortar which has been "drowned"—that is, a mortar that has been mixed with or has absorbed too large a quantity of water. Mortar containing too much water lacks compactness, as can be readily understood. The surplus water occupies a certain amount of space, and when the water evaporates, as sooner or later it will, this space will be left and will always remain vacant. The bad quality of "drowned" mortar is not merely owing to its lack of compactness (according to Vicat) but depends also on a chemical cause, namely, that the water which is used in large quantities tends to decompose the silicate of lime and reduce it to the state of a neutral silicate.

On the other hand, in using the water in small quantity it would be absorbed and solidified by the combination, so that decomposition would not take place. Vicat says that "there can be no doubt but that the hydrosilicate of lime, in which the whole mass is chemically united, is of more use than a mere mixture of the neutral hydrosilicate and the pure hydrate of lime, which tends to form when too great a quantity of water is made use of." The foregoing remarks apply equally to rich lime, hydraulic limes and cements.

There is another point bearing upon what might be termed the abuse of water to which reference has to be made, and that is the softening up or diluting of mortar with additional water after it has commenced to

set. This is not so much felt when using rich limes, as the rate of setting is very slow, but with hydraulic limes and cements the results are disastrous.

Two years ago the author made a lengthy series of experiments on Arden lime-mortar, to determine, amongst other matters, the effect of water added to mortar after it had commenced to set, or after the stage of initial set; also as to what effect the quantity of water used in the mixing of the mortar had in the ultimate setting of the mortar. To test the time of setting, the Vicat needle was used (Standards Committee on cement recommend the use of a square instead of a round needle, of certain specified dimensions), the depth of the pat being 40 millimetres. The mortar was made in the proportion of 2 parts of standard sand to 1 part of freshly-ground Arden lime. The lime was got from two different works—that from one work being marked No. 1, while that from the other was marked No. 2. The quantity of water required to mix a mortar of the above proportions to a consistency suitable for use was $4\frac{1}{2}$ gallons of water to 1 cwt. of lime. With No. 1 lime setting commenced within five minutes after being gauged, while with No. 2 setting did not commence till after fifteen minutes had elapsed. Although longer in commencing to set, by the time that fifty minutes had passed No. 2 lime had overtaken No. 1 in the process of setting, and kept the lead until six hours after gauging, when No. 1, which had been slowly setting, got level again. By this time both may be said to have set.

When an additional quantity of water was used for mixing the mortar (1 gallon additional per cwt. of lime) the time of initial setting of No. 1 lime was retarded by ten minutes, while with No. 2 setting did not commence till forty-five minutes after the mortar had been gauged. No. 1 was found to be set six hours after gauging. At that time No. 2 was still a considerable distance from being set, but was found to be set twenty-four hours after gauging.

In the third test the same quantity of water ($5\frac{1}{2}$ gallons to the cwt. of lime) was used as in the second. With both limes the initial stage of setting commenced at twenty minutes after being gauged. A further quantity (equal to 1 gallon to the cwt. of lime) of water was then added and the mortars re-mixed. The setting did not commence until an hour after being re-mixed, and it went on very slowly; so much so that at the end of three days the pats were still unset; to all appearance they were reduced to the level of a mortar made from a fat lime or a feebly hydraulic lime in the ordinary manner. The foregoing results are graphically shown by the accompanying diagram. The loss of strength resulting from the re-mixing of the mortar is correspondingly greater for quick-setting than for slow-setting hydraulic limes and cements, and greater for neat than for

sand mortar, and greater with fine sand than with coarse. The loss increases with the amount of set. Mortar that has been re-mixed shrinks more in setting than mortar freshly used after mixing. This explains the cause of a large number of cracks that are to be seen on cement plasterwork. The only safe rule in using cement or hydraulic lime mortar for practical work is to get the mortar thoroughly mixed, and then not permit any to be used which has taken an initial set, that is, which has lost its plasticity.

Effect of Freezing of Mortar.

The freezing of mortar before it has set may be said to have two effects: (1) The low temperature retards the setting and hardening action, and (2) the expansive force of the freezing water may overcome and destroy the cohesive strength of the mortar.

The action of frost on rich lime-mortar is not serious, since it hardens so slowly. When lime-mortar is used, however, it is not permissible to allow building operations to be carried on during frosty weather. Apart from any effect which the frost may have on the mortar there is great danger to the stability of the wall by the alternative thawing and freezing of the mortar with which the wall has been built. For instance, where a wall has been frozen through, as we term it, when the thaw comes the fresh wind may strike on one side of the wall only, with the result that the mortar on that side of the wall becomes soft, while that on the other side remains hard; thus in many cases causing an unequal settlement of the wall, by which it is put out of the perpendicular.

Effect of Frost on Cement-mortar.

The author made an experiment recently to determine the effect of frost on cement-mortar, but found that before anything definite could be said on the subject a long series of tests would require to be made. The results of the experiment may be summed up briefly:—At 3 degs. of frost, or at 29 degs. Fahr., the physical appearance of the mortar was affected; at lower temperatures ranging from 25 degs. to 14 degs., there was no physical change visible to the eye. The briquette which was at a temperature of 14 degs. when newly gauged presented the same appearance as a briquette which was kept at a temperature of 60 degs. Fahr. The tensile stress required to break the briquettes did not show much variation until the briquettes which had been kept at the temperature of 14 degs. were reached, when their tensile strength was found to be about 10 per cent lower than that of the others.

In the United States of America, where the effect of frost is more serious than in Britain, numerous experimental tests have been made to determine the effect of freezing temperatures on hydraulic limes and cements. Although the conclusions of the various experimenters do not in all points agree, it is the generally accepted belief that the ultimate effect of freezing upon Portland-cement mortar is to produce only surface injury.

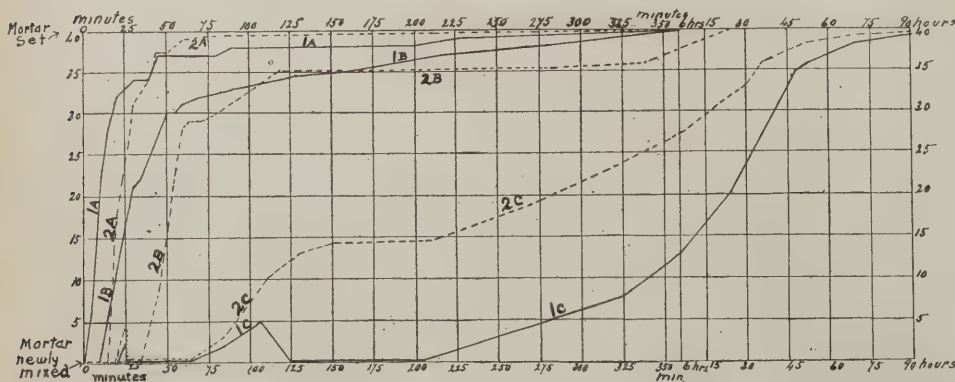
The following is a table showing the result of experiments made by T. F. Richardson, an American engineer:—

EFFECT OF FROST UPON TENSILE STRENGTH OF MORTAR: 1 OF CEMENT TO 3 OF SAND.

Briquettes.	No. of briquettes.	Tensile strength in lbs. per sq. in. at				
		7 days.	28 days.	3 months.	6 months.	1 year.
In water in laboratory -	20	268	304	359	370	401
In air in laboratory. -	20	298	352	364	392	517
Outdoors below freezing	80	139	238	344	435	627

This appears to show that frost improves

TIME OF SETTING OF ARDEN LIME-MORTAR.



Mortars 1A and 2A composed of 1 part lime and 2 parts sand mixed with water = $4\frac{1}{2}$ gallons per cwt. of lime.

" 1B and 2B

" 1C and 2C same as 1B and 2B, but 15 per cent. of water added, after settling had commenced.

Portland-cement mortar, though the author is a little dubious about the improvement.

The author has found, however, that when cutting into walls where the skin has been peeled off the mortar by frost, the mortar in the wall was quite sound. He once had experience of a Granolithic pavement where the skin was pulled off the surface of a few of the sections by a severe frost. It was intended to relay these sections in the following Spring, but on examination the concrete was found to be quite sound, and at the present time, after the lapse of nine years, the sections that were affected by the frost cannot be distinguished from the others.

It may, however, be stated as a general rule that, if possible, building operations should be suspended during frosty weather. In cases of emergency, or where the buildings are urgently required, with proper precautions cement-mortar may be used with very little (if any) bad effects.

These precautions are admirably put as follows by an American engineer, a Mr. Baker, in his treatise on "Building Construction":—

- (1) Use a quick-setting cement.
- (2) Make the mortar richer than for ordinary temperatures.
- (3) Use the minimum quantity of water.
- (4) Prevent freezing as long as possible.

The first three requirements of Mr. Baker's are easily met, but the fourth is more difficult. To cover up the wall that is being built will prevent freezing of the mortar in a wall when the temperature is below freezing-point during the night. The author found by experiment that if four hours passed from the time the mortar was mixed till it was attacked by the frost there was no bad effect. It is when the temperature is below freezing-point during the daytime that greater precautions have to be taken. Fires should be kept burning around the board upon which the mortar is prepared. The stones or bricks with which the wall is built should be dry and free from frost.

Various American writers advocate the use of salt among the water with which the mortar is mixed. Baker gives the following recipe:—Add to the water used for mixing the mortar 1 per cent. of salt for each Fahr. degree below freezing. Messrs. Taylor and Thomson, in their book on "Concrete, Plain and Reinforced," another American publication, writing of the effect of salt on mortar, say: "Since the temperature of the water cannot be determined in advance, an arbitrary quantity is as suitable as a variable one. In the New York Subway work in 1903 9 per cent. of salt to the weight of water was adopted; on the Wachusett Dam, during the winter of 1902, 2 per cent. of salt to the weight of water. This makes about 1 cwt. of salt to every 120 gallons of water used at the subway and 1 lb. of salt to every 5 gallons of water at the dam."

In Mr. Richardson's experiments salt, added in the proportion of from 2 per cent. to 4 per cent. of the weight of water, gave slightly higher tensile strength than the unsalted mortar at all seasons of the year.

The following table is given by a Mr. Charles S. Cowen, another American, as the result of his experiments with salt added to the extent of 10 per cent. of the weight of water used:—

TENSILE STRENGTH OF 1 TO 3 MORTARS MADE WITH FRESH AND SALTED WATER.

	1 week.	1 month.	3 months.	6 months.	9 months.	12 months.
Fresh water used	112	183	268	335	351	458
Salt water used	68	131	215	266	301	413

The above table scarcely bears out Mr. Richardson's statement that the mortar is

improved by the addition of salt to the water.

The author is of opinion that a small quantity of salt may be added without much harm being done, and that it will keep the water from freezing until the cement has become fairly well set; but there are so many risks in connection with the use of mortar during frosty weather, and so many precautions to be taken, that unless there are very urgent reasons for the work being proceeded with all building operations should be suspended during frosty weather.

MANCHESTER SCHEMES.

(By our Manchester Correspondent.)

TWO schemes of more than ordinary importance have just been mooted in Manchester—the transfer of the Royal Exchange to the old infirmary site in Piccadilly and the provision of a new General Post Office.

Since the decision of the trustees to build the new infirmary outside the centre of the town the future of the old site has been the subject of constant discussion, but the idea which has most appealed to the imagination has been the provision of a large building in which should be housed the art collection and the fine reference library. This would still allow for an open space where it is particularly needed, and for such an extension of the tram lines as would make a convenient tram centre.

Both the art gallery and the reference library—the latter the old town hall in King Street—are congested, and immediate extension or removal is imperative. The art gallery in Mosley Street could be extended by taking in the plot of ground surrounded by Princess Street, George Street and Nicholas Street, but this would mean the purchase and demolition of the Athenæum, an historic and almost unique institution. That, however, would not be an insuperable difficulty, for the finances of the institution are not in a most healthy state and the members might welcome the opportunity of a profitable sale. The ground available for the extension of the reference library is small, and as the building is not particularly well adapted for its present purpose the wisdom of any further expenditure upon it is doubtful.

Now it is announced that there has been a conference between the directors of the Royal Exchange and the Corporation with a view to the erection of a new exchange upon the old infirmary site. In common with the other institutions, the fine building erected in the 'seventies by Messrs. Mills & Murgatroyd is too small for present-day needs. Manchester, in fact, is outgrowing all its clothes. The large room contains over 4,400 sq. yds. of floor space, yet this immense area is insufficient for the accommodation of almost 9,000 members, and on market-days the room is insufferably crowded. An extension across Bank Street has been frequently suggested, but presents obvious difficulties, and the building does not adapt itself to extension in any direction. Yet the removal of such an institution the whole length of Market Street seems still more difficult. At present all the Exchanges—stock, coal, produce and cotton—are within a stone's throw of each other, are in close proximity to the Exchange and Victoria Stations, and are surrounded by a mass of offices and other accessories which, as it were, anchor the great Royal Exchange to its present site. The removal to Piccadilly would change the centre of gravity of the whole city.

The second large scheme is the provision of a new head post-office, for which land has been purchased in Newton Street, just off Piccadilly. The present post-office in Brown Street was built in the 'eighties and cost, exclusive of the site, £100,000. It covers an

area of 4,700 sq. yds. Notwithstanding the subsequent provision of a separate parcel-post depôt and of various outside district sorting offices, the great building is unequal to present needs. In Newton Street a building will be erected which will meet the requirements of the greatest postal centre in the kingdom outside London, and the present office will be retained as a subsidiary branch.

In another quarter of the town a change is imminent. For some time past it has been understood that St. Peter's Church was doomed, and it seems now probable that the site will be acquired by the Corporation and converted into an open space. The doubtful point is whether Manchester will stand the expense of so costly an improvement. The recent emphatic negation of the Corporation Bill proves the existence of a severely economical spirit.

Apart from these large schemes, one hears of few projected buildings of importance except schools. Of these the Lancashire Education Committee is prodigal, and almost every week sees an advertisement for tenders for a new school in some part of Lancashire. Mr. Henry Littler's output in this direction will soon break all records, if it has not already done so. The Salford Committee has just decided to spend £18,600 in the provision of a new school in Pendleton to replace two existing and inadequate elementary schools. The plans of Mr. J. H. Woodhouse, of Manchester, have been accepted.

A Garden City or model village is projected at Didsbury—one of the most pleasant of the Manchester suburbs—and eighteen acres of land are said to have been acquired for the purpose.

Notes and News.

A Crematorium for Cardiff is suggested.

New Grammar School for Newark.—New school buildings for 150 boys and a master's house, including boarding accommodation for thirty boys, are proposed to be built at Newark at a cost of £10,000.

Proposed new Schools at Eccles.—The proposal of Eccles Town Council to rebuild the Clarendon Road Council Schools for 1,100 children was the subject of a Board of Education enquiry last week.

"Canadian Cities" formed the subject of a lecture at the Birmingham Builders' Exchange last week by Mr. Peter Ball, resident agent at Birmingham for the Commercial Agency of the Canadian Government.

New Buildings at Whitgift Grammar School, Croydon, were opened last week. They include six large classrooms, a drawing school, woodwork and metalwork shop, and mechanical laboratory, with chemical and physics laboratories on the first floor. The new buildings have cost £17,500.

A Russian Restaurant has been provided at Romano's, in the Strand. Mr. Frank Stuart Murray designed it. The work has been carried out by Mr. W. E. Thornton-Smith in pine-wood brought from North Europe forests, and has doors discovered in an old château in Denmark.

At the Second International Congress on School Hygiene to be held in London next year there will be a section devoted to "The School Building and its Equipment" and another to "Special Schools, including those for the feeble-minded, blind, deaf, dumb, crippled, invalid and exceptional children." An exhibition of school building and furnishing appliances will also be organized by the Royal Sanitary Institute in connection with the Congress. The offices are at the Royal Sanitary Institute's premises in Margaret Street, W.

The Society of Architects visited the new Central Criminal Court in Old Bailey on Saturday last, about 150 being present.

Mr. Albert E. Bullock, A.R.I.B.A., of Chiswick, now has offices at 5, John Street, Bedford Row, W.C.

A new Central Stores is proposed to be built by the Metropolitan Asylums Board at a cost of £18,000.

Mr. James Miller, of Glasgow, who is a member of the Glasgow Institute of Architects, and an F.R.I.B.A., is the new Architect Associate of the Royal Scottish Academy. He was the architect for the main buildings of the 1901 Glasgow Exhibition.

The Twenty-Third Annual Congress of the Royal Sanitary Institute will be held at Bristol from July 9th to 14th under the presidency of Sir Edward Fry. Mr. Edwin T. Hall will preside over the Engineering and Architecture section.

Extras on the Glasgow Technical College.—The extra cost over the accepted tenders for the Glasgow and West of Scotland Technical College is £10,303, the total value of work done being £151,318. The extra cost is largely for foundations, there having been difficulties with rock and running sand.

Five Guineas an Hour.—At last week's meeting of the London County Council members of the Tribunal of Appeal under the London Building Act made a request for increased fees. They are now paid three guineas for the first hour and two guineas an hour for subsequent hours. Their request was for five guineas for the first hour and three guineas for any subsequent hour, with a minimum of twelve guineas for each appeal when an appointment had been fixed, whether the case was argued before the Tribunal or not. The Building Act Committee thought the present rate of payment was adequate, and the Council agreed.

The Strand Alignment.—At the meeting convened at the Royal Academy of Arts last week a resolution was passed to the effect that "the memorial of the Further Strand Improvement Committee, the Royal Academy of Arts and other corporate bodies makes a clear case against the plan adopted for the building land between Aldwych and the Strand, and that the London County Council be requested to receive a deputation charged with the duty of presenting the memorial." Sir Aston Webb, R.A., spoke on behalf of the Royal Institute of British Architects. The Institute, he said, felt very strongly that a great mistake would be committed if some alteration were not made in the alignment proposed.—The architect in charge of the adopted scheme for the Strand site is Mr. W. Gilbee Scott, F.R.I.B.A.

Leeds and Yorkshire Architectural Society.—At last Thursday's meeting of this Society Mr. W. H. White, F.R.I.B.A., read a paper on "Modern Town House Architecture." Taking as example an ordinary good-class town house with a frontage of from 22ft. to 30ft. and (according to position) of a rental value from £300 to £500 per annum, Mr. White said the accommodation required would be dining-room, library and morning-room on the ground floor, drawing-rooms and boudoir on the first floor, and eight or ten bed and dressing rooms, two or three bathrooms, a well-arranged basement with all the necessary offices, service lifts, a good hall and staircase, and, if possible, a back staircase, and, to be quite up to date, an electric passenger lift. The following officers were elected for the ensuing session:—President, Mr. H. S. Chorley; vice-presidents, Messrs. P. Robinson and S. D. Kitson; council, Messrs. W. G. Smithson, F. E. P. Edwards, C. B. Howdill, H. A. Chapman, A. R. Hill and G. E. Reason.

Professor Moira's Mural Paintings at the Central Criminal Court.—Prof. Gerald Moira has now completed two of his mural paintings for the lunettes over the entrances to the courts in the Central Criminal Court, Old Bailey. They are not yet in position, however. The lunettes represent "Justice receiving the Homage of the Empire" and "Mosaic Law," the latter forming one of a series which will include English, Greek and Roman Law.

Irish Building Stones were dealt with by Professor Cole, F.G.S., at last week's meeting of the Architectural Association of Ireland at Dublin (Mr. Harry Allberry, A.R.I.B.A., president, in the chair). He drew attention to the splendid beds of limestone which exist in many places in Ireland, more especially in County Roscommon, and referred in terms of high appreciation to the Mount Charles sandstone, the Liscannor stone, the Ballyknocken granite, Newry granite, Galway granite, and other varieties, making clearly evident that there exists in Ireland abundant provision of good building stone.

R.I.B.A. Prizes and Studentships, 1907.—The following are the subjects set for this year's prizes and studentships of the Royal Institute of British Architects:—Essay Medal and 25 guineas: "The Influence of the Use of Iron and Steel on Modern Architectural Design." Soane: "A Large City Hotel facing a Public Square." Tite: "A Loggia for Sculpture to screen the blank end of a building 150ft. long." Grissell: "A Grandstand for a Racecourse, of timber, to accommodate 1,000 people in the boxes and 3,000 on the roof." Henry Saxon Snell Prize: "A Critical Report on Hospitals for the Treatment of Consumption." Other prizes as before. A pamphlet giving full particulars of each can be obtained from the offices of the Institute, 9, Conduit Street, W., price 3d.

Trade and Craft.

Checking Receipts of Public Conveniences.

There are many serious objections to the system of coin-collecting locks in public conveniences, so generally adopted, the chief objection being the ease with which a dishonest attendant can pilfer the takings. To overcome this failing a combined registering lock and indicating latch has been designed with a very simple and effective form of registering apparatus. The accompanying illustration shows it. The arrangement of lock



and indicator with the counting mechanism is simplicity itself, only one spring being used in the combination. The lock measures 6ins. by 4ins. by 1in. and is fitted on the outside of the door. The system is one that should commend itself to all persons having the control of public conveniences. It is already in use by the Corporation of London, and numerous other metropolitan boroughs are now adopting it. The apparatus is being put on the market by the New Century

Co., of 235, High Holborn, W.C., and, considering its utility, is being sold at a very low figure.

Law Cases.

Joinery Works and Fire protection: Heavy Fine.—At the North London Police Court last week the Steam Joinery Works, Elthorne Road, Holloway, were summoned by the London County Council for neglecting to comply with an order to provide means of escape in case of fire at their premises. Mr. Chilvers, who prosecuted for the London County Council, said the factory consisted of ground floor and three floors over. There were ninety-two men employed there, sixty of whom worked on the upper floors. There were no proper staircases to those upper floors—only step-ladders. The County Council ordered the erection of an iron staircase connected with each floor; but, though this order was delivered last May, nothing whatever had been done.—The manager of the company said it was an expensive order, costing nearly £300; and there was a probability of the property being sold. He asked for an adjournment of the case until next August.—The magistrate refused to allow this. The defendant, he said, had too long delayed a very necessary work, and would now pay a fine of £36 and £3 3s. costs.

Partnerships.

Dissolutions of Partnerships.

[The date when the partnership was dissolved is given in parenthesis where known.]

F. W. COOPER & DAY (FREDERIC WILLIAM COOPER and JOHN FREDERIC DAY), architects, surveyors, auctioneers and estate agents, Walsall and Wednesbury. (Jan. 15.)

JOHN JACKSON & SONS (THOMAS JACKSON and ROBERT JACKSON), joiners, builders and contractors, Whitefield. (Jan. 26.) Debts by R. Jackson, who continues.

GILBERT SMITH & MARCUS TYPE (FRANCIS GILBERT SMITH and OSWALD MARCUS TYPE), architects and surveyors, Birmingham. (Dec. 25.)

BOWSER & PETTY (ROBERT BOWSER and RICHARD MORTIMER PETTY), builders and contractors, 70, Williamson Street, Hull. (Feb. 3.) Debts by R. M. Petty.

PIERCY & NOBLE (MACKLEY PIERCY, HENRY SAMUEL PIERCY and JOSEPH HENRY NOBLE), builders, Haxby, York. (Mar. 1.)

HEDLEY & CLAYTON-GREENE (HUGH TAYLOR DEMICUS HEDLEY and CLARE ARNOLD CLAYTON-GREENE), architects and surveyors, Sunderland. (Feb. 17.) Debts by H. T. D. Hedley, who continues as Hugh Hedley.

DAVIS, KEEBLE & KEEBLE (GEORGE KEEBLE, JOSIAH YOUNG KEEBLE and ARTHUR CHARLES DAVIS), contractors for the Norman Portland Cement Co., Ltd., Works, Cambridge. (Feb. 1.)

E. FEARLEY & SONS (EDWIN FEARLEY and JOHN EDWIN FEARLEY), joiners and builders, Trafalgar Street, Bradford. (Jan. 26.) Debts by John Kitson, Swan Arcade, Bradford.

HARTLEY & ASHBY (AGNESE EMMA HARTLEY and HERBERT WILLIAM ASHBY), painters, decorators and paperhangers, 28, Blake Street, York. (Dec. 31.) Debts by A. E. Hartley, who continues.

BURGESS & LOMAX, builders, Manchester. The partnerships between WILLIAM BURGESS and SAMUEL LOMAX and WILLIAM BURGESS, SAMUEL LOMAX and JAMES HOPKINSON LOMAX dissolved Mar. 2.

TAIT & HARVEY (CHARLES JAMES TAIT and JACOB EMLYN HARVEY), architects, Bampfylde House, Exeter. (Dec. 31, 1903.) Debts by J. E. Harvey, who continues. C. J. Tait will practice at 57, High Street, Exeter.

BATES, DEWSBERRY & CO. (GEORGE FREDERICK BATES and GEORGE HENRY DEWSBERRY, tile manufacturers and decorators, Mayer Street Tile Works, Hanley. (Feb. 19.) Debts by G. F. Bates, who continues at Victoria Art Tile Works, Adventure Place, Hanley.

BRADSHAW & SON (EDWIN BRADSHAW and EDWIN BRADSHAW, jun.), asphalt manufacturers, artificial paving manufacturers and builders' machinists, Fawcett Road, Southsea and Northam, Southampton. (Feb. 1.) Debts by E. Bradshaw, jun.

DUESBURY BROTHERS & BILL (FREDERICK WILLIAM AMBROSE DUESBURY, ARTHUR EDWARD DUESBURY, ALFRED ERNEST DUESBURY and CLEMENT HENRY BILL), varnish manufacturers, Faraday Works, Monmouth Green, Wolverhampton. (Mar. 9, as regards F. W. A. Duesbury.) Debts by the continuing partners.

FOSTER & SANDERSON (HUGH FOSTER and GEORGE SANDERSON), plumbers, glaziers and gasfitters, 15, Garne Street, Middlesbrough, and 7, Smeaton Street, North Ormesby, near Middlesbrough. (Mar. 3.) Debts by H. Foster, who continues at 15, Garne Street, Middlesbrough in his own name.

SMITHS, GORE, NORTON & CO. (SPENCER WILLIAM GORE, THOMAS HERBERT NORTON, JOSEPH HENRY SHERWIN, and JOSEPH HENRY SABIN), land agents and surveyors, 10, Little College Street, Westminster, S.W. and Darlington and Chester. (Jan. 31, as concerns S. W. Gore.) Debts by the remaining partners.

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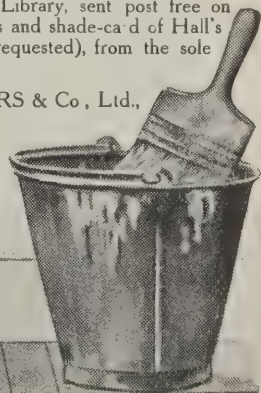
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Electrical Notes.

A Plea for the Electrical Draughtsman.

In the architectural profession the cry of the draughtsman has long been familiar, and, in the very nature of things, is likely to continue. More often than not he is a considerable factor in the design of the work in hand, being very much more than a mere inker-in of pencil drawings: indeed, it is often left to him to work out the difficult details of the problem, and so, in actuality, he becomes the real author of the design, though by reason of office conditions his employer claims the credit for the work. This same tale, so familiar among architects, has a similar application in other professions—the electrical, to wit: thus we find our contemporary the “Electrical Review” dealing with the position of the engineering draughtsman. This, it appears, instead of being one of the most interesting and desirable, has become a position to be avoided, as it is badly paid and is looked down on with supreme contempt by every man who has been fortunate enough to obtain other employment on the staff of an engineering works, and who for that reason fancies himself a vastly superior person. But, asks our contemporary, do engineering employers as a body realize what an important element the draughtsman is in the machinery of the works? Do they recognize the fact that few of their employees have more power to waste or save their money, and to injure or enhance their reputations? “This is most serious, for the reason that their influence for good or evil is more difficult to detect than, say, of the estimator or works manager. This influence is, of course, greater in the case of men who are originating designs or are engaged on work in which the firm has little experience.” But in the electrical profession,

as in the architectural, the credit for anything the draughtsman may do is taken by others, frequently his inferiors in knowledge and experience, who sometimes overrule his better judgment. “All this,” says our contemporary, “tends to crush any enthusiasm the man may have, and generally he becomes resigned to jog along in a groove, with little or no interest in his work beyond that necessary to keep his job. . . . Let employers treat ‘designers’ as something more than mere draughting machines, give credit when due, and make it clear that they have a chance of improving their positions. Then engineering draughtsmen would feel a pride in their work, and a better, and more competent, class of men would be obtainable.”

Liverpool Electrification.

An item of railway work of interest is about to be carried out near Liverpool by the Lancashire and Yorkshire Railway Co. This is the electrification of a short length of line between Marsh Lane and Seaforth, in connection with the electrified line between Liverpool and Southport. It is expected that as a completing operation to the project named, a physical connection will be made between the Liverpool Overhead Railway and Marsh Lane station, similar to that which was recently made between the Overhead Railway and the Lancashire and Yorkshire Railway, at Seaforth. This last-named connection involved some interesting and costly work, from the constructional point of view.

The Manufacture of Carbons.

Though carbons are so extensively in use and have become one of the staples of the electric lighting engineer, the method of their manufacture is not so generally known. We may take, as a good example, the works of the General Electric Co. at Witton, near Birmingham, where nearly 300 hands are

employed. The carbons here are made up of a mixture of gas-retort carbon, soot and tar, all three being thoroughly well ground and mixed together under heat, and then passed into cylinders and extruded through a die in the form of rod, which is cut off in 3ft. lengths. Bundles of the rods are then made up for firing in the furnace, where they are packed round with carbon dust, to exclude air. A very high temperature is maintained, and the carbons are completely baked, after which they are gradually cooled and then cut to the required lengths (each being tested for straightness by rolling down an incline), and finally ground flat at one end and pointed at the other. In addition to the ordinary carbon there is the cored variety, which is moulded over a needle centre and the coring mixture pumped in after the baking process; then oven-dried.

Extensions to Scotland Yard are nearing completion, from designs by Mr. Norman Shaw. The new block faces the original one, and over Derby Street is a fine granite arch connecting the two portions. The span is 38ft., with an extreme height of 38ft. also. The face is pierced on either side by openings 6ft. wide for passengers.

The new roof of Charing Cross Station will be of the ridge and furrow type, supported by two rows of steel columns 35ft. high. The highest point of the trusses will be 45ft., as compared with 85ft. of the original structure. The roof is being erected from a huge staging weighing 450 tons, in the construction of which 25,000 cub. ft. of timber have been used. The old station contained originally fourteen bays, each 35ft. wide. Two of these fell down, and four have since been removed, leaving half the work yet to be done. The contractors are Messrs. Handyside & Co., of Derby.



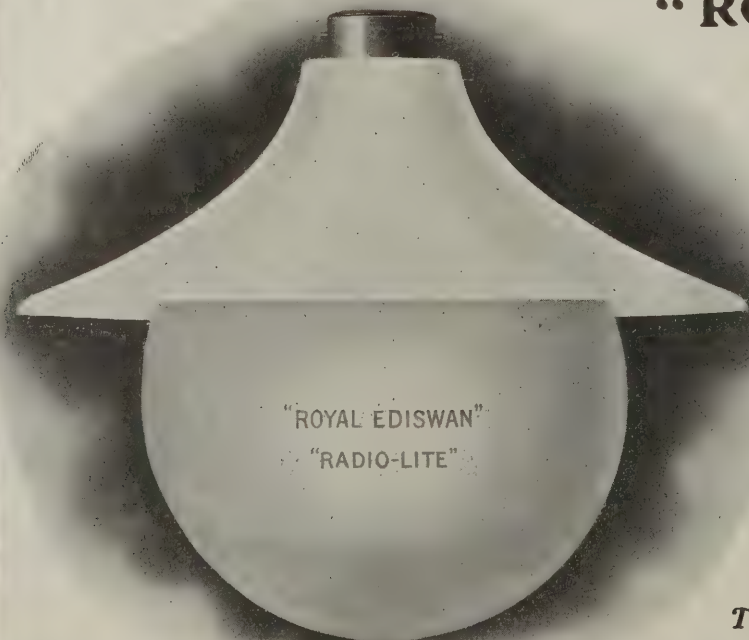
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Coming Events.

Wednesday, March 28.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Mr. J. Roxburgh Sharman on "Steel Building Construction: A Comparison of British and American Methods," at 8 p.m.

INSTITUTION OF CIVIL ENGINEERS.—Students' Visit to the works of Messrs. Price's Patent Candle Co., Ltd., Battersea, S.W.

ARCHITECTURAL ASSOCIATION (Discussion Section and Law Students' Debating Society).—Discussion on "The Legal Ownership of Drawings," at 7.15 p.m.

Thursday, March 29.

BIRMINGHAM BUILDERS' EXCHANGE.—Mr. W. Francis Goodrich on "The Goldfields of the City," at 6 p.m.

INSTITUTE OF SANITARY ENGINEERS.—Mr. A. E. Abbott on "Heating and Hot-water Supply," at 7 p.m.

Friday, March 30.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—Mr. John Ward on "The Excursion to Mont St. Michel."

SECOND INTERNATIONAL CONGRESS ON SCHOOL HYGIENE.—Meeting at the Jehanghi Hall, University of London, South Kensington, at 5 p.m.

Saturday, March 31.

ST. BARTHOLOMEW-THE-GREAT, WEST SMITH-FIELD.—Lecture on the History and Architecture of the Church.

Monday, April 2.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.—Messrs. W. Aumonier and A. W. Martyn on "Wood Carving," at 8 p.m.

SOCIETY OF ENGINEERS.—Mr. Frank Latham, M.I.C.E.I., on "Harbour Exigency Works," at 7.30 p.m.

Thursday, April 5.

INSTITUTION OF CIVIL ENGINEERS.—Students' Annual Dinner, Trocadero, at 7.30.

Friday, April 6.

ARCHITECTURAL ASSOCIATION.—Mr. E. Greenop on "Valuations, Compensations, and Light and Air," at 7.30 p.m.

New Companies.

TANYBRYN COLLIERY AND BRICK WORKS Co. Capital: £5,000.

R. W. & F. C. SHARP, English and foreign timber merchants, builders' merchants, &c., as carried on at Exeter and Exmouth by R. W. & F. C. Sharp. Capital: £30,000.

GEORGE READ & SONS, to acquire the business carried on by George Read & Sons at Burnley, and to carry on the business of builders, contractors, builders' merchants, &c. Capital: £2,000.

ISHERWOOD SUTCLIFFE & Co., LTD., to acquire the business of a varnish, lacquer and colour manufacturer and dealer, carried on by T. G. Pratt at Wood Street, Willenhall, Staffs, and to carry on the same. Capital: £1,000.

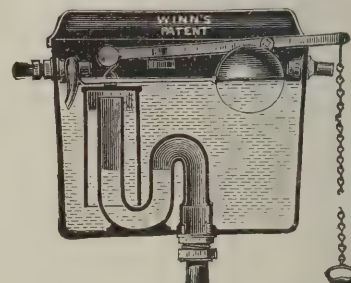
GEORGE BELL & SONS, LTD., London, to acquire the business carried on as George Bell, and to carry on the business of contractors for public works, ironfounders, engineers, builders, builders' merchants, &c. Capital: £50,000.

STEPHENSON PATENT CAVITY BUILDING BLOCKS Co., Consett, Durham, to adopt an agreement with J. Stephenson, to acquire a certain patent, and to carry on the business of cavity block manufacturers, builders, contractors, builders' merchants, &c. Capital: £6,000.

Registration: Favourable Pronouncement Likely.—It is likely that the Institute registration committee will report favourably on the subject to the special meeting which is to be held next month.

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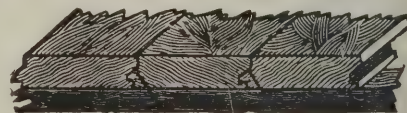


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DELIVERIES FROM TOWN STOCK

THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD.

March 28th, 1906.

CONTRACTORS' SUPPLEMENT (MONTHLY).

SOME NOTES ON ESTIMATING.

By J. H. Pinnock.

THE profit on all work generally accepted in the trade is 10 per cent., but in actual practice in competition work it is much lower. A builder with a large turnover and monthly draws on a contract at the rate of 80 per cent. or 90 per cent. on the amount of work done will be quite satisfied if he gets a profit of $2\frac{1}{2}$ per cent. on his turnover, and when this is considered in relation to the amount of capital necessary for the turnover it will show a very substantial dividend. Of course in a good many cases the 10 per cent. profit included in estimates is expected to provide for establishment charges, accidents, mistakes made by foremen and other unforeseen contingencies; but in the case of large provisional amounts included in bills of quantities the risk is a purely financial one, and some builders are quite content to price them at the sum mentioned in the quantities, except in cases where it is stipulated that the builder shall provide cement, attendance, special scaffolding or other items requiring money to be paid by the builder.

Constants.

There is a general impression that the requirements of a good estimator are the possession of a list of constants and some recognized price book, but this view is erroneous, as constants are not to be depended upon in competition work. It is generally understood that a large portion of the work under contract is done under the piecework system, or, to give it a more polite term, "task work," and when an estimator knows that an estimate is to be prepared at cut figures he makes himself acquainted with the lowest prices obtainable for that particular work, the quantity of which will tell him that it will be the dominant factor in obtaining the work. In comparing the prices so obtained it is to be noticed that the variation according to the locality or demand for work is very great. Take, for instance, the question of dressed stonework. If the estimator knows of a country quarry that wants work he very often obtains a ridiculous price for the stone dressed and delivered without deviating from the general conditions of the contract.

The London Builder

at the present time is nothing more than a contractor or financial agent, and within bounds of the clauses in his contract prepares the best part of his work in the workshops. At the present time the tendency is to locate these in the country, and the architect or his client does not know whether the work is being prepared in the builder's London shops or let out task work to a specialist in the country.

In preparing estimates at the present time, when competition is very keen, the estimator must see that he covers himself (1) by obtaining prices for his work from specialists or merchants for materials in every branch where this is possible; (2) making the stipulation that the quotation shall be open for a month, and that the goods and work supplied shall be to the satisfaction of the architect and contractor, and (3) that when the work

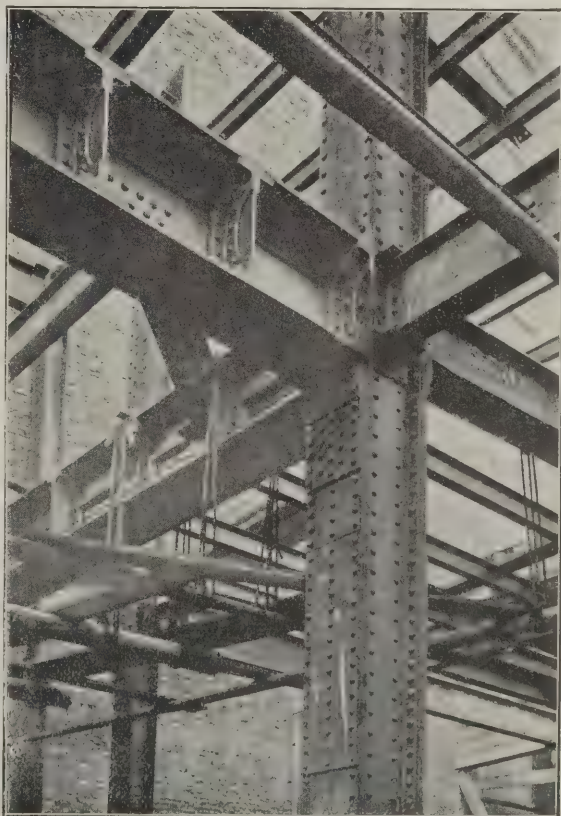
is obtained an agreement shall be entered into with them as to the method of payment (there is now a standard form of agreement for sub-contractors issued by the Institute of Builders). Of course, in obtaining these special prices it will be noted that very often they vary much from the constants quoted in the standard works, and that is not always on account of locality, but chiefly a question of supply and demand. Mr. Banister Fletcher in his book on "Quantities" gives a list of constants, but states, "I am aware they are very far from perfect." Constants and price books are useful to estimators in some isolated cases that are rarely met with in the building trade, but the requirements of a good estimator are actual work at bench and on jobs, technical training, quick reading of drawings (rough or otherwise), knowledge of builder's prime cost, and experience, which last comprises testing the prime cost of works against their estimated cost.

In some builders' offices the cost of work is purposely kept back from the estimator, or purposely inflated or varied, and this I think is a very wrong method of conducting a builder's business. The estimator should be kept constantly in touch with the cost of the work, and if there is a loss on the estimate, or a very large profit on any particular item, he should be acquainted with the fact so that he can keep himself up to date in the prices. The management of a builder's business is likely to alter at any time, and with the introduction of new machinery or methods the cost of production might be lowered. On the other hand, it is possible that increase of wages and other contingencies may happen to raise the cost of production. Unless these facts are within the knowledge of the estimator he will get jobs at ruinous prices, or waste his time in pricing work at too high a figure.

In pricing quantities prepared by a surveyor it is best to ignore those items of labour only which are set out very fully, and price the quantities as they appear with the materials, excepting where the labour is very unusual or expensive. In advocating this course I do so because so many estimates have to be prepared from drawings and specifications only, and in most builders' offices there is not the organization or time to amplify the bill of quantities as a quantity surveyor would do when paid for all his clerical work. After taking out quantities from drawings and specifications I should advise the same prices to be used as when pricing from a professional set of quantities. By so doing an estimator can adopt a method of pricing suitable to all classes of estimates he has to deal with.

One very special point I would impress on estimators is always to view the drawings of a building and note any particular fads of the architect which are set out in the specification or conditions. This does not take long if a few judicious questions are put. The site should also be viewed and the distance of the nearest goods station obtained, and it should also be noted if the goods station is on the main line of the railway; if not, the branch railway line should be ascertained, as the charges for running over the lines of two railway companies very often so increase the cost of delivery that it is better to pay extra cartage. In viewing suburban sites, or those difficult of access, it is very convenient to traverse the neighbourhood on a cycle provided with a cyclometer, as, not only can distances be measured, but carmen and merchants in the locality can be brought into touch.

The new works for the American Radiator Co. at Hull are to be erected in three months. The contract is in the hands of Messrs. H. Arnold & Sons, of Doncaster, who commenced their task nearly a fortnight ago. The foundations are nearly completed, and the steelwork will follow. The requisite temporary roads to the site have been made, and the North Eastern Railway Company have erected a siding some distance away, from which railway lines have been laid for the purpose of unloading material.



STANCHION AND GIRDER CONNECTIONS AT GLOUCESTER HOUSE FLATS PARK LANE, PICCADILLY, LONDON.

GLOUCESTER HOUSE FLATS.

IN this issue we publish several photographs showing the erection of the Gloucester House Flats at the corner of Park Lane and Piccadilly, London, of which Messrs. Colcutt & Hamp are the architects. This building is a big example of steel-frame construction, as about 1,400 tons of steel-work are to be used. The steelwork is being made and erected by Messrs. Drew-Bear, Perks & Co., Ltd., of the Battersea Steel-works, Wellington Road, S.W., who are performing their part of the work with the utmost dispatch, as will be seen by the two photographs on p. 19, showing the progress that has been made; it should be mentioned, however, that considerable delay has been caused by ancient lights troubles, which have prevented the drawings getting much beyond the second floor. The first stanchion arrived on January 11th, and was put in place, together with four others, on January 20th. The foundation plan on p. 20 shows the concrete and steel grillages which are being used, while the photograph below shows the manner in which the stanchions are braced along the Park Lane front. The construction of the steelwork is somewhat unusual. A detail of connections on the preceding page show its elaborate nature, and the peculiar way in which the plates have been riveted on the stanchions, projecting one beyond the other, completed with a final small angle iron. This is unnecessarily elaborate, and it greatly increases the cost. Messrs. Drew-Bear, Perks & Co., however, are not responsible for the design.

No contractor has been engaged up to the present for the general building work, which has been done under the clerk of works and the architect. The work was commenced in July last, at which time the previous building on the site had been demolished. When the excavation was carried out it was discovered that the foundation of the previous building on the Piccadilly front consisted of a large oak beam, which was still sound. The adjoining party-wall had no foundations at all, and not only had this to be underpinned, but some of the interior walls also. Eleven wells and cess-pits were found on the site. We shall illustrate the building further as it advances.

A JOINER'S SHOP.

Its Organization and Management.

By W. YOUNG.

[The author of this paper is by trade a joiner and the son of a joiner, and has occupied positions as foreman of joiners' shops for over thirty years, so that his opinions are the result of mature experience.—Ed. B. J.]

THE joiner's shop I have in mind is one of ample size for the accommodation of from forty to fifty single benches, well-lighted naturally and artificially, well-ventilated, with lavatory accommodation carefully arranged, easy access with approaches of sufficient width to allow of ready incoming and outgoing of employees, trap doors in floor for the purposes of lowering

or raising material, &c., to or from the mill floor, and sliding doors of sufficiently large dimensions, provided with appliances for lowering finished work from shop on to vans without damage and expeditiously. The shop would also be fitted with bins for containing a good supply of wedges of all sizes, cross-tongues, angle blocks, nails, brads, &c., thereby obviating any unnecessary delay, which would add to cost of work besides ruffling the tempers of the employees concerned.

Tools, such as joiners' cramps of various lengths, with a complement of lengthening bars, iron cramps for jointing, and a good supply of strong roughly-finished hand-screws, should be in evidence, with proper tacks and stands for stowage immediately they are finished with.

A Good Supply of Glue.

It is absolutely essential that a good supply of well-cooked glue is at all times readily obtainable, and clean hot water also. I have found that the best and cleanest method for this purpose is to have one or two tanks perforated at the top to suit sizes of pots with a draw-off tap for water and an overflow pipe. Pots should be of copper. Tanks can be heated by exhaust steam if there is sufficient, but I have found it necessary to have live steam, and that properly regulated by a shop labourer.

The shop should at all times be kept at an even temperature. Then, with material properly seasoned and work standing after being knocked together prior to wedging up, there will not be much fear of complaints from shrinkages—a very wise requirement found in most specifications, but not so generally observed or carried out as it deserves to be.

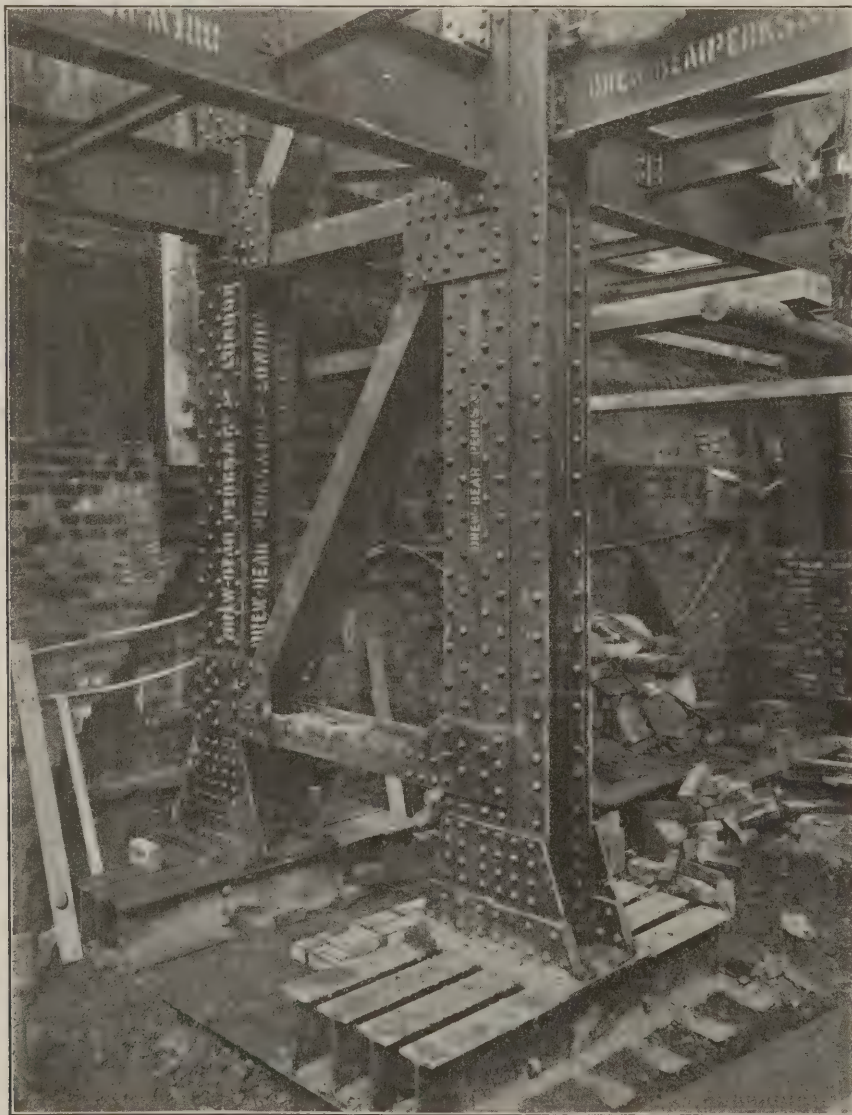
Doubtless many of the details mentioned may be considered trivial. But Michael Angelo once said that trifles make perfection, and perfection in joiner's work is no trifle.

In addition to the benches provided for joiners (which, by the way, should be from 11ft. to 12ft. long and about 27ins. wide, and if space at command will allow about 26ins. between, and never less than 22ins.) one or two long benches should be provided for setters-out of rods. If possible these should be at some distance from the joiners, yet within easy reach for information which may be required from the setters-out.

The shop should preferably be on the first floor and all the machinery on the ground floor. No material except for works in hand should be allowed to accumulate on the shop floor, and any reference to the mill for materials or work should be made through and supplied by a shop labourer. No communication should be made by joiner to machinists except through the labourers, setters-out or foreman.

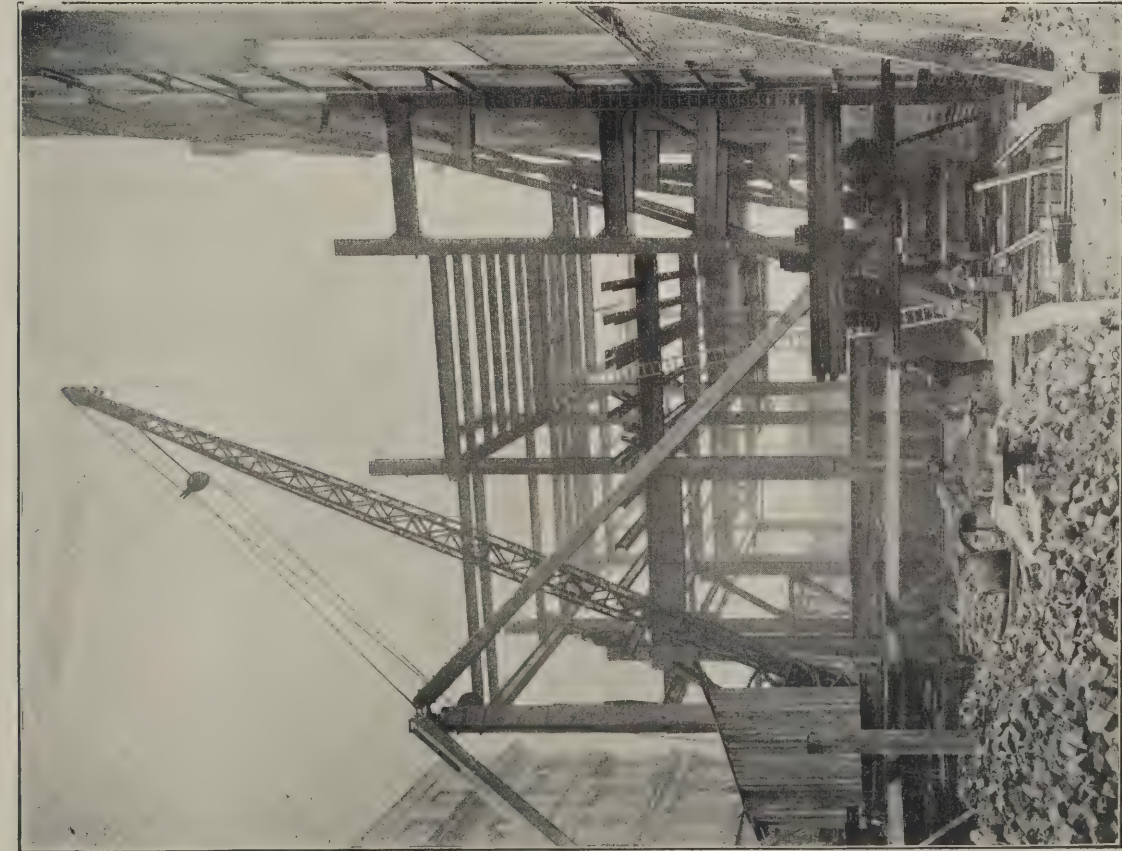
The Foreman.

Next to the shop on the first floor, the machinery on the ground floor, and other requisites mentioned, is the work itself. Of course fluctuations cannot be avoided, but I have always found the greatest incentive and stimulus to a rapid output is to let employees see that there is another job awaiting their attention immediately on completion of the job in hand, and the foreman will, if he is a good and tactful manager, be ever on the alert, making sure no loss through delay shall occur from any laxity on his part. The foreman in charge is the man who winds up, and so long as the supply of work continues he keeps wound up. He occupies an onerous and responsible position, and generally very many of his most trying and anxious hours are those spent by employees under him in rest or recreation; oft times his most difficult jobs have been finished in his mind after his day's duties have been fulfilled. He must be a man thoroughly qualified in all theoretical, technical and practical questions appertaining to



(Photo: Ars.)

GRILLAGE FOUNDATIONS AND BRACED STEELWORK AT GLOUCESTER HOUSE FLATS, CORNER OF PARK LANE AND PICCADILLY, LONDON.



View taken on February 20th, 1906.



View taken on March 19th, 1906.

Photos: Ays.

STEEL FRAME CONSTRUCTION OF GLOUCESTER HOUSE FLATS, CORNER OF PARK LANE AND PICCADILLY, LONDON.

the trade (not joinery only, but the whole of the building trade), versed in the values and qualities of material, sound in his judgment, quick to discover and explain to those under his control the readiest and most economical method of carrying out any and every detail of work in hand (consistent with drawings and specification), and always prepared to reply with decision to any queries relating to the work, for in my opinion there is nothing so tends to belittle a foreman in the estimation of men under him as hesitancy on matters of detail or construction. Nothing will so securely establish him as to let those under him see by his answers that he knows what he is talking about.

The foreman must have not only the joiner's shop under his control but also the management of the mill as regards his work, his instructions of course being given to the foreman in charge of machinery and machinists. If he is handicapped by any adverse influences he is bound to fail.

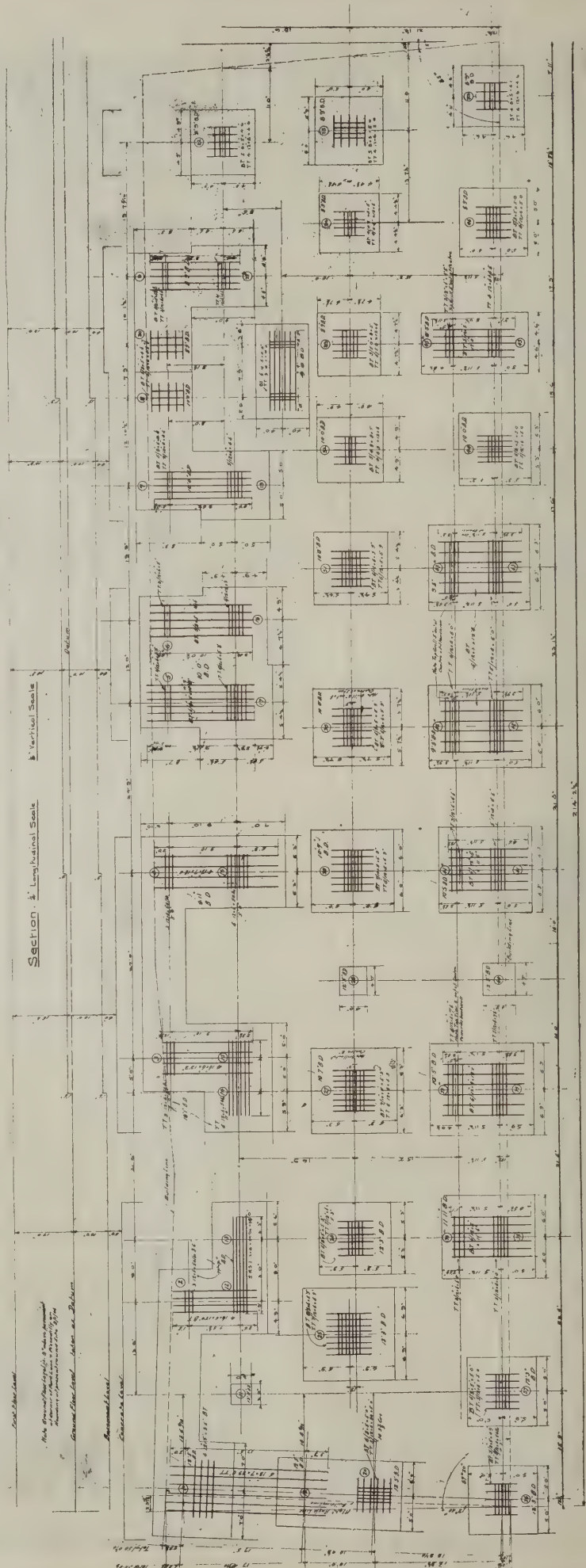
Setting-out.

With all manifold duties pertaining to the position occupied by the foreman, it is evident he could not devote the time and attention required in setting-out working rods, but every rod set out should be under his direction and supervision. Assistance he must have, and no one is more fitted than himself to select his assistant from those under him. Were it not for our technical institutes I fear there would be just grounds for the statement we at times hear about the deterioration of British workmen. Unless advantage is taken of the opportunities afforded by these institutions, it is almost impossible to-day for a young man to acquire such a thorough knowledge of carpentry and joinery as in the days of our ancestors. This is through no fault of his own, but owing to the sub-division of labour that came in with the introduction of machinery. In the writer's apprenticeship days one had to begin at the beginning, and a great drudge it was at times, but one was allowed to carry out the job to the end. First it was the cross-cut saw, then the half rip, next the jack and trying planes, morticing, tenoning and moulding—all by hand: but in the end the pleasure was derived in being able to say, "That is my piece of work."

I have an idea that many of our present-day apprentices would be inclined ere the end of their first year to regret the selection of the trade were they called upon to do as in days prior to machinery. However, setters-out, and proficient ones, are to be found, and the foreman whom we have selected will readily select the proper men for the position, and with a little extra remuneration over the standard rate of pay there will be no question about the rods being set out.

As regards Rods,

the writer's preference is for boards about 3/4 in. thick and gins. or 11 ins. wide, thinly whitened so as to show lines clearer; they are not then so liable to become defaced. They should be clear, and as far as possible set out so as to obviate any necessity for questions after once being explained to the individual entrusted with the execution of the work. The rod having been set out from the foreman's instructions, or the architect's drawings and specification, it should be numbered. The number should be clearly shown, a coloured pencil being used. Any information necessary should be added in writing, such as quantity, quality, whether for staining or painting, floors, and destination of work when completed. Should the job be intricate in any way, an elevation to scale should also be given. The rods must now be measured up by the setter-out for quantities, &c., of material required. The best system I know of for keeping a record of the same for office-booking, foreman's reference and cutter-off's use is a book with three leaves for each job, two of the leaves



Note.—All levels given are to top of top-tier of grills. Grills and stanchions to be steel to steel. — A cement bed 1 in. thick to be under lower grills. All joists British standard weights rain. by 6 in. by 54 lbs. GLOUCESTER HOUSE FLATS, CORNER OF PARK LANE AND PICCADILLY: FOUNDATION AND GRILLAGE PLAN.

being perforated for detaching—one for office, one for cutter-off, and the remaining one in the book kept by the setter-out. Material must be taken off to avoid waste; lengths, widths and thicknesses for sawyer; and in columns provided the width and thickness for use of planer. After being passed by the foreman, rods should be marked with numbers on the edges, and stood with the marked edge outwards for use when wanted by the setter-out of the work in the mill. The material, board or sheet, is placed for cutting off in the hands of a specially appointed man called

"The Chalkey."

and all stuff as cut off must have the corresponding number to the rod and board distinctly marked on it. This "chalkey" should be a joiner, as it is essential that he should be able to read a rod and understand the relative position of each piece of stuff cut off, as well as understand the nature and quality of stuff, and be able to discriminate between the values of material he has at his command. It is a most grievous and costly experiment to put a labourer to this work. The little extra pay given to the mechanic is amply repaid.

The Shop Labourer

is another very valuable—very essential—adjunct to a joiner's shop. My experience has been that with a shop full of men I could more readily dispense with two average joiners than be without the services of the shop labourer. He is the one that must see that everything is in its place, every receptacle filled with its different requisites (such as wedges, tongues, blocks, &c.), tools in their allotted places, glue always ready for use, and hot water from the tank at all times ready. If he neglects his duties there is no need for the foreman to say anything, for the men will speak loudly and strongly! The careful loading of all works on to vans, paying special attention to see that it is well packed and securely fastened, the keeping of the shop clear of shavings and refuse, are part of his duties. He must be able to read the countenances and anticipate the coming wants of the joiners, be civil and obliging, and yet have sufficient courage to hold his own. Such men are to be found—some who have served three and four apprenticeships in the position.

No joinery should leave the works unless the rod numbers are clearly marked out, and should any questions arise on the receipt by the foreman on the job, the rod number should at all times be quoted for reference.

No Rod should be Destroyed

or defaced upon any condition until the works shown thereon is completely finished, because of possible disputes.

An index-book containing all rod numbers should always be kept in the foreman's office, with a description of work or any particulars relative thereto; and a copy from this same book should be kept in the office.

Time Sheets

in joiners' shops have always appeared to me somewhat costly, especially in view of the fact that every joiner is not of necessity an expert penman. I should prefer a time-keeper to go through the shop and take from each man daily the number of his rod and number of hours engaged. I feel convinced that a great saving of time would ensue and the possibility of mistakes be reduced to a minimum.

Some readers may think all this cost would be somewhat expensive, but I know from experience that, given a fair supply of work, material suited to the different classes of work, up-to-date and judiciously-arranged machinery, and such a foreman as I have described, and given a free hand and a fair test, results will be satisfactory to employer, foreman and employees: and the work carried out will redound to the credit of all concerned, while at the same time satisfying the architect.

THE LABOUR MARKET.

Board of Trade Returns for February.

THE Board of Trade returns show that employment in the building trades remained dull in February, but there was a slight improvement on the whole as compared with a month ago. It showed little change compared with a year ago.

Returns received from sixty-one London employers showed that in the last week of February they paid wages to 10,445 work-people of all classes, compared with 10,339 in January and 12,086 in February, 1905. Employment generally in London was much the same as in the previous month, but worse than a year ago.

Returns were received from employers' associations in seventy-one districts outside London, and in nearly all of these employment was reported as dull generally. Compared with a month ago, no change was reported in fifty-five towns, while in eight, including Birkenhead, Lancaster, Blackpool and Dublin, employment was better, and in eight, including Stockport, Chester, Rugby, Newport and Aberdeen, it was worse. Compared with a year ago, employment was reported about the same in forty-two towns, worse in twenty-two, and better in seven.

The following information is based on returns from trade unions and from local correspondents:—

Bricklayers.

With bricklayers employment was dull generally, and no better than a month ago. In many towns short time through bad weather was reported.

Stonemasons.

Employment with stonemasons was bad generally, and about the same as a month ago. Bad weather interfered with outdoor work in some districts.

Carpenters and Joiners.

With carpenters and joiners employment was better than a month ago in most districts, the chief improvements being in London, the Eastern Counties and Scotland, while there was some decline in Ireland, and a slight falling off in the Northern Counties and Yorkshire. Compared with a year ago, employment showed considerable improvement in Ireland, and a decline in Wales and Monmouth. The percentage of trade-union members unemployed at the end of February was 9.5, compared with 10.1 in January and 9.6 in February, 1905.

Slaters and Tilers.

With slaters and tilers employment was bad. In England it was worse than a month ago, but in Scotland showed some improvement. Short time was very general.

Plumbers.

With plumbers employment, as compared with a month ago, showed an improvement in the Eastern Counties and in Scotland; in London there was no change; and in most other districts there was a decline, the greatest falling off being in Ireland. Compared with a year ago there was a considerable decline in the East Midlands. The percentage of trade-union members unemployed was 12.1 at the end of February; in February, 1905, it was 12.5.

Plasterers.

With plasterers employment was bad. In Scotland it was worse than a month and a year ago, but in the rest of the kingdom there was some improvement as compared with January.

Painters.

Employment generally with painters was quiet, but showed considerable improvement on the previous month, and was rather better than a year ago. Short time was worked in some districts.

Employment with labourers showed little change, and was bad generally.

Current Rates of Wages in Large Centres.

TOWNS.	Masons.	Bricklayers.	Carpenters and Joiners.	Plasterers.	Slaters.	Plumbers.	Painters.	Labourers.
Aberdeen -	d. 8	d. 8	d. 8	d. 8	d. 8	d. 8	d. 4½-5½	d. 4½-5½
Accrington -	9	9	8½	9	7½	8½	—	5-5½
Ashton - under-Lyne -	9	10	9	10	8½	9	8½	5½-6½
Barnsley -	9	9	8½	9	8½	9	8½	5½-6½
Barrow-in-Furness -	9	9	8½	9	9	8½	8½	6-6½
Bath -	7½	7½	7½	7½	7½	6½-6½	6½	5-5½
Belfast -	8½	8½	8½	8½	8	8½	8½	19s. wk
Birkenhead -	9½	9½	9½	9½	9	9½	9½	5-6½
Birmingham -	10	9½	9½	10	9	9½	8½	6½-7
Blackburn -	9½	10	9	9	9	9	8	5½-6½
Blackpool -	9½	9½	8½	9½	8½	9	8½	5½-6
Bolton -	9½	10	9½	10½	9	9	8½	6-7
Bournemouth -	8½	8	8	8	8	8	7½	5-6
Bradford -	9	9	8½	8½	9	9	8	6-6½
Brighton -	9	8	8	8	8	9	7	5½
Bristol -	9	9	9	9	9	9	8½	6-6½
Burnley -	8½	8½	8½	—	—	—	—	—
Burton-on-Trent -	8½	8½	8½	—	—	—	—	5½-6
Bury -	9½	10	9½	9	9	9	8½	5-5½
Cambridge -	9½	8	8	8½	8	8	6½	5-5½
Cardiff -	9	8½	8	9	9	9	8½	5½
Carlisle -	8½	8½	8½	8	8	9	8	5-5½
Chatham -	8	8	8	8	10	8½	7	5½
Cheltenham -	8½	8½	8	7½	7½	7½	7	5-5½
Chester -	9	9	8½	9	9	8½	7½	5-5½
Coatbridge and Airdrie -	9½	9½	9½	9½	9	8½	9	6
Cork -	7½	7½	7½	7½	7½	8	8	3s.
Colchester -	8	8	8	8	8	9	6-6½	5-5½
Coventry -	9½	8½	8½	8½	8½	9	8	6
Crewes -	8½	8	7	9	8	8	7	5
Darlington -	9	9	8½	9	9½	8	7½	6
Darwen -	9	9	9	9	9	8	7½	6
Derby -	9	8½	8	9	9	8½	7½	5½-6
Dublin -	8-8½	8½	8-8½	8	8	8½	7½	4½-4½
Dundee -	8½	8	8	8½	8½	8	7½	4½
Dunfermline -	8-8½	10	9	8½	8½	8½	7½	5½-6
Eastbourne -	8½	8	8	9	pce.	8	7½	5½
Edinburgh -	8½	8½	9	9	9	9	8	5
Exeter -	8	8	7½	7½	7½	7½	6½	5
Glasgow -	—	9½	9½	9½	9½	9	9	5½-6
Gloucester -	7½	8	8	7½	8	8	7½	5
Greenock -	9½	10	9	9½	9½	9	9	5½
Grimsby -	9	9	8	9	pce.	9	7½	6-7
Halifax -	9	9	8½	8½	8½	8½	7½	6
Hartlepool -	9½	10	9½	9½	—	—	—	7-7½
Hastings and St. Leonards -	8	8	8	8	—	8	7	5½-6
Huddersfield -	9	9	11	8½	9	7½-8	7½	6
Hull -	9½	9	9	9	9	9	8	6½-7
Ipswich -	8	8	8	8	9	8	7½	5-5½
Keighley -	8½	8½	8	7½	8½	7½	7½	5½-6
Lancaster -	9	10	8½	9	9	8	7½	6
Leeds -	9½	9½	9	9½	9	9	8	6½-7
Leicester -	9	9	9	10	9	9	8	6-6½
Leigh -	9½	9½	9½	9	8½	9	8	6-6½
Lincoln -	8½	8	8	9	8	8	7½	5-6
Liverpool -	9½	9½	9½	9½	9½	9½	8½	5-6
London -	10½	10½	10½	11	—	11	—	—
Londonderry -	7	7	7	7	6½	7½	7½	15s. wk.
Macclesfield -	8	8	7	7½	6½	7½	7½	5s.
Manchester -	9½	10	9½	10	9	9½	8½	5½-7
Merthyr Tydfil -	8½	8½	8	8½	8	8	7½	5½
Middlesbrough -	9	9½	9½	9½	10	9	8	6½-6½
Newcastle -	9½	9	9½	9	10	9	9	6
Newport (Mon.) -	8½	8½	7½	8½	8½	7½-8	7½	5½
Northampton -	8½	8½	8½	8½	—	8½	7½-8	5½
North Shields -	10	10	10	10½	9½	8½	9	6½-7
Norwich -	8	8	8	8	7½	8	6½	5
Nottingham -	9½	9	9	10	9	9	8½	6½-7
Oldham -	9½	10	9½	9	8½	9	8½	5½-7
Oxford -	8½	8	8	8	8	8	7	5½
Paisley -	9	9½	9	9	9	9	9	6
Perth -	8	8	8	8	8	8	7½	5½-6
Plymouth -	8	8	8	8	8	8	7	5
Portsmouth -	8½	8½	8	8½	pce.	7½	6½-7	5
Preston -	9½	10	9	8½	8½	8½	8½	5½-6
Rochdale -	9½	10	9	9	8½	9	8½	5½-6½
Rotherham -	9½	9½	8½	8½	8	8½	7½	6
Scarborough -	8½	8½	8	8½	8	8	7½	6
St. Helens -	9	9	9	9	9	8½	8½	5½-6
Sheffield -	9½	9½	9	9	9	9	7½	6½-7
Southampton -	8	8	8	pce.	8	7	5	6
Southport -	9	9	8½	9	9	9	8½	6
South Shields -	9½	—	9½	—	10	8½	9	6
Stockport -	9½	9½	9	10	8½	8½	8	4½-7
Stockton - on-Tees -	9	9½	9½	9½	10	9	8	6½-6½
Sunderland -	9½	10	9½	10	10	9	9	6½-7
Swansea -	8½	—	8½	8½	—	8½	7½	5½
Swindon -	—	—	—	—	—	—	—	—
Torquay -	7	7	7½	7	7	7	7	4½-5
Wakefield -	9	8½	8	8½	8	8	7½	6
Walsall -	9	8½	8½	8½	8½	8	7	5½-6½
Warrington -	8½	9½	9½	8½	8½	8	8	5½-6½
West Bromwich -	9½	9	8½	9	pce.	8½	7	6-6½
Wigan -	9½	10	9	9	8½	9	8½	5½-7
Wolverhampton -	9	9	9	8½	8½	9	7½	6-6½
Worcester -	8½	8½	8½	8½	8½	8½	7	5½
Yarmouth -	7	7½	7½	7½	7½	7½	6	4-4½

The Month's Trade.

(Reports by our Special Correspondents.)

STONE, GRANITE AND MARBLE TRADES.

There is very little change for the better to report in these trades. The labour returns of the Board of Trade again show that employment in February was slack, as it has been for many months. As regards limestone, the reports for February show, however, that employment continued good in Cumberland and Weardale; in Derbyshire it was adversely affected by bad weather. In the Bath stone quarries it was slack, with short time. Employment in the Plymouth district was quiet. In North Wales it was not so good as a month ago.

As regards other stone, employment was good, with considerable overtime, in chert quarries in Derbyshire. At Gateshead it was fair. In the Clee Hill road-material quarries and in grindstone and building stone quarries in the Rowsley district employment was moderate. It was generally slack in the Sheffield, Barnsley and Rotherham districts, and it continued bad in Forfarshire, with short time.

With granite workers employment continued dull in Aberdeenshire and bad in Devonshire and Cornwall. In Leicestershire it was fair.

As to settmaking, in Aberdeenshire employment was considerably affected through a dispute. In the Clee Hill district it was moderate, and in North Wales and at Airdrie and Edinburgh it was fair.

The returns for imports of stones, slabs and marble, rough, hewn and manufactured, for the month of February, 1906, as compared with the same month in 1904 and 1905, are as follows:—

Tons.			Value.		
1904.	1905.	1906.	1904.	1905.	1906.
86,311	87,409	87,631	99,680	91,374	98,158.

Portland Stone.

The quarrying operations at Portland have been very seriously interfered with during the month of February by gales, rains and inclement weather. Shipping has been disorganized. The output has therefore been restricted, but notwithstanding this the sales of stone have kept up, the stocks having been largely drawn upon.

Some very interesting stones have been discovered on the eastern side of the island, on land leased by the Bath Stone Firms, Ltd., with certain quarry marks indicating that they were quarried and squared at the time of the building of St. Paul's Cathedral. Three of these stones have been unearthed, and the portion containing the masons' marks copied off and made into keystones and presented to the local Masonic Mark Lodges.

One stone, however, is more interesting from the fact that it contains a quarry mark, namely, the letter Y, which we believe corresponds with the quarry mark of the stones to be seen at St. Paul's Cathedral, and this clearly indicates that these stones were quarried by master-masons in the seventeenth century under the supervision of Sir Christopher Wren. The remarkable thing about these stones is that the arris is very clean and sharp, although exposed to the sea, thus showing the durability of Portland stone.

The latest news at Portland is that the best portion of the Piccadilly Hotel, London—i.e., the Quadrant front—is to be built with stone from the quarries in the Kingbarrow district—the same from which stone was taken for building the new War Office.

Bath Stone.

At the Bath stone quarries the employment has been normal. All the quarry-owners have heavy stocks in hand ready in anticipation of the revival of trade. The

masons' yards at Box and Corsham are not working to their full capacity, and there is plenty of room for improvement.

According to the report of the Bath Stone Firms, Ltd., a new estate has been developed at Gastards, Corsham, where it has been discovered there is a large area of unquarried stone of fine quality. A working shaft has been sunk, and although nearly ready it will be some little time before the stone is put on the market. It is satisfactory to know this famous building stone is not likely to be exhausted for many generations.

At the well-known St. Aldhelm Box Ground quarries an unusual number of large blocks have been obtained, each not less than 6 tons in weight; the quality is exceedingly good, and it is likely to lead to an extended use of this excellent weather stone.

Bath Stone Firms.

The report of the Bath Stone Firms, Ltd., for the half year ended December 31st last, submitted at the meeting on March 16th, shows that the general slackness in the building trade has affected this successful undertaking. After providing for remuneration of directors and auditors, the nett profit for the half year ended June 30th, 1905, was £18,509, and for the half year ended December 31st, 1905, £13,185, and after adding balance brought forward from December 31st, 1904, £15,851, together £47,545. Comparing these figures with the previous year's we find that for the six months ended December 31st, 1904, the nett profit was £21,500, making the aggregate for the year about £44,100. The interim dividend paid in September last absorbed £15,896, and there now remains available for distribution £31,648. The directors recommend a dividend at the rate of 16 per cent. per annum, making 15 per cent. for the year, leaving a balance of £13,481 to be carried forward. The provision for depreciation is now £93,433. During the year the directors have secured a long lease of a large area of additional quarry land in the Bath stone district, which, with other leases acquired at different times since its formation, gives the company control over more unquarried land than at any period of its existence. The company's holdings in Portland have also been materially increased during the twelve months.

Marble.

There is little doing in the marble trade. A contract has been settled for the supply of a large quantity of marble work for Sir Ernest Cassel's new town house. The remarks in our first "Contractors' Supplement" still apply. It is peculiar that, while we have such fine marbles in England and Ireland, we should make such little use of them. The Belgians were, however, the first to realize the possibilities of the material, and the trade to-day is mostly in their hands; the French works running them close. One consequence of this is that our local marbles are not adequately developed, so that when an order is placed it is seldom that the material can be obtained from stock or in large blocks. The greatest amount of marble comes from Italy. Greek marbles probably come next, although only developed in recent years. They are, however, most beautiful, and superior to many Italian, Belgian and French marbles. The new German tariff has cut the Belgian marble works very hard, and being practically excluded from Germany it is natural that they should seek other outlets and endeavour to secure a larger share of orders from this and other countries. We hear that prices for marble work in this country have been cut 10 per cent., which will be a still further obstacle in the progress

of the few English works. The foreign workmanship is not, however, always satisfactory, because of the natural difficulties of working material so far removed from the job, and because of the competition. It is not realized by architects that great care, trouble, time and labour are required to produce a beautiful result in marble, just as in any other artistic craft.

The new commercial treaty between Belgium and Austria-Hungary which was concluded on February 12th favours Belgian marble workers by securing reductions in the customs tariff.

A Swedish green marble has recently come on the market. It is cheap, but looks very poor compared with the older known green marbles.

THE SLATE AND TILE TRADES.

The slate and tile trades show no improvement during the past month. The prices remain unremunerative, and competition among merchants to secure orders is keener than ever. The producers have made little alteration in their prices, though a slight rise has taken place in North Wales in the case of some of the larger sizes, the shortage in the supply of which we commented upon in a previous issue. On the other hand, in some districts in Wales prices for the smaller sizes have given way, presumably owing to the accumulation of stocks. Enquiries are rather more numerous, especially for the better class of work, but the trade will not feel the benefit of the result of these until next year.

The Board of Trade reports, as regards slate quarrying, that employment in February continued slack in the Festiniog district and in Carnarvonshire, with the exception of the Llanberis district. Employment was slack in Argyllshire, where only five days a week were worked.

Westmorland Slates

are readily procurable from most of the districts where they are produced, and reports generally indicate that fair though not excessive stocks are held by most of the quarries.

The output of this class of slate is governed a good deal by the weather. In one case within our recollection a quarry was unable to supply material for six weeks until the roads were re-made. To guard against exigencies of this kind many of the quarries keep a fair stock of slates at the railway sidings.

From Colleyweston

we hear the supply in no way equals the demand, which appears to be general over England. The normal output of this district is hardly sufficient to supply the new buildings erected in connection with the colleges at Oxford and Cambridge Universities.

The durability of these slates is surprising; some have been used recently at Trinity College, Cambridge, which are known to have been previously on the roofs of some farm buildings in Lincolnshire for a period of over 400 years.

The interest in this slate appears to have spread to America, where Messrs. Close & Sons, of Colleyweston, recently covered a large mansion at Westbury, Long Island, this, we believe, being the first occasion on which these slates have been used in America.

In order to make certain of securing material from the Colleyweston district the contract should be settled at the earliest possible moment, as the output of this material depends entirely upon the action of frost at certain periods of the year. The work is a speciality, as no ordinary slater, unless he had had years of experience and a special knowledge of this material, would be able to carry out the work successfully.

Welsh Slates.

The Welsh slate trade appears to be in much the same condition as last month, and there does not seem to be any immediate prospect of an improvement.

Tiles.

The reports from the various tile producing areas all tend to show that the demand for roofing and other tiles has been very small, although in some cases things have improved. In the Broseley district a few of the larger firms are maintaining their trade, but appear to be able to meet any reasonable demands made on them. Prices remain unaltered.

THE CLAYWORKING INDUSTRY.

There is little better to report in the clay-working industry this month. The trade seems as depressed as ever, though the increase for building that always comes in the Spring has its effects. The Board of Trade returns for February show that employment generally in the brick and tile trades during the month continued bad, and much the same as the previous month, a great deal of time being worked. In the Peterborough district, however, there was a slight improvement on a month ago, and employment was reported as fair in the Tees and Hartlepool district, and at Brierley Hill and Stourbridge. It continued good at Exeter and fair in South Wales.

The common brick trade in Flettons is not moving. Stocks remain as they were. The glazed brick trade is also without life, and the only thing doing is in glazed terra-cotta or faience and sanitary ware. The porous terra-cotta partition blocks have met with such remunerative results that other firms are entering the field with clays that are not quite good enough for the high fire-resistance required, or else are expensive to work.

Little, if any, recovery is perceptible in the results set forth in the report for the past year of Messrs. Stanley Brothers, brick and tile makers, Nuneaton, from the sudden decline in 1904, when the nett trading profits (£12,864) were less than half those for 1903. For 1905 they were £12,928. The dividend is again 6 per cent. Nothing is placed to reserve, to which £2,500 was added a year ago, mainly made up of premiums received on the issue of new capital, and the carry-forward is smaller at £7,631, as compared with £8,678.

THE PORTLAND CEMENT AND LIME TRADES.

There has not been much movement since our last report in February. The most hopeful feature in the trade is, that the exports of English Portland cement are showing satisfactory increases compared with the corresponding period of last year, and that the import of the cheap Belgian cement is rapidly decreasing. The imports of February were 7,000 tons less than a year ago. Should this state of things continue the statistical position of the trade should materially affect prices.

From contracts booked ahead it looks as if this country may export about 100,000 tons more during the year, while the imports may decline to the extent of 80,000 tons. The knowledge of this expected alteration of 180,000 tons in the balance of trade is making itself felt in the firmer attitude now being shown by the manufacturers. Buyers are no longer having things all their own way, which is a new experience after the depression which has now existed for five years. The arrival of Spring, with the longer working hours and finer weather, gives a brisker tone to the trade than that which naturally exists during the short and unfavourable winter days, and the accumulated stocks in the manufacturers' warehouses are expected to vanish with the melting snow.

The coal strike in France which now seems likely to spread to Belgium is resulting in a considerable advance in the price of coal, and as so much cement is now made on the rotary principle, this is an item which must result in enhanced cost of manufacture. Should the strike continue for any length of time, manufacturers will be compelled to ask a considerable advance for their materials. This is the more likely as everything which is required in the process of manufacture also seems dearer, such as cask staves, hoop-iron, nails, oil, sacks and coke.

The lime trade is very quiet, indeed—in fact, depressed would be a truer description. This article, unlike cement, is entirely dependent on the general building trade, and as this particular industry is universally slack, lime-burners are suffering accordingly.

The cheapness of Portland cement also reacts on the lime trade, because, as about 2 yds. of lime constitute a ton, the cost of lime almost equals that of cement, and as the latter article is so far superior and takes a larger aggregate, cement is being supplied where a few years ago (when the margin in prices was greater) lime would have been used.

The returns for imports and exports of cement for building and engineering purposes for the month of February as compared with the same month in 1904 and 1905 are as follows:—

		IMPORTS.		
		1904.	1905.	1906.
Tons	-	20,894	19,820	13,070
Value	-	£30,322	26,476	16,339
		EXPORTS.		
		1904.	1905.	1906.
Tons	-	24,800	26,977	36,318
Value	-	£41,671	44,149	54,524

Of the exports for February this year the Argentine Republic took 2,286 tons, British South Africa 9,632 tons, and the British East Indies 5,464 tons.

THE TIMBER TRADE.

The Board of Trade reports that employment in February with mill-sawyers and woodcutting machinists continued dull, but was rather better than a year ago. Trade unions with a membership of 4,611 reported 232 (or 5 per cent.) as unemployed at the end of February, compared with 5·2 per cent. at the end of January, and 5·8 per cent. in February, 1905. Employment was good at Coventry and Dundee; fair at Birmingham; improving at Nottingham, Newcastle-on-Tyne, and on the north-east coast generally; quiet at London, Glasgow, Bristol, Cardiff and Bradford; bad at Hull, Leicester, Liverpool, Bolton, Wolverhampton, Dublin and the Potteries.

The Liverpool Market.

Business in builders' timber for early delivery has been rather quiet, but for later delivery more business has been done. The consumption within the Liverpool trading area still continues fairly brisk, flooring boards, joists and roof timber being worked up rather freely. The London and North-Western Railway Co. are using a fair quantity of new sleepers on part of their Liverpool and Manchester main line, which will affect stocks of this class of timber. Heavy timber for weight-carrying purposes has been passed inland in good quantities for the large factory and works' building operations which are now in progress, notwithstanding the strong preference for iron and steel joists and girders.

Canadian pine and spruce deals have only been received in small quantities, and stocks of pine-deals show a total in standards one-quarter less than at the corresponding date last year; the stock of spruce deals, however, is nearly double that of a year ago, though the stock then was very small. Late values of Quebec pine deals have ranged from £23 to £33 per standard for first-quality yellow pine; £17 to £22 for seconds; £11 to £12 10s.

for thirds. St. John's spruce deals have been selling at £7 15s. to £8 per standard, but values have stiffened slightly, and 2s. 6d. more has been paid in late sales. Red pine deals have been in rather better demand. Oregon pine logs and planks have sold more freely. Stocks are reduced, but are still equal to fully five months' consumption, at the present rate.

Spruce and pine deals from New Brunswick and Nova Scotia have arrived in smaller quantities, but the deliveries have been steady, on the recent scale. The aggregate of stocks is slightly less than a month ago. The importation of red deals and boards from the Baltic has been very small, while the deliveries have been slightly greater. Norway flooring boards have been received in somewhat larger quantities. Planed whitewood boards, of first and second quality, mixed, have sold at £9 2s. 6d. to £9 5s. per standard; and third quality from £8 5s. to £8 10s. Redwood boards, planed, first quality, have sold at £11 to £11 2s. 6d. per standard. United States whitewood in logs and lumber has come to hand freely, and ample stocks are now held.

Pitch-pine continues in a very strong position, there being a good demand, with a light importation, and stocks correspondingly light. Values, however, continue at 1s. 4d. to 1s. 8d. per cub. ft. The arrivals of hewn pitch-pine have also been light, while the deliveries have been more than double what they were in the opening weeks of the year. Stocks are much reduced. The aggregate is less than half of what it was a year ago. The quotation remains at 1s. 3d. to 2s. per cub. ft. Planks have also come to hand in smaller quantities. Prime deals and boards have ranged from £16 to £17 10s. per standard.

Oak, of Canadian and American sorts, has been received in larger quantities, and stocks equal to four months' consumption are now in hand. A good supply of oak planks has been received. Stocks are larger than in the early part of the year, but are less than half of what they were a year ago.

East India teak has arrived more largely, but the arrivals leave a greater aggregate of stock, equal to a five months' consumption, at late demands. Planks have ranged from £16 to £17 5s. per load.

The interest shown in mahogany at the last auction sales conducted by Messrs. Farnworth & Jardine, and Alfred Dobell & Co. afforded a correct index to the state and prospects of the market for this timber. Useful and figurey woods find ready buyers at full prices, but inferior woods have to be traded on the best terms obtainable. A considerable stock of African and a fair stock of Cuban wood are in hand. African sorts have ranged in value from 2d. to 8d. per inch-foot; Cuban, from 4d. to 6½d. Generally the mahogany market is in a healthy state.

At the auction sales held by Messrs. Farnworth & Jardine on March 22nd and 23rd large quantities of mahogany were offered, all of African growth.

THE GLASS TRADE.

The glass trade, notwithstanding the depression in the building trades, is fair. The Board of Trade returns for February show that with sheet-glass makers and flatteners at St. Helens employment continued good. It had improved with pressed-glass makers in the Tyne and Wear district. With plate-glass bevellers and silverers at Birmingham it was quiet. Employment was fairly good with glass-blowers in London.

Messrs. Pilkington Brothers, Ltd., have recently added two further patterns to their figured rolled glass, namely Persian and Japanese. We referred last month to the fact that these figured glass patterns can now be had picked out in colours, as many as three different ones in one sheet being obtainable.

IRON AND STEEL TRADE.

Recent Progress.

The record of the steel market has always displayed that infinite variety which age cannot wither nor custom stale. From that historic bear in small steel which followed the deluge of arms from the legions of Darius into the camp of Alexander, to the present day, causes beyond any man's control have produced strange vicissitudes.

At the time of the last issue of this supplement we were able to paint the prospect in Turneresque tints: the trend of affairs, as subsequent events have proven, having then about reached their zenith. To-day, however, though the colour of affairs is far from sombre, we are obviously in a well advanced state of transition.

Nevertheless we may be permitted to doubt whether all those undiluted jeremiads to which we are treated from many sources are to be accepted as correctly representing the present situation. Booms cannot last for ever, and a boom in the steel trade is always most aggressively regarded by those who are not its direct beneficiaries, and *no lens volens* the most transient of its kind. If, then, this little boom of ours still retains a trace of vigour it should not be unduly importuned to move off the stage, and when it has departed let us at least accord it a decent burial.

Looking backward for a brief space, the first few days of this month were not remarkable for any great degree of enthusiasm in the manufacturing centres; in fact, even then, there was an obvious tone of pessimism in the general opinion of various markets.

On the Tyne and the Clyde, it is true, considerable demand prevailed among ship-builders, and the *status quo* was fairly well maintained. Generally, however, enquiries were not so numerous as they might have been, but such shading as there was in manufactured iron and steel did not result in any marked economies to other than the larger buyers.

Birmingham early reported the sale of "common" bars at £7 2s. 6d., as against the official quotation of £7 5s.

There was a distinct improvement in the exports of iron and steel from the North of England during February, the Middlesbrough customs reporting shipment of 72,740 tons of pig iron, 14,435 tons of manufactured iron and 31,000 tons of steel, the aggregate increase over January being 15,000 tons.

In this district the slight downward tendency, although far too evident to be ignored, was rather regarded as one of those inevitable lulls which are always to be looked for in any upward movement. The fact that this period of the year is essentially one of advances rather supported this view than otherwise. Probably on this latter account the fact that makers continued to produce regardless of the falling off in demand, and the excess thus created, rather increased the tendency towards depression. Manufacturers, of course, were not actually in want of orders, although fresh bookings were far from numerous.

The range of prices during the first week of March was somewhat as follows:—Common bars and iron angles, £7 5s.; steel angles, £6 12s. 6d.; steel joists, £6 7s. 6d. All these prices were liable to be shaded for good orders.

In the Midlands the situation was not essentially different, save that the cheering influence which the shipbuilding activity gave to the Northern markets was, of course, lacking.

In best finished iron the price of £9 was well maintained. Rolling stock makers kept busy, but no attempt was made to do business in iron bars at the official figure of £7 5s., the actual selling prices having been but little over £7.

The associated makers' quotation of £12 7s. 6d. for corrugated sheets pretty well represented the market, and most firms were inclined to toe the line and keep the figure firm. Angles ranged from £6 10s. to £6 17s. 6d., joists from £7 to £7 2s. 6d., and girder plates from £7 12s. 6d. to £7 17s. 6d.

On the whole, reports from Scotland were more consistently hopeful than elsewhere, and prices were well maintained and new business fairly plentiful. The price of structural steel shapes showed no signs of weakening, and demand continued good.

The Present Position.

As the month has advanced the general tone has become more confident in many quarters. Not that any appreciable improvement in the month's opening prices has taken place, but there has not been that consistent slackening of demand which the pessimists prophesied at the commencement of the month.

In Staffordshire bar-iron a fair trade has been done, and the £9 figure is still in force. In common bar-iron it must be acknowledged that current orders are running out more rapidly than new orders are being entered, but makers have been able to do business at prices approximating the official figure of £7 5s.

In the Midlands steel makers do not seriously entertain the idea of easier prices. All works are fairly well booked with orders, and deliveries are still comparatively slow.

In Sheffield orders came in more freely towards the middle of the month and prices were steadier. Some good railway orders were booked for home and abroad.

In Scotland, as well as in the Cleveland district, the outlook has brightened up by comparison with the beginning of the month, and there has been a steady flow of orders, although none were heard of carrying remarkable dimensions.

Steel joists kept pretty firm at £6 7s. 6d. and angles at £6 12s. 6d., and on the whole there need be no serious dissatisfaction if the position is maintained.

The following comparison of London prices with those of March of last year is interesting as showing that there is still a very fair factor of safety to work upon:—

	Mar. 1905.	Mar. 1906.
Staffs marked bars -	£9 0 0	£8 0 0
" common -	7 5 0	6 0 0
Steel angles, Middlesbrough -	6 15 0	5 15 0
Glasgow -	6 15 0	5 10 0
Steel plates, Middlesbrough -	7 0 0	5 17 6
Glasgow -	7 7 6	6 2 6
Steel rails, Middlesbrough -	6 5 0	5 2 6

In Continental steel prices have kept fairly well in sympathy with the movements on this side. There are no active signs as yet of the anticipated rise in the price of rolled steel joists and channels. It is too early yet, however, to say that the advance will not take place, and the progress of events during the next few weeks will be interesting to watch. Meanwhile, as a matter of fact, a slow but consistent downward movement has taken place through the month, although latterly prices have been a little firmer, and to-day things are just beginning to pull themselves together again.

The figure for a fair basis specification, delivered ex steamer Thames or c.i.f. equal ports, for joists, is about £5 10s. per ton nett; for channels £5 15s. nett.

Angles are quoted at £5 18s. to £6 and Tees about £6 3s. 6d., all delivered ex steamer Thames, or c.i.f. equal East Coast ports.

Belgian bars in these latter shapes are selling at somewhat lower prices than the German, and both seem inclined on the whole to remain fairly firm.

Deliveries are better than they were earlier in the year, but Continental makers generally are inclined to look forward to improved business in the near future. Much depends

on the events of the next few weeks, and in the meanwhile it is not safe to be at all dogmatic.

Other Metals.

A decided improvement has taken place in the lead market during the past week or two, and a slow but steady advance in prices is expected. Considerable forward buying is reported. Soft foreign for delivery over April is selling at somewhere in the region of £10 and upwards, English at £16 10s., and pipes at upwards of £19.

Better demands have also been remarked in spelter, especially for prompt deliveries. Prices for G.O.B.'s touching such a figure as £25 7s. 6d., mark a decided improvement, as do special brands at £25 10s. to £25 15s.

In this connection it is interesting to note a report from South Wales that arrangements are contemplated for erecting four new furnaces at the Upper Bank Works, Swansea.

The market in galvanized sheets has nothing alarming to report; things have in fact been somewhat quiet latterly. The price for 24-gauge corrugated lines of £12 7s. 6d. f.o.b. remains firm, and no downward movement is anticipated. A rather encouraging item of news records the receipt of some heavy indents in galvanized sheets from Australia, and a further demand is expected from the same quarter.

Copper, again, has displayed a certain degree of firmness, the fluctuations being of a very mild order, and recent quotations in the region of £82 (standard) bid fair to be well maintained.

News Items.

The production of pig-iron in Germany last year was 11,000,000 tons as compared with 10,000,000 in 1904.

The estimated cost of rebuilding Blackfriars Bridge, for which Parliamentary sanction is being sought, is given as between £200,000 and £250,000.

The proposal of the Swedish Government to put an export duty on iron ore has been shelved, pending certain negotiations with Germany.

An iron and steel company has been formed, with a capital of over £1,000,000 sterling, to develop the Gurumashini mines in Bengal.

The British Government contemplate including £10,000 in the estimates for the coming financial year for buildings and equipment at Teddington for the National Physical Laboratory.

Forty six vessels, aggregating 77,336 tons, were launched in Scotland during the first two months of this year, as against twenty-five vessels and 69,076 tons during the same period of 1905.

It is reported that blast furnaces are about to be erected at Lithgow, in New South Wales. Coal and coke are to be obtained on the spot, and ore mines are within 100 miles.

There is considerable activity in the marine engineering shops on the North-East coast. One firm has orders for over fifty sets of marine engines—sufficient to keep them going to the end of the year.

In reply to a question in the House of Commons in regard to the appointment of a Minister of Commerce, the Premier stated that he saw no prospect of the matter being dealt with this session.

A new type of universal plate mill, recently patented, is to be erected in South Chicago. The mill will be driven by an 8,000-h.p. electric motor, and will be the first of its size to be electrically driven.

The continued falling-off in the shipbuilding industry in the United States is indicated in the recently published records, which show the number of ships built in 1905 as 1,054, gross tonnage 306,563, as against 1,065 ships and 365,104 tons in 1904.

THE WALLPAPER TRADE.

The wallpaper trade continues fairly good. Foreign competition is not a very serious amount, although imports are more than a year ago, though less than in January. Our exports, however, remain stationary, as the following return of paper-hangings for February will show; though January's export was more than for a year ago:—

IMPORTS.					
1904.	Cwts.	1905.	1904.	1905.	1906.
—	4,499	5,818	—	£12,528	£16,198
EXPORTS.					
1904.	Cwts.	1905.	1904.	1905.	1906.
8,573	8,305	8,242	£23,342	£22,802	£22,173

THE IRONMONGERY TRADE.

The builders' ironmongery trade continues depressed. In the goods used by the engineering trades business is good. The Board of Trade returns for February show that employment at Wolverhampton in the lock and latch trade continued depressed, more short time being worked than a month

ago. It was fair on cast-iron hollow-ware and good on iron fences and hurdles. In the hollow-ware trade it was good at Wigan, fair at Birmingham and West Bromwich, but remained slack at Sheffield.

Employment in the stoves, grates, &c. trades was fair at Falkirk and quiet at Rotherham. At Glasgow short time was worked, but a slight improvement was shown compared with a month ago.

With nut and bolt makers employment continued good at Darlston, and fair at Birmingham and in South Wales. With wire-nail, shoe-rivet and cut-nail makers at Birmingham it continued fair. At Black Heath with nail workers it was fair, but with rivet makers it was not so good as a month ago.

As regards wire employment continued good on the whole, and rather better than a year ago.

The returns for imports and exports for February 1906, as compared with the same month in 1904 and 1905, are as follows:—

IMPORTS.					
1904.	Tons.	1905.	1904.	Value.	1906.
Wire nails	2,224	2,617	£22,364	25,187	37,515
Nails (other than wire nails), screws and rivets	1,150	917	17,010	16,375	18,105
Bolts and nuts	391	358	5,226	5,625	6,325
EXPORTS.					
1904.	Tons.	1905.	1904.	Value.	1906.
Nails, screws and rivets	1,556	2,134	31,162	36,303	43,326
Bolts and nuts	1,322	1,198	22,320	22,139	32,618

THE PAINT TRADES.

The paint trades are fair. As regards materials, the returns for imports and exports for February, 1906, as compared with the same month in 1904 and 1905, are as follows:—

IMPORTS.					
1904.	1905.	1906.	1904.	1905.	1906.
	Cwts.			Value.	
White lead	27,971	22,080	£22,037	17,881	21,433
Zinc oxide	120,730	113,835	79,481	14,532	19,031
Other colours and pigments	29,237	105,829	61,003	60,343	62,235
Turpentine	11,935	43,969	108,936	84,127	54,445
Lac-dye, seedlac, shellac and sticklac	—	6,528	—	48,657	59,544
Linseed oil	473	50	8,820	868	43,162
EXPORTS.					
1904.	Cwts.	1905.	1904.	Value.	1906.
White lead	24,171	23,130	23,643	22,332	29,675
Zinc oxide	104,732	4,049	158,731	5,116	28,822
Other colours and pigments	95,127	111,704	121,969	148,201	—
Linseed oil	2,013	2,220	42,850	39,890	38,652

MISCELLANEOUS.

The Indian Tariff.—From inspection of the list of general duties under the import tariff of British India we find that a duty of 5 per cent. will be charged on the estimated value of hardware and ironmongery, but machinery and parts thereof may be imported free. The duty on iron and steel is 1 per cent. and the duty on lead, tin and zinc 5 per cent., and on building and engineering materials such as asphalt, bricks and tiles, cement, fireclay, stoneware pipes, lime, &c., is 5 per cent. on the estimated value.

The new Tariff Regulations of Brazil increase the former duties on many goods. The following new rates apply to our readers:—Oxide of lead 400 reis per kilog.; pine or fir trunks 20,000 reis per cub. metre, boards,

planks and joists 25,000 reis per cub. metre; cast-iron ingots 20 reis per kilog.; iron plates 130 reis per kilog.; steel plates 150 reis per kilog.; rolled iron 140 reis per kilog.; rolled steel 160 reis per kilog.; iron and steel wire 150 reis per kilog.; stoves, furnaces, &c., 300 reis per kilog.; plain cast-iron goods 300 reis per kilog.; painted &c., cast-iron goods 500 reis per kilog.

Production of the U.S.A.—The following table showing the estimated production of the more important minerals and metals in the United States in 1905, as compared with the preceding year, is taken from the "Engineering and Mining Journal" (New York). The estimates, it is stated, are made by authorities in each branch, on substantial data:—

	Unit.	1904.		1905.	
		Quantity.	Value.	Quantity.	Value.
Carborundum	lb.	7,060,380	706,038	3,940,000	394,000
Cement, natural hydraulic	bb. (a)	4,866,331	2,450,150	4,500,000	2,250,000
" Portland	" (b)	26,505,881	23,355,119	31,000,000	32,000,000
" slag	" (b)	303,045	226,651	300,000	210,000
Copper, sulphate	lb.	63,234,557	3,161,728	52,405,009	2,751,263
Copperas (d)	short t.	16,956	118,692	20,392	142,744
Iron ore	long t.	29,462,839	51,559,868	44,054,197	79,372,135
Lead, white	short t.	126,336	13,899,913	130,192	15,874,384
" red	"	13,938	1,672,569	14,635	1,858,645
Litharge	short t.	12,487	1,248,691	13,111	1,573,320
Pyrites	long t.	173,221	669,124	189,201	650,412
Zinc-lead	short t.	6,781	474,670	7,200	540,000
" oxide	"	57,613	4,524,031	65,403	5,232,240
" ore, exported	"	35,911	905,782	26,597	738,532
Copper (c)	lb.	817,715,005	106,302,950	925,267,840	145,257,798
Iron (pig)	long t.	16,276,641	225,268,711	23,010,625	382,666,694
Lead	short t.	302,204	26,043,941	322,587	30,368,340
Zinc	"	181,803	18,543,906	199,964	23,523,765

(a) Barrels of 300 lbs. (b) Barrels of 380 lbs. (c) Value computed on average of Lake copper at New York. (d) Only that marketed as copperas.

Note.—Short t. = 2,000 lbs.; long ton = 2,240 lbs.

THE LIVERPOOL DISTRICT.

In the building industry of the Liverpool district the winter which, meteorologically, has now closed, saw more activity than has been usual in winter seasons of former years. This has been due largely to the great mildness of the weather, brick-laying, stone-laying and plastering operations having gone on without any stoppage on account of frost.

Six large jobs have been in hand in Liverpool. These have been: The completion of the extensive new hospital for infectious diseases at Fayakerley; the erection of the large block of buildings which will form the head offices of the Mersey Docks and Harbour Board, on the site of the old George's Dock; the erection of the new Cotton Exchange in Old Hall Street, and of the new head offices for the Liverpool tramways department in Hatton Garden; the reconstruction of the Children's Infirmary; and the prosecution by the Corporation of a large scheme for providing workmen's dwellings, on the Hornby Street area.

Three other building projects have also found work for different branches of the building trade. These have been the large schemes of dock reconstruction at the north and south ends of the docks estate (which have entailed among other things the building of extensive blocks of quayside sheds), the finishing-off of an enormous granary and silo on the east side of the Queen's Dock, and the earlier operations in the erection of the Liverpool Cathedral at St. James's Mount. In addition a considerable amount of house-building has been in progress, especially on the east and south-east border lines of Liverpool, in the West Derby, Old Swan, Tue Brook, Wavertree and Garston districts. For a winter season, therefore, the building industry of the district has been well and busily employed.

Most of the work spoken of has made a large demand primarily for common bricks for inside walls and backing work. Pressed smooth-faced red bricks and white-faced glazed bricks for special facing-work have also been much used. For large buildings steel is coming into greater use. The new offices of the Mersey Docks and Harbour Board, the new dock sheds, and the new Cotton Exchange exemplify this strikingly; while in Manchester a new building for which the Manchester Iron & Steel Co. are now constructing a frame, at the bottom of Victoria Street, on the east side, is another example of this.

At the new Liverpool Cotton Exchange, part of the extensive north face, in Edmund Street, is constructed of cast iron, the surface between the windows being ornamented by wreath and flower work cast in relief. This use of cast iron is quite new to Liverpool. The main elevation of the Cotton Exchange is of stone. The work is being carried out by the Waring-White Building Co., and is now far advanced.

The use of concrete for building purposes is slowly extending in the Liverpool and Manchester districts. A year ago, an experimental block of twelve workmen's dwellings of concrete was erected by the Corporation of Liverpool. A new water tower for the Urban District Council of Newton-le-Willows has just been constructed of ferro-concrete, under the Hennebique patents, by Mr. L. G. Mouchel, of Manchester and London. The tower supports a cylindrical tank of 300,000 gallons capacity 63ft. above ground-level. Both the tank and its supports are of ferro-concrete.

On the Stenhill estate, Halton, Cheshire, houses are being erected of concrete. Machines have been set up for making the blocks, on the site, from materials found in the locality.

Complete List of Contracts Open.

With a few exceptions, news of Contracts Open are not repeated after they have been published once in these columns, so that readers will find particulars in our previous issue of other contracts that still remain open.

Unless expressly stated to the contrary all deposits required for bills of quantities, &c., are returned on receipt of bona-fide tenders.

The words "Fair Wages Clause" inserted in certain paragraphs signify that persons tendering must conform to a fair-wages clause in the contract, which requires them to pay the rates of wages current in the district.

BUILDING.

Mar. 29. Cork.—Two semi-detached villas on the Old Blackrock Road, in accordance with plans and specification which may be inspected at the offices of W. H. Hill & Son, architects and civil engineers, 28, South Mall, Cork, with whom tenders are to be lodged on or before Mar. 29.

Mar. 29. Nottingham.—Cricket pavilion, tool-house, &c., on the Meadows New Recreation Ground. Plans may be seen and copies of specification, bill of quantities and form of tender obtained from Frank B. Lewis, city architect, Guildhall, on payment of a deposit of £1 1s. Sealed tenders, endorsed "Tender for Cricket Pavilion, &c., Meadows Recreation Ground," to be delivered at the Town Clerk's Office not later than 6 a.m. on Mar. 29.

Mar. 29. Eastney.—Church hall and mission buildings in Eastfield Road, Eastney, according to drawings, specifications and conditions, which can be seen and quantities obtained at the office of the architect, G. E. Smith, "Glendore," 145, Victoria Road North, Southsea, between 10 and 4 and on Saturday 10 to 12. Sealed and endorsed tenders are to be delivered at the St. James' Vicarage, Milton, by noon on Mar. 29.

Mar. 29. Cardiff.—Internal alterations to the premises of Fulton & Dunlop, Ltd., at the corner of Duke Street and St. John Square. Drawings may be seen and bills of quantities obtained on deposit of £1 1s. Tenders to be delivered to Edward H. Bruton, F.R.I.B.A., architect, 119, Queen Street, Cardiff, not later than 10 a.m. on Mar. 29.

Mar. 29. Cefn-Coed.—Thirty-nine houses. Particulars can be obtained from R. Cound Jenkins, architect, Cefn-Coed. Tenders to be sent in by Mar. 29.

Mar. 29. Guildford.—Portland cement for the ensuing twelve months, for the Town Council. Specifications and forms of tender may be obtained at the office of the borough surveyor, C. G. Mason, A.M.I.C.E., Tuns Gate, Guildford. No tender will be considered which is not upon the prescribed form. Tenders, endorsed "Tender for Cement," to be sent to F. S. Miller, town clerk, Town Clerk's Office, Bridge Street, Guildford, by noon on Mar. 29.

Mar. 29. St. Austell.—Two cottages at Trethurgy, St. Austell, for Joseph Payne. Plans and specifications may be seen at Alsovear Farm, Trethurgy. Sealed tenders will be received not later than Mar. 29.

Mar. 29. Stafford.—Bedroom accommodation, &c., for eight laundrymaids at the County Asylum. Drawings and specification of the proposed work may be seen at the offices of Walter H. Cheadle, county surveyor, Stafford. Applications for bills of quantities to be made on or before Mar. 29, accompanied by a deposit of £2 2s. Fair wages clause.

Mar. 30. Shrewsbury.—Additions to workhouse, consisting of a dayroom, stone-breaking cells, bathroom, iron gangway and staircase, for the Guardians of the Atcham Union. Plans and specifications can be seen at the Union Offices, St. John's Hill, Shrewsbury, and any other information can be obtained from A. B. Deakin, Pride Hill, Shrewsbury, the architect to the Guardians. Tenders, under seal, endorsed "Tender for Buildings," to be sent to Joseph Everest, clerk to the Guardians, Atcham Union Offices, St. John's Hill, Shrewsbury, by Mar. 30.

Mar. 30. Penarth.—Building a large hall and assembly-room. For bill of quantities and to see plans, &c., apply J. Coates Carter, Bank Buildings, St. Mary Street, Cardiff. Tenders to be sent in by Mar. 30.

Mar. 31. Forres.—Additions and alterations to the Mechanics' Hall Buildings. Plans and specifications of the works may be seen with the Architect, and offers to be lodged with John Forrest, architect and surveyor, Forres, by noon on Mar. 31.

Mar. 31. Maesteg.—Fifty cottages on Tonnadefaid Estate, Nantyffyllon, Maesteg, for the Tonnadefaid Building Club. Plans and specifications may be seen at the Mining Offices, Maesteg. Sealed tenders to be sent to J. P. Gibbon at the above offices, endorsed "Tender," not later than Mar. 31.

Mar. 31. Wallsend-on-Tyne.—Six houses in flats at Station Road, for the Industrial Co-operative Society, Ltd. Plans and specifications may be seen on personal application at the Society's offices, Carville Road, Wallsend-on-Tyne. Tenders returnable not later than Mar. 31.

Mar. 31. Wookey Hole.—Alterations and additions to the Council School at Wookey Hole, near Wells, for the Somerset County Education Committee. Drawings and specification can be seen at the schools. For any further information apply to Hans Price & William Jane, architects, Weston-super-Mare. Tenders to be delivered to the County Education Secretary, Weston-super-Mare, on or before Mar. 31.

Mar. 31. Aberdare.—Colliery offices at Cwmaman, Aberdare, for the Cwmaman Coal Co., Ltd. Plans, &c., may be seen at the offices of Morgan & Elford, architects, 1, Jeffrey Street, Mountain Ash, or 42, Canon Street, Aberdare, to whom endorsed tenders must be sent by Mar. 31.

Mar. 31. Nantyffyllon.—Presbyterian Church at Nantyffyllon, near Maesteg. Plans and specification may be seen and bills of quantities obtained on deposit of £1 1s. Sealed and endorsed tenders are to be delivered to Arthur Lloyd Thomas, engineer and architect, Church Street Chambers, Pontypridd, by Mar. 31.

Mar. 31. South Brent.—House, for H. T. Mackenzie. Drawing may be seen at the office of T. W. Latham, architect, Kingsbridge, and bills of quantities obtained on payment of £1 1s., to whom tenders are to be delivered by 11 a.m. on Mar. 31.

Mar. 31. Worcester.—Restoration of Cleeve Prior Church. Apply with 5s. deposit to C. F. Whitcombe, architect, Newbury, Broadheath, Worcester. Tenders to be sent in by Mar. 31.

Mar. 31. Whitby.—Alterations to old buildings at Spital Bridge, for the Urban D. Council. For particulars apply to T. K. Scott, R. D. Council Offices, Whitby. Tenders to be sent in by Mar. 31.

Mar. 31. Trefonen.—Reconstruction of schoolrooms, classrooms, cloakrooms, urinals, &c., at the Trefonen, Oswestry, National Schools, in accordance with drawings, (1 to 5) and specifications prepared by W. Penant Ellis, architect and surveyor, Town Hall, Rhyl, North Wales. Drawings may be seen and a copy of the specification, also form of tender, obtained from H. O. Stokes, Underhill, Trefonen, as above, on payment of a deposit of £1 1s. Tenders, sealed and endorsed "Tender, Trefonen, Oswestry, National Schools," must be delivered at Underhill, Trefonen, not later than 10 a.m. on Mar. 31.

Mar. 31. Coseley.—Stripping and re-tiling of a portion of the roof of Hurst Hill Council Infants' School, and for supplying of fountain heads, &c. Particulars may be obtained at the Education Offices, Green Street, Coseley. Samples of brindle and blue valley tiles will be required from the firm whose tender is accepted, and the tenders should reach Frederick J. C. Toole, secretary to the Education Committee, Coseley, not later than Mar. 31.

Mar. 31. Slough.—Eight-stall stable at Manor Farm, Dorney, for the Urban D. Council. A plan, specification and particulars may be seen and a form of tender obtained at the Surveyor's Office, 1, Mackenzie Street, Slough, on payment of a deposit of £1. Sealed tenders, endorsed "Stables," addressed to the Chairman of the Drainage Committee, 11, Mackenzie Street, Slough, to be delivered on or before Mar. 31.

Mar. 31. St. Keverne.—New Wesleyan church. Builders desirous of tendering are requested to send their names to Stuart Rule, St. Keverne, before Mar. 31.

Mar. 31. Mortomley.—Proposed Catholic schools and adjoining residence, at Mortomley, near Sheffield, for the Rev. Father De Baere. Applications for bills of quantities must be made to Arthur Hartley, architect County Chambers, Castleford, Yorkshire, before Mar. 31.

April 2. Rotherham.—New business premises at the corner of Doncaster Gate and Wellgate. Builders wishing to tender must forward their names and addresses, accompanied with a deposit of £3 3s., to J. Platts, architect, &c., High Street, Rotherham, by April 2.

April 2. Banbridge.—Dispensary and dispensary residence for the use of the medical officer of the Crossgar Dispensary District, in the township of Crossgar, convenient to the village of Dromare, according to the plans and specifications prepared by W. W. Larmor. The Guardians desire that the materials used in the above works shall be, as far as possible, of Irish manufacture. The contractor must undertake to have the whole of the works completed on or before Oct. 31. Sealed tenders, addressed "To the Presiding Chairman," on the special form, and containing the names and addresses of two solvent sureties willing to join with contractor in a joint and several bond for double the amount of the contract, will be received at the Poor Law Office, Workhouse, Banbridge, up to noon on April 2.

April 2. Murcia.—Museum and school to be constructed at the upset price of 188,751 pesetas (about £6,435), in accordance with conditions set forth in the "Gaceta de Madrid," a copy of which can be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall Street, E.C. A deposit of 8,570 pesetas (about £292) is required to qualify any tender. Tenders will be received at the Municipal Offices at Cartagena and Lorca and at the offices of the Secretary to the Institute, Murcia, by April 2.

April 2. Pontypridd.—Twenty-five cottages at Rhydfelen, near Pontypridd. Plans and specification may be seen and quantities and form of tender obtained at the office of the surveyor, P. R. A. Willoughby, A.M.I.C.E. Sealed tenders, endorsed "Workmen's Houses," must be received by J. Colenso Jones, clerk to the Council, District Council Offices, Pontypridd, by April 2.

April 2. Armley.—Erection of Wesleyan Church with spire. Quantities may be obtained from W. J. Morley, F.R.I.B.A., & Son, architects, 269, Swan Arcade, Bradford, to whom tenders must be sent by April 2.

April 2. Newtown.—Repairs and improvements at the following Council Schools:—Llangynog, Llangurig, Glandwr (Llandloes), Wern (Llanbrynmar), Cwm (Llanllugan), Hafod (Llanerfyl). Plans and specifications may be seen on application to the Clerk at the Education Offices, Newtown; and any further information may be obtained, if desired, on written application being made to

the County Surveyor, Welshpool. Tenders are to be sealed and marked on the outside "Tender," and are to be forwarded so as to be received by the Clerk to the Education Committee, County Education Offices, Newtown, by April 2.

April 2. Bispham.—Dwelling-house in Hesketh Place. Plans and specifications may be seen, and bills of quantities obtained, upon application to G. Moss, 13, Hesketh Avenue, Bispham. Tenders to be sent to Thomas Kershaw, A.R.I.B.A., architect, Lancashire and Yorkshire Bank Chambers, Halifax, by April 2.

April 2. Bradford.—Alterations to the Church Institute. Plans may be seen and quantities obtained from T. H. and F. Healey, architects, 42, Tyrryl Street, Bradford, to whom tenders must be delivered by April 2.

April 2. Leeds.—Block of shop premises at Hyde Park Corner, for Joseph Pickersgill. Names must be forwarded to Thomas Winn & Sons, architects, 84, Albion Street, Leeds, by April 2.

April 4. St. Breward.—Cottage at the Kennels, St. Breward, for the North Cornwall Hunt Committee. Plans and specifications can be seen at the residence of N. Hosken, to whom tenders must be sent by April 4.

April 4. Portland.—Justice room, adjoining the police-station. Plans and specifications may be seen, and bills of quantities and forms of tender obtained, of the County Surveyor, at his office, Wimborne, or at the Shire Hall, Dorchester. The sum of £2 2s. will be charged for the bills of quantities. Tenders, marked "Justice-room, Portland," must be sent to E. Archdall Fooks, clerk to the Standing Joint Committee, County Council Offices, Sherborne, by April 4.

April 4. Withington.—Alterations and additions to the lunatic wards at the workhouse. Plans, &c., may be seen and bills of quantities obtained at the offices of Charles Clegg & Sons, architects, 21, Spring Gardens, Manchester, on payment of £1 1s. Sealed tenders, enclosed in the official envelope, to be delivered to D. S. Bloomfield, clerk to the Guardians, Union Offices, All Saints, Manchester, not later than 12 a.m. on April 4.

April 4. Arboe.—New parochial residence at Arboe, co. Tyrone. Plans and specifications can be had on application to Rev. James Loughran, P.P., Arboe; or at the offices of E. & J. Byrne, architects, offices, 4, Waring Street. Tenders to be forwarded not later than April 4.

April 4. South Shields.—Improvements at Hilda Colliery wagonway, Station Road. The work embraces the construction of a tunnel, 14ft. span, together with excavation and concrete retaining walls for railway cutting under Station Road. General and detail drawings may be seen and a copy of the form of tender, conditions, specification, quantities, &c., and other information obtained at the office of S. E. Burgess, M.I.C.E., borough engineer and surveyor, Chapter Row. Tenders, on forms supplied (to be fully priced out in the schedule and totalled), must be delivered to the Town Clerk, Court Buildings, South Shields, not later than 4 p.m. on April 4, endorsed "Tender for Station Road Tunnel."

April 5. St. Ervan.—Repairs for the Cornwall Education Committee, according to the specification which may be seen at the said schools or at the office of the architect, B. C. Andrew, Biddick's Court, St. Austell. Forms upon which all tenders must be made may be had from the architect or the secretary. Sealed endorsed tenders to be sent to F. R. Pascoe, secy., Education Office, Truro, by April 5.

April 5. Woodbridge.—Ventilating and making small alterations to the board-room, for the Guardians. Plans and specifications of the proposed work may be seen at the office of Brown & Burgess, architects, Arcade Street, Ipswich. Sealed tenders, endorsed "Alterations to Board-room," to be delivered at the board-room not later than 10 a.m. on April 5.

April 6. Kemplar.—Rebuilding a small bridge a Kemplar, near the village of Dufton, for the East Westmoreland Rural D. Council. Plans and specifications may be seen at the Surveyor's Office, Kirkby Stephen. Sealed tenders, endorsed "Dufton Bridge," must be delivered at the office of William Hewitson, Appleby, the clerk to the said Council (where also plans and specifications may be seen), not later than April 6.

April 6. Boyndie.—New central school and teacher's house for the School Board. Plans and specifications to be seen with John M'ulloch, clerk to the School Board, Boyndie, and offers, marked "Tender for School Buildings," to be lodged with the clerk of the Board not later than April 6.

April 7. Ashill.—Repairs at the Council School. Specification and further particulars at the office of Samson & Cottam, architects, Bridgwater. Sealed tenders must reach the County Education Office, Weston-super-Mare, before noon on April 7.

April 7. Puriton.—New offices and for alterations at the Council School. Plans, specifications and further information at the office of Samson & Cottam, architects, Bridgwater. Sealed tenders must reach the County Education Office, Weston-super-Mare, before noon on April 7.

April 9. Kingston-on-Thames.—Pulling down of old premises and erection of new offices and workshops for Knapp, Drewett & Sons, Ltd., as follows:—New

premises for the "Surrey Comet" offices, at No. 20, Clarence Street, Kingston-on-Thames; new workshop on land at rear of No. 18, Church Street, Kingston-on-Thames (adjoining above-named premises). In accordance with specifications, quantities and drawings prepared by William H. Hope, C.E., architect and surveyor, of Hampton Wick, Middlesex, and Billingham, Sussex, who will give any further information required. The plans may be seen and copies of specification and quantities obtained on application to the Secretary, Knapp, Drewett & Sons, Ltd., 20, Clarence Street, Kingston-on-Thames. A deposit of £2 2s. for these particulars is required by the Company. Sealed tenders, duly endorsed, to be delivered to the Secretary as above, not later than 10 a.m. on April 9.

April 9. Lancaster.—*Alteration and extension to the administrative block at the Sanatorium.* Plans and conditions may be seen, and bills of quantities obtained, on application at the office of J. C. Mount, borough surveyor. Sealed tenders to be delivered to T. Cann Hughes, town clerk, Town Hall, Lancaster, by 9 a.m. on April 9.

April 9. Salford.—*Storerooms and pump-house at the Electricity Station, Frederick Road, Pendleton.* Drawings may be seen, forms of tenders and bills of quantities obtained at the Borough Engineer's Office, Town Hall, Salford. Tenders, endorsed "Storerooms, Electricity Station," addressed to the Chairman of the Electricity Committee, must be delivered to L. C. Evans, town clerk, Town Hall, Salford, by 5 p.m. on April 9.

April 10. Hastings.—*Four cottages in the parish of Brede, adjoining the pumping station of the New Waterworks, for the Corporation.* Drawings and specification may be seen and form of tender and bill of quantities obtained at the office of the borough engineer, P. H. Palmer, M.I.C.E., Town Hall, Hastings, between 10 and 5, on payment of a cheque for £1 1s. Sealed tenders, endorsed "Tender for Cottages at Brede," must be delivered at the Town Clerk's Office, Town Hall, Hastings, not later than noon on April 10.

April 10. London, S.E.—*Improving the Alverton Street School, Deptford, S.E., by providing new classrooms, teachers' rooms, halls, staircases, cloak-rooms, lavatories, w.c.'s, covered playground, new drainage scheme, &c., for the London County Council.* Persons desiring to submit tenders may inspect the drawings and specification and obtain the bills of quantities, form of tender and other particulars at the Education Offices (Architects' Department), Victoria Embankment, W.C., on payment to the cashier of the sum of £5. Tenders must be upon the official forms, and the printed instructions contained therein must be strictly complied with. Fair wages clause. Each tender must be enclosed in an envelope (which will be provided) and delivered at the Education Offices (Room 148), Victoria Embankment, W.C., not later than 11 a.m. on April 10.

April 10. London, W.—*Working men's flats.* The Council of the royal borough of Kensington invite tenders for the demolition of the existing houses, Nos. 4, 6 and 8, Hesketh Place, and 5 and 6, Thomas Place, Notting Dale, and the erection on the site thereof of two buildings, to contain respectively eighteen and eight one-room tenements, in accordance with specification and drawings, which can be obtained at the office of Town Clerk, Town Hall, Kensington High Street, W. Persons proposing to tender will be required to deposit £3 3s. with the borough treasurer at the Town Hall, when applying for a form of tender. Fair wages clause. Sealed tenders, and endorsed "Tender for Working Men's Flats," must be delivered at the Town Clerk's office not later than 4 p.m. on April 10.

April 12. Kendal.—*Proposed alterations and additions to Broom Close, Kendal.* Plans may be seen and quantities and specifications obtained at the office of John F. Curwen, F.S.A., F.R.I.B.A., architect and sanitary engineer, 26, Highgate, Kendal, to whom tenders must be sent not later than noon on April 12.

April 12. Antrim.—*Labourers' cottages in the rural district, for the Rural D. Council, in accordance with plans and specifications, which can be seen at the office of the clerk of the Council, or at the office of the architect, W. T. R. Taggart, Scottish Provident Buildings, Belfast, as follows:*—Two cottages at Townparks, Antrim, on the lands of Dr. Gawn; two cottages at Townparks, Antrim, on the lands of Mrs. Young; one cottage at Islandbawn, Muckamore, on the lands of John Clark; one cottage at Ballyear, Carmoney, on the lands of William Houston; one cottage at Ballyrobin, Muckamore, on the lands of Scott Gilliland; one cottage at Killiyad, Randalstown, on the lands of John Fulton; one cottage at Annaghmore, Toomebridge, on the lands of B. O'Boyle; one cottage at Portlee, Toomebridge, on the lands of Mrs. McCann; two cottages at Ballynamullen, Toomebridge, on the lands of Felix Lavery; one cottage at Tamnadrery, Randalstown, on the lands of James Gilbert; four cottages at Cranfield, Randalstown, on the lands of James Charleton; two cottages at Cranfield, Randalstown, on the lands of Bernard O'Kane; one cottage at Cranfield, Randalstown, on the lands of Mrs. Hume; two cottages at Ballydonagh, Crumlin, on the lands of John McCullurg; two cottages at Ballyshanagill, Crumlin, on the lands of John Nelson; two cottages at Feehogue, Randalstown, on the lands of Lord O'Neill; four cottages at Lurgan West, Randalstown, on the lands of Lord O'Neill; one cottage at Ballygrooby, Randalstown, on the lands of G. L. Young; two cottages at Craigmore, Randalstown, on the lands of J. H. Mulligan; two cottages at Ballymacilhoyle, Crumlin, on the lands of W. S. Thompson. Persons tendering may do so for any or all of the different blocks, but they must name the particular site or sites on their tender. Tenders are to be lodged with J. Clark, clerk of Council, Union Office, Antrim, by 10 a.m. April 12.

April 14. Wakefield.—*New school at Sandal, near Wakefield.* Stainforth (Thorne Union) Provided School: new cloak-room, &c., &c.; Castleford Wheldon Lane Provided School: alterations, repairs, &c. A deposit of £1 is required for each of the above schools, which will be returned on receipt of a bona-fide tender. Cheques, &c., to be sent to the West Riding Treasurer. Builders desirous of tendering must send in their names to J.

Vickers-Edwards, county architect, County Hall, Wakefield, by April 14.

April 21. Mold.—*Alterations and extensions to the County School, Mold, Flintshire, North Wales.* Plans and specifications may be seen at the offices of the architect, Samuel Evans, N. & S.W. Bank Buildings, High Street, Mold, from whom bills of quantities may be obtained on payment of a sum of £2 2s. Tenders to be made out on forms to be supplied, and sent in to W. R. Howard Evans, solicitor, Mold, clerk to the Governors, by April 21.

April 23. Coventry.—*Nurses' home, for the Coventry and Warwickshire Hospital Committee, in accordance with plans and specifications prepared by the architects, A. Hessel Tiltman, F.R.I.B.A., 1, Raymond Buildings, Gray's Inn, London, W.C., and Herbert W. Chattaway, Trinity Churchyard, Coventry.* Plans and specifications may be seen at the Architect's Office, Trinity Churchyard, Coventry, and bills of quantities and forms of tender can be obtained upon depositing the sum of £3 3s. Tenders, sealed and endorsed "Nurses' Home," to be sent to Ellis E. Crisp, secy., Coventry and Warwickshire Hospital, Stoney Stanton Road, Coventry, not later than 10 a.m. on April 23.

No date. Cairo.—*Erection of Courts of Justice at Sembellawein, Kafr-el-Zayat, Facos and Santa.* Tenders should be addressed to the Ministry of Public Works, Cairo. The conditions, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall Street, E.C.

No date. Cork.—*Rebuilding premises at the corner of Grand Parade and George's Street, for O'Sullivan & Son.* All particulars may be obtained on application to the architect, Arthur Hill, B.E., M.R.I.A., 22, George's Street, Cork.

No date. Trancreek.—*Church.* Drawings and specifications may be seen at J. H. Clemens, The Bracken, Newquay.

ENGINEERING.

Mar. 30. Sunderland.—*Steam alternator, &c.* For the supply of one 750-kilowatts triple-expansion engine direct-coupled to three-phase generator, 5,000 volts, with exciter; one 300-kilowatt static transformer; two portable air-compressors, for the Corporation. Forms can be obtained on application to the borough electrical engineer, J. F. C. Snell, M.I.C.E., Town Hall, Sunderland, and on payment of a deposit of £1 1s.

April 2. Dover.—*One rectangular surface pattern condenser and one Edwards' air-pump with requisite valves.* Specification, with general conditions, form of tender, &c., can be obtained from the borough electrical engineer, L. W. Woodman, Electricity Works, Park Street, Dover, on payment of a deposit of £1 1s. Additional copies of specifications, 2s. 6d. each. Tenders on the prescribed form, endorsed "Tender for Condensing Plant," to be delivered to Wollaston Knockner, town clerk, Castle Hill House, Dover, by April 2.

April 2. Aston.—*Telephone installation, to establish communication between the various blocks of buildings in connection with the workhouse at Gravelly Hill.* Specification and conditions of contract may be seen, and forms of tender obtained, at the office of W. H. Whitehouse, 37a, Waterloo Street, Birmingham, electrical engineer, and tender endorsed "Workhouse Telephones," must be received by John North, clerk to the Guardians, Union Offices, Vauxhall Road, Birmingham, by April 2.

April 2. Ullapool.—*Works in connection with the water supply of the village.* There will be about one mile of 4-inch cast-iron pipe, and 1,100 lineal yds. of 2-in. cast-iron pipe in village, replacing the present lead service pipes, with the necessary connections as per schedule. Plan and specification can be seen with A. G. Joass, surveyor, Dingwall, and the local water manager will point out the line of the pipe tracks. Sealed tenders for the work to be lodged with Wm. Mackenzie, clerk, Mid-Ross District Committee, by April 2, marked on outside of envelope "Tender for Water Supply, Ullapool."

April 4. Barnsley.—*Construction of a house to receive the chalk-mixing apparatus, &c.* Drawings, and specification may be inspected, and forms of tender and schedules of quantities may be obtained on payment of £2 2s. on application at the office of J. Henry Taylor, Manor House, Barnsley, and at the offices of T. and C. Hawksley, civil engineers, 30, Great George Street, Westminster, S.W., and tenders must be delivered at the office of Henry Horsfield, town clerk, Barnsley, by 10 a.m. on April 4.

*** April 4. The Hague.**—*Railway and bridge materials, for the Netherlands Colonial Office.* Contract 414—The metal superstructure and appurtenances for 57 railway bridges. Contract 415—150 axles with wheels for railway carriages and waggon. Particulars may be obtained from Mr. M. Nijhoff, at the Hague, at a cost of 6 fl. (10s.) for contract No. 414 and 2 fl. (3s. 4d.) for contract No. 415. Tenders will be received up till April 4.

April 5. London, W.—*Alterations to the heating and hot-water works at the Infirmary in the Marloes Road, Kensington, for the Guardians, in accordance with specifications, plans and bills of quantities, which may be seen upon application to the Clerk between 10 and 4 and Saturdays between 10 and 1.* Sealed tenders, upon the form supplied, must be delivered at the Guardians' Offices, Marloes Road, Kensington, W., by 1 p.m. on April 5.

April 5. Hackney, N.E.—*Condensing works, for the Hackney Borough Council, as follows:*—Specification No. 26.—Condensing water-supply works, including brick screening chamber by the River Lee, intake and overflow pipes, subways, &c. General conditions, specification, drawings, form of tender and form of agreement may be inspected at the offices of Robert Hammond, M.I.C.E., consulting engineer to the Council, 64, Victoria Street, Westminster, S.W., and may be obtained there on making a deposit of £5. Extra copies of the specification may be obtained by bona-fide tenderers at a charge of 5s. per copy, which sum will not be refunded. Fair wages

clause. Tenders, sealed and marked "Tender for Condensing Works," must be addressed to W. A. Williams, town clerk, Town Hall, Hackney, and delivered by 4 p.m. on April 5.

April 5. Lisbon.—*Metal bridge over the river Mondego, at Martyr Santo.* Tenders will be received at the Ministry of Public Works, Lisbon, up to April 5.

April 6. Greenock.—*Electric lighting, electric lift telephones and electric bells for new combination hospital, presently in course of erection at Gateside, Inverkip Road, Greenock, according to plans and specifications by John Dixon, A.M.I.M.E., consulting engineer.* Schedules of quantities and forms of tender can be obtained on application to the Clerk, Municipal Buildings, Greenock, on payment of a deposit of £1 1s. for each schedule. Sealed tenders on the prescribed form must be delivered at the Town Clerk's Office, Greenock, not later than 11 a.m. on April 6.

April 6. Hitcham.—*Digging the trench and laying about 1,950 yds. of cast-iron water main, 3 ins. diam., with valves and hydrants; also for the construction of a small concrete reservoir, at Hitcham, Suffolk.* The pipes, valves and hydrants will be provided by the Council, but the carting from Stowmarket Station will be included in the contract. Plans can be seen and copies of specification obtained on deposit of £1 1s. on application to Henry Miller, engineer, 16, Museum Street, Ipswich. Tenders to be sent to Alfred Newman, clerk, Hadleigh, Suffolk, by 10 a.m. on April 6.

April 7. Madrid.—*Dam construction in the port of Motrico, Bilbao.* Apply to Direccion-General de Obras Publicas, Madrid. Tenders to be sent in by April 7.

April 7. Madrid.—*Construction of a breakwater at the port of Arrecife, Island of Lanzarote, Canaries, at the estimated cost of 927,191 pesetas (or about £32,000), in accordance with conditions set forth in the "Gaceta de Madrid," a copy of which may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall Street, E.C. A deposit of 9,271 pesetas is required to qualify any tender. Tenders will be opened on April 7 at the Directorate General of Public Works, Madrid.*

April 9. Haslemere.—*Extension of heading in well, lining of well, construction of reservoir, and laying cast-iron pipes, fixing valves, &c., for the Hambleton Rural D. Council.* Copies of the specification and form of tender can be obtained at the offices of R. B. Grantham & Son, 23, Northumberland Avenue, London, W.C., on payment of a deposit of £3 3s. Sealed tenders, which must be on the prescribed form and endorsed "Haslemere Waterworks," must be sent, addressed to Ferdinand Smallpiece, clerk to the Council, Guildford, on or before April 9.

April 10. Loughborough.—*Waterworks.* Providing, carting and laying about 1,300 yds. of 6 in., 2,300 yds. of 4 in., and 3,500 yds. of 3 in. cast-iron mains, providing and fixing valves and other fittings, together with building valve and other chambers and other works in connection with the supply of water to Shepshed, for the Corporation. The drawings may be inspected at the offices of the engineer, A. H. Walker, A.M.I.C.E., Town Hall, Loughborough, and conditions of contract, specification, quantities and forms of tender obtained from him upon payment of £2 2s. Sealed tenders upon the form supplied, addressed to the Chairman of the Water Committee, Town Hall, Loughborough, are to be delivered not later than 5 p.m. on April 10, endorsed "Tender for Shepshed Mains."

April 10. Lisbon.—*Metal bridge over the River Velto or Veride, in accordance with conditions set forth in the "Diario do Governo," a copy of which may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall Street, E.C.* Tenders will be opened at the Ministry of Public Works on April 10. A deposit of 400 milreis (about £90) is required to qualify any tender.

April 11. Portballintrae.—*Waterworks, for the Ballymoney Rural D. Council.* Plans, sections, details, specification and quantities have been prepared by the Engineer, and may be seen at the Clerk's Office, or at the offices of J. A. McCormick, engineer, Diamond, Coleraine. Copies of quantities, together with form of tender, may be obtained from the Engineer on payment of £2 2s. Proposals, endorsed "Tender for Portballintrae Waterworks," properly sealed, are required to be in the hands of T. B. Hamilton, clerk, Rural D. Council, Boardroom, Ballymoney, by April 11.

April 13. Liscard.—*Extension to the engine and boiler-house at the Generating Station, Seaview Road, for the Wallasey Urban D. Council.* Drawings can be inspected and a copy of the specification and quantities procured at the Electrical Engineer's office, on the site, on payment of £2 2s. Also for the supply and delivery on seat of new boilers; also a 500-k.w. steam-driven single-phase alternator, to be delivered and fixed at the generating station. Copies of specification for Nos. 2 and 3 may be obtained at the Engineer's Office on payment of £1 1s. All tenders, endorsed "Tenders for Buildings," "Boilers" or "Steam Generator," as the case may be, to be delivered per post to H. W. Cook, clerk and solicitor to the Council, Public Offices, Egremont, Cheshire, not later than noon on April 13.

April 21. Salford.—*750-k.w. steam turbo-generator and condensing plant, for the Corporation.* Plans, specification and form of tender may be obtained from the Borough Electrical Engineer, Electricity Works, Frederick Road, Pendleton, on payment of a deposit of £2 2s. All enquiries in connection therewith to be addressed to the Borough Electrical Engineer at the above works. Sealed tenders, endorsed "Tender for Turbo-Generator," to be delivered to the Town Clerk, Salford, by April 21.

May 7. Sydney (New South Wales).—*Plant.* For supply and erection of boilers, automatic stokers, pipe work, &c.; turbo-alternator, sub-station machinery, switch boards, &c., for the Municipal Council. Forms may be obtained on application to T. Rooke, at the offices of Preece & Cardew, 8, Queen's Gate, Westminster, on deposit of £5 5s. Tenders to be sent in by May 7.

June 1. Luxemburg.—Supplying electricity to the town of Luxemburg for lighting and tramway traction. Full particulars may be obtained from the "Collège des bourgmestres et échevins, Luxemburg."

No date. Hyde.—Steel gasholder tank. For the supply and erection of a steel gasholder tank, 12ft. in diameter and 24ft. gins. deep, with two-lift telescopic gasholder and connections, for the Gas Co. Specifications and drawings may be seen on application to Thomas Newbigging & Son, engineers, 5 Norfolk Street, Manchester, and a copy of bill of quantities may be obtained from the Engineers on deposit of £2 2s.

IRON AND STEEL.

Mar. 30. Manchester.—Two 36-in. sluices, with cast-iron connecting pieces and shields, for the Corporation waterworks. Particulars may be obtained on application to the Secretary, Waterworks Offices, Town Hall, Manchester, on payment of £1 rs. Tenders must be delivered to Wm. Henry Talbot, town clerk, Town Hall, Manchester, not later than Mar. 30.

April 2. Haslemere.—Cast-iron cylinders, pipes, valves, hydrants, &c., for the Hambledon Rural D. Council. Copies of the specification and form of tender can be obtained at the offices of R. B. Grantham & Son, 23, Northumberland Avenue, London, W.C., on payment of a deposit of £2 2s. Sealed tenders, which must be on the prescribed form and endorsed "Haslemere Waterworks," must be sent, addressed to Ferdinand Smallpiece, clerk of the Council, Guildford, on or before April 2.

April 3. London, W.—About 200 tons of girder work and other steel and iron work of British manufacture, for the Great Western Railway. Plans and specification may be seen and forms of tender and bills of quantities obtained at the office of the Engineer at Paddington Station between 10 and 4. Tenders, marked outside "Tender for Girder Work," must be sent to G. K. Mills, secy., Paddington Station, London, by April 3.

April 3. Christiania.—Steel plates, for the Norwegian State Railways. Sealed tenders, marked "Anbud paa Leyerance af Staalplader," should be addressed to "Maskiningenrens Kontor, Bispesgaden 12, Christiania," where they will be received up to 3 p.m. on April 3. The steel plates required must be of the best mild steel. The quantity is divided into twenty-three lots of varying sizes and thicknesses. Prices are to be quoted in kroner per kilog. for each lot, delivered free at the State railway works yard in Christiania. Customs duty will be refunded to the deliverer if the plates are received in good condition. Tenders are to state when the goods can be delivered; great importance is attached to speedy delivery. Conditions of tender (in Norwegian) and drawing may be inspected at the offices of the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall Street, London, E.C.

April 3. Belfast.—Enlargement of a cast-iron water tank at Ormeau Avenue Baths, and alternative tenders for the erection of a new tank. Specification and form of tender may be obtained on application at the City Surveyor's Office. Sealed tenders, endorsed "Tender for Storage Tank," must be sent in to R. Meyer, chief clerk, by April 3.

April 3. Orpington.—Wire fences, &c., at the sides of the approach road from the existing hospital to the small-pox hospital at Crofton Heath, Orpington, Kent, for the Bromley and Croydon Joint Hospital Board, in accordance with the plan and specification, which may be seen during office hours at the Board's Offices. Tenders, to be made on the prescribed form, which may be obtained from the Clerk, must be delivered at the office of the Board, Park House, Bromley, by 3 p.m. on April 3.

April 4. London, S.W.—Supply and erection of wrought iron boundary fencing at Bethnal Green Gardens, N.E., for the London County Council. Persons desiring to submit tenders may inspect the drawing and obtain the specification, bill of quantities, form of tender, and other particulars at the Parks Department, 11, Regent Street, S.W. Tenders must be upon the official forms, and the printed instructions contained therein must be strictly complied with. Fair wages clause. Each tender is to be delivered at the County Hall, in a sealed cover addressed to the Clerk of the London County Council, Spring Gardens, S.W., and marked "Tenders for wrought-iron boundary fencing, Bethnal Green Gardens." No tender will be received after 10 a.m. on April 4.

April 4. Sunderland.—Steel, copper and cast-iron pipes, for the Corporation, for the extension of their Hylton Road Electricity Station. The specification and form of tender can be obtained on application to the borough electrical engineer, John F. C. Snell, M.I.C.E., Town Hall, Sunderland, and on payment of a deposit of £1 rs. Sealed tenders, addressed to the "Chairman of the Electricity and Lighting Committee," Town Hall, Sunderland, must be endorsed "Steam and other Pipes," and delivered at the Town Clerk's Office not later than noon on April 4.

April 7. Wishaw.—370 tons or thereby of 12-in. cast-iron gas pipes, with the necessary specials, drip-boxes and valves, for the Town Council. Also for the cutting and filling of the track for the laying of the above pipes. Plans of the proposed pipe track can be seen and forms of tender can be obtained on application to P. B. Watson, city engineer, Wishaw. Tenders to be lodged with John Logan, town clerk, Wishaw, not later than April 7.

April 9. Lockerbie.—Steel and iron work required in the renewal of roof over Dumfries Dock Lines, at Lockerbie Station, for the Caledonian Railway Co. Drawings may be seen at the office of the Company's District Engineer, Princess Street Station, Edinburgh, where copies of the specification and schedule may be obtained on payment of £2 2s. Sealed tenders, endorsed "Tender for Steel and Iron Work required in the renewal of the roof over Dumfries Dock Lines, Lockerbie Station," to be lodged with J. Blackburn, secretary, Caledonian Railway Company's Offices, 302, Buchanan Street, Glasgow, by April 9.

April 25. Adelaide.—For the supply of the following materials, delivered in bond, on wharf, Port Adelaide, wharfage to be paid by the contractor:—33 best mild steel boiler plates; 19 best mild steel smokebox tube plates for flanging (eight drawings, 1s. each); 10 copper tube plates (five drawings, 1s. each); 1,450 solid-drawn best toughened copper tubes; 25 solid-drawn best copper pipes; 200 volute springs (one drawing, 1s.); 12 best steel straight axle forgings (one drawing, 1s. 6d.); 19 bars channel steel (two drawings, 1s. each); 93 bars angles steel (two drawings, 1s. each); 340 mild steel plates; 150ft. of iron chain; 300 private locks (one drawing, 1s.); 281 solid-drawn mild steel tubes. Specifications may be seen and forms of tender obtained at the Supply and Tender Board Office, and the office of the Chief Mechanical Engineer, Islington, South Australia; specifications may also be seen at the office of the Agent-General for South Australia, 28, Bishopsgate Street Without, London, E.C. Copies of indent, with specifications complete (13s. each), and drawings may be obtained at the Chief Mechanical Engineer's Office, Islington, South Australia. Date of delivery, as well as the names of manufacturers of the materials tendered for, must be distinctly stated in each tender. The materials are subject to the inspection, test and approval of the Government Inspecting Engineer in London, or the Chief Mechanical Engineer in Adelaide. The expenses of the inspecting engineer will be paid by the Agent-General, London (except in cases as specified), who will also advance 75 per cent. on the contract on receipt of bills of lading, insurance policy and the usual shipping documents, accompanied by the certificate of the inspecting engineer; and the balance of the contract will be paid in Adelaide or London, at the option of the contractor, upon satisfactory delivery of the materials. Successful tenderers will be required to make a deposit equal to 5 per cent. of the total value of their accepted tender as security. Tenders, which should be endorsed "Tender for Railway Materials," will be received at the Supply and Tender Board Office, Adelaide, up till 3 p.m. on April 25.

PAINTING AND PLUMBING.

Mar. 31. Frodingham.—150 cwt. of lead pipes ranging from 1/2 in. to 1 in. in diameter, and for plumber's solder, for the Brumby and Frodingham Water Supply. Forms of tender may be obtained from J. Green, surveyor, Council Office, Frodingham, Doncaster, on payment of a deposit of 10s. Sealed tenders, on the forms supplied, endorsed "Tender for Pipes," must be delivered to G. S. Sowter, clerk to the Council, Brigg, by Mar. 31.

Mar. 31. Penrith.—Painting the public street lamps, for the Urban D. Council. Particulars may be obtained on application to Shaul, Gas Works, Penrith. Sealed tenders, endorsed "Lamp Painting," must be delivered to the Clerk, Town Hall, Penrith, by Mar. 31.

Mar. 31. Barrow-in-Furness.—Cleaning, painting, papering, &c., at Biggar Bank Pavilion, and at the caretaker's house, Holker Street School. Quantities may be obtained on application at the Borough Engineer's Office. Tenders to be sent to C. F. Preston, town clerk, Town Hall, Barrow-in-Furness, by noon on Mar. 31.

April 4. London, N.W.—Internal and external cleaning and painting works at the North-Western Fever Hospital, Lawn Road, Hampstead, N.W., for the Metropolitan Asylums Board, in accordance with specification prepared by W. T. Hatch, M.I.C.E., M.I.M.E., engineer-in-chief. Specification, bill of quantities, condition of contract and form of tender may be inspected at the office of the Board, Embankment, London, E.C., and bill of quantities and form of tender can be obtained upon payment of a deposit of £1. Tenders, addressed as noted on the form, must be delivered at the office of the Board not later than 10 a.m. on April 4.

April 5. Cairo.—Paint brushes, &c. Tenders, accompanied by stamped paper of 30 millièmes, must be sent by registered post to the Directeur Général, Chemins de fer de l'Etat, Cairo, before April 5. Specification, &c., and form of tender may be obtained on application to Col. J. H. Western, R.E., Queen Anne's Chambers, Westminster, S.W., on payment of 2s. per copy. A copy of the specification may be seen at 73, Basinghall Street, E.C.

April 12. Warrington.—Painting part of the outside wood and ironwork at the Lancashire County Asylum. Persons desirous of tendering must measure up the work themselves, between 9 and 12 a.m. and 2 to 5 p.m. on any of the following days—the 28th, 29th and 30th inst. Tenders must be made upon forms, which can be obtained from H. Ellis, clerk, and must be delivered at the Asylum not later than 8 a.m. on April 12, addressed to "The Chairman," and endorsed "Tender for Painting."

April 12. Winchfield.—Supply of 5 tons of sheet lead (5 lbs. to the foot), carriage paid, to the Workhouse. Tenders, marked "Tenders for Lead," must reach W. H. Wright, clerk to the Guardians, Odiham, Hants, not later than 9 o'clock on April 12.

No date. Oldham.—Painting and colouring of a number of schools. Copies of specifications may be obtained on application to me, the undersigned, J. Bennie, secy., Education Offices, Union Street West, Oldham.

ROADS AND CARTAGE.

Mar. 29. Thakeham.—Supply and cartage of road material for the repair of highways in the parishes of Ashington, Coldwaltham, Findon, Greatham, Hardham, North Stoke, Pulborough, Thakeham, Warminghurst, Washington, West Chiltington and Wiston, for the Rural D. Council. Full particulars and forms of tender may be obtained at the Clerk's Office at Storrington. Tenders, marked "Supply," "Supply and Cartage" or "Cartage," as the case may be, must be sent so as to reach Arthur Flowers, clerk, Storrington, by Mar. 29.

Mar. 29. Croydon.—Private street works in Lower Road, Coulsdon; Little Roke Road, Coulsdon, and Mayfield Road, Sanderstead, for the Rural D. Council. Plans, sections and specifications, prepared by the Council's surveyor, R. M. Chart, F.S.I., can be inspected and

forms of tender obtained at his office, Town Hall, Croydon on payment of £5. Sealed tenders, endorsed "Tender for Private Street Works," must be delivered to E. J. Gowen, clerk to the Council, Town Hall, Croydon, before noon on Mar. 29.

Mar. 29. Hampton.—Supply of the following materials, for the Urban D. Council:—Hand-broken blue Guernsey, quensis, basalt, or Clee Hill stone; granite chippings; broken Kentish brown flints, and Derbyshire limestone marble tar-paving material. Forms of tender, conditions and all particulars can be obtained at the offices of the Council, Hampton, Middlesex, where tenders duly filled up must be delivered, sealed and endorsed "Tender for —," not later than 4 p.m. on Mar. 29.

Mar. 30. Northwood.—270 tons of hard clinker ashes or pottery refuse and 100 yds. lineal of 4 in. land drains. Specification and quantities may be obtained from W. Louis Carr, surveyor, Council Offices, Northwood. Tenders, properly endorsed, are to be delivered to Edmund P. Abbott, clerk, Northwood, R.S.O., Middlesex, by Mar. 30.

Mar. 30. Newmarket.—Carting a quantity of flints from the pits at the Sewage Farm, Newmarket, on to the several highways in the urban district, in accordance with the form of tender and schedule, which can be seen at the Surveyor's Office, Town Hall, Newmarket. Tenders, endorsed "Carting," to be delivered to S. J. Ennion, clerk to the Council, Deva Chambers, High Street, Newmarket, by Mar. 30.

Mar. 31. New Romney.—For the supply of 420 tons of 1 1/2 in. quartzite; 150 yds. of Kent rag (broken); 150 yds. of double screened gravel. Sealed tenders, endorsed "Tender for Stone," must be sent to Albert E. Hayward, borough surveyor, New Romney, by Mar. 31.

Mar. 31. Bexhill.—Making-up the following streets, for the Corporation:—Mitten Road, Sidley Street, Suffolk Road (part) and North Road (part). Plans may be seen and specification, bills of quantities and forms of tender obtained upon application to the Borough Surveyor, George Ball, A.M.I.C.E., Town Hall, upon payment of £1 rs. Tenders, endorsed "Private Street Works," must be received by T. E. Rodgers, town clerk, Town Hall, Bexhill, not later than noon on Mar. 31.

Mar. 31. Faversham.—Supply of the following materials, for the Corporation:—Portland cement, double-distilled tar and crushed sea shell for the year ending Mar. 31, 1907. Particulars and forms of tender can be obtained from and a sample of the crushed shell seen at the office of the borough surveyor, S. Percy Andrews, 20, West Street, Faversham. Tenders, in sealed envelopes, endorsed "Tender for Materials," to be sent to Allan Tassell, town clerk, 20, West Street, Faversham, by Mar. 31.

April 3. Caerphilly.—Supply of limestone, for the Urban D. Council. Specification can be seen and form of tender obtained at the Council Offices, Caerphilly. Sealed tenders, endorsed "Tender for Limestone," to be addressed to the Chairman of the Council, and delivered at the Council Offices, Caerphilly, not later than April 3.

April 4. Bromsgrove.—About 600 tons of 2 1/2 in. broken granite, delivered free at Bromsgrove Station. Tenders and small samples to be sent to F. J. Russon, clerk, Urban D. Council, New Road, Bromsgrove, by April 4.

April 4. Tenterden.—Supplying and delivering the following materials:—1,290 cub. yds. Kent rag, 2,560 cub. yds. stone cliff rock, 600 cub. yds. flints, 1,000 cub. yds. granite, 170 tons beach. Further particulars and forms of tender may be obtained of W. L. C. Turner, district surveyor, Tenterden, Kent. Tenders to be sent to J. Munn Mace, clerk, Tenterden, by April 4.

April 5. Fenton.—Macadam, for the Urban D. Council. Forms of tender will be forwarded on application. Tenders to be delivered to S. A. Goodall, surveyor, Town Hall, Fenton, by April 5.

April 5. Leeds.—Paving and flagging the following streets:—Hamilton Terrace, Back Hillcrest Avenue, Hillcrest Place, Tempest Road, Maud Place, Back Burlington Road, Colenso Mount, Back Colenso Mount, Cleveleys Mount, Cleveleys Street, Cleveleys Terrace and Cleveleys Avenue. Plans and specifications may be seen at the City Engineer's Office, Municipal Buildings. Tenders, on forms supplied, must be sent to the Town Clerk's Office, Town Hall, addressed to the Highways Committee, and endorsed "Tender for Private Street Works," by April 5.

April 6. Barcelona.—Paving works at the upset price of 260,375 pesetas (about £8,877), in accordance with conditions set forth in the "Gaceta de Madrid." A deposit of 13,018 pesetas (about £443) is required to qualify any tender. Tenders will be opened simultaneously at the "Casas Consistoriales," Barcelona, and at the Directorate General of Municipal Administration, Madrid, on April 6.

April 7. Shelmersdale.—Supply of the following materials, for the Urban D. Council. About 90 tons of best and seconds lime, to be delivered at the railway station; 500 tons of best setts, to be not less than 6 ins. or more than 6 ins. deep, by form 5 ins. to 6 ins. wide; also for 6 ins. kerbs, and 6 ins. runners. For cart material, &c., with one or more horses, with competent drivers above the age of eighteen years, at per day; also at per ton. Tenders to be endorsed "Tenders for Material," and sent to E. Huntington, surveyor, by April 7.

April 7. Blean.—Road materials and road maintenance, for the Rural D. Council. Full particulars as to the terms of the contracts, and any other information, may be obtained of the acting district surveyor, H. Elliott, Rose Cottage, Herne Street, near Canterbury. Forms of tender may be obtained of the Clerk, and all tenders not on such forms will be rejected. Sealed tenders, addressed to the Urban D. Council, marked "Tender for Materials," or "Tender for Road Maintenance," to be delivered at the Clerk's Office, 39, Castle Street, Canterbury, on or before April 7.

April 9. Sevenoaks.—*Levelling, metalling, kerbing, tar-paving, footpaths, channelling and making good of The Drive, Sevenoaks.* Plans, sections, detail drawings and specifications may be inspected, forms of tender and further information obtained at the office of S. Towilson, A.M.I.C.E., surveyor to the Council, upon payment of a cash deposit of £5. Tenders must be on the forms supplied, and sent enclosed in an envelope, endorsed "Tender for Street Works," to Herbert J. Thompson, clerk to the Council, Urban Council Offices, Argyle Road, Sevenoaks, by April 9.

April 9. Kingston.—*Hauling stone and other materials for the repair of the roads, for the Rural D. Council.* Estimates of quantities and particulars of the several roads may be obtained from the surveyor, Francis Exton, Broxwood, Pembridge, who will supply forms of tender. Sealed tenders to be delivered to Anthony Temple, clerk to the Council, Kingston, by April 9.

April 11. Bosmere and Claydon.—*Granite picked stones and pit stones, for the Rural D. Council, inclusive or exclusive of carriage of the same to the several parishes and stations in their district, namely:—Parishes: Ashbocking, Ashfield-cum-Thorpe, Barham, Barking, Battisford, Bayham, Blakenham (Great), Blakenham (Little), Bramford, Brickett, Claydon Coddenham, Creeting St. Mary, Crowfield, Debenham, Flowton, Framsen, Gosbeck, Helmingham, Hemingstone, Henley, Mickfield, Needham Market, Nettlestead, Offton, Petteugh, Ringshall, Somersham, Stonham Aspal, Stonham (Earl), Stonham (Little), Swilland, Whitton, Willingham, Winstan. Stations: Claydon, Bramford, Needham Market, Westerfield.* Forms of tender and particulars of estimated quantities, &c., may be had from George Fiske, surveyor to the Council, Red House, Coddenham, Ipswich. Tenders must be sent by post to the Clerk of the Council at 6, Providence Street, Ipswich, not later than 9 a.m. on April 11.

April 11. Horsham.—*Granite or other approved stone and flints (total, about 7,000 cub. yds.), delivered to the various railway stations in the district.* Also for cartage of materials from railway stations to the roadsides, for the Rural D. Council. Forms of tender and further information to be obtained of the surveyor, William Dengate, 58, Park Street, Horsham, to whom prepaid samples must be sent. Tenders, marked "Highways Tender," to reach A. C. Coole, clerk to the Council, 9, Carfax, Horsham, by April 11.

April 12. Treherbert.—*Private street works, for the Rhondda Urban D. Council.* Plans may be seen and specification and forms of tender obtained at the Public Offices, Pentre, on depositing the sum of £1 is. Fair wages clause. Sealed tenders, endorsed as the case may be, must be delivered addressed to the Chairman of the Council, Council Offices, Pentre, by April 12.

April 14. Hastings.—*Cartage of 200 yds. of unbroken stone from the quarry at Gatehurst Farm, Pett, to various places, for the Rural D. Council.* Forms of tender, which only can be received, may be obtained from the district surveyor, D. Paine, Stonelynk Farm, Fairlight, Hastings. Tenders to be forwarded to Arthur R. Inskip, clerk, 11, Wellington Street, Hastings, by noon on April 14.

No date. Wem.—*Granite, basalt and slag.* Cartage of road materials from the various wharfs and stations. Forms of tender, with all particulars and conditions, can be obtained from Percy R. Francis, surveyor, Wem, Rural D. Council, Wem.

SANITARY.

Mar. 29. Chippenham.—*Sewage pumping plant, consisting of two oil engines and two centrifugal pumps at the sewage pumping station, for the Urban D. Council.* Particulars may be obtained from A. E. Adams, A.M.I.M.E., borough engineer, Chippenham, Wilts, upon payment of £1 is. Tenders to be sent in not later than Mar. 29.

Mar. 30. Hull.—*Sewer along the north side of the Town Hall, between Lowgate and Quay Street.* Forms of tender and other particulars may be obtained at the City Engineer's Office. Tenders, endorsed "Tender for Sewer," are to be addressed to the Chairman of the Works Committee, and delivered at the Town Clerk's Office before noon on Mar. 30.

Mar. 31. Barrow-in-Furness.—*Alterations and improvements required at the Thwaite Street and Rawlinson Street school conveniences.* Bills of quantities may be obtained at the Borough Engineer's Office, Town Hall. Tenders to be delivered not later than noon on Mar. 31.

Mar. 31. Greetland.—*Bacteriological tanks, filters, carriers and other appurtenant works.* Drawings may be seen and copies of the specification, bill of quantities and form of tender may be obtained at the office of the engineers, K. E. W. Berrington & Son, Bank Buildings, Wolverhampton, or at the Council Offices, Greetland, upon payment of £5 ss. Sealed tenders, upon the forms supplied, endorsed "Tender for Sewage Tanks and Filters," must be delivered at the office of A. T. Longbotham, clerk to the Council, 41, Carlton Street, Halifax.

April 2. Cawston.—*Drainage work for the Aylsham Rural D. Council.* Specification can be seen, and particulars obtained from Henry J. Gidney, clerk to the council, Aylsham, to whom tenders must be sent by April 2.

April 2. Burley-in-Wharfedale.—*Alterations and additions to the sewage-disposal works, including the building of a pumping station fitted with oil engines, centrifugal pumps, liquefying tanks and continuous filters, in accordance with the plans and specifications prepared by the engineers, Haller & Macbell.* Plans and specifications may be seen and form of tender and bills of quantities obtained at the offices of the Engineers, Corporation Chambers, Dewsbury, on the payment of a deposit of £2 ss. Seated tenders, on form supplied, and endorsed "Sewage-disposal Works," must be delivered at the Clerk's Office, 5, Ramsey Terrace, Otley, not later than noon on April 2.

April 3. Leigh.—*9-in. stoneware pipe sewer, about 233 yds. in length, near the Green, Leigh, Tonbridge.*

Drawing and specification may be seen at the clerk's office. Sealed tenders, and endorsed outside, must be sent to George F. Carnell, clerk of the Rural D. Council, Sevenoaks, by April 3.

April 4. Watford.—*Re-drainage of houses, 1-47, Fearnley Street, for the Watford Urban D. Council.* Persons desirous of tendering for the work may see the drawings and specification, &c., at the offices of the Council, 14, High Street, Watford. Sealed tenders, endorsed "Tender for Fearnley Street Drainage," must be delivered to H. Morten Turner, clerk to the Council, Council Offices, Watford, by April 4.

April 6. Renfrew.—*Scavenging of the district, which comprises part of Renfrew parish, including Scotstoun, Scotstounhill, Jordanhill, Anniesland, and Yoker, all on the north side of the River Clyde, for one or two years, commencing May 16, 1906.* Full information and forms of specification can be had from J. R. Parker, clerk, 76, Fulbar Street, Renfrew, with whom sealed tenders, marked "Offer for Scavenging," must be lodged not later than noon on April 6.

April 7. Monmouth.—*Works of drainage, with necessary manholes, &c., at the union workhouse, for the guardians of the poor of the Monmouth Poor Law Union.* Plans, specification and conditions of contract may be seen and form of tender obtained at the Union Offices, Monmouth, or at the offices of Ernest G. Davies, M.S.A., Hereford and Monmouth, architect to the Guardians. Sealed tenders, which must be on the form obtainable as above and endorsed "Union Drainage," to be sent to T. A. Williams, clerk to the Guardians, Union Offices, Monmouth, by April 5.

TIMBER.

April 2. Stockholm.—*Supply of 1,900,000 kilos. of creosote oil for the use of the Swedish State Railways.* 1,500,000 kilos. are to be delivered at Motala, in about five equal quantities, between 15th May and 15th July, and the remaining 400,000 kilos. at Töreboda during July. With the tenders a sample of at least two litres of the oil must be supplied. A copy of the specification and form of tender (in Swedish) together with the special regulations for testing creosote oil, may be inspected at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall Street, London, E.C. Sealed tenders, marked "Anbud a Kreosotolja," should be addressed to "Kungl. Järnvägsstyrelsens Registrator, Stockholm," where they will be received up to noon on April 2.

April 2. Manchester.—*Supply of the following timber during twelve months ending April 30, 1907, for the Lancashire and Yorkshire Railway Co.:—Crossing timber, fencing (larch), sleepers.* Further particulars and forms of tender may be obtained on application to—Duffin, stores superintendent, Osborne Street, Manchester. Tenders, properly endorsed and addressed to the directors, must be lodged with R. C. Irwin, secretary, Hunt's Bank, Manchester, by 10 a.m. on April 2. Separate forms of tender will be provided for each contract; parties applying are therefore requested to state the particular contract for which they propose to submit tenders.

April 3. London, S.W.—*Oregon pine, for the Crown Agents for the Colonies, acting on behalf of the Administration of the Central South African Railways, about 97,000 cub. ft. of Oregon pine, known on the Liverpool market as "Select Quality" are required.* Forms of tender, with specifications and conditions of contract, may be obtained on application at the office of the Crown Agents for the Colonies, Whitehall Gardens, London, S.W., between 10 and 4 (Saturdays 10 to 1), on payment of a deposit of £1 per copy. Tenders to be delivered in sealed envelopes, addressed to the Crown Agents for the Colonies, endorsed "Tender for Oregon Pine, C.S.A.R.," by noon on April 3.

April 4. Glasgow.—*For the supply of ash and hickory handles for the Corporation.* Specification and form of tender can be obtained on application to James Dalrymple, general manager, 46, Bath Street, Glasgow. Sealed tenders, marked "Tramways—Tender for —," must be lodged with A. W. Miles, town clerk, City Chambers, Glasgow, by 10 a.m. on April 4.

April 4. Gravesend.—*70 fathoms of best Swedish yellow deal and batten ends (whitewood and boards will not be accepted) to be delivered into the Wood Yard of the Workhouse, Arthur Street, Gravesend, by July 2.* Tenders must be made on forms, which will be supplied on application. The Guardians do not bind themselves to accept the lowest or any tender. Tenders marked "Firewood," are to be sent to William John King, clerk to the Guardians, Town Hall Buildings, Gravesend, not later than 4 p.m. on April 4.

MISCELLANEOUS.

Mar. 29. London, E.C.—*Tools and stores, for the Burma Railways Co., Ltd.* Specifications and forms of tender may be obtained at the Company's Offices, 199, Graham House, Old Broad Street, E.C. For each specification a fee of ros. will be charged which will not be returned. Tenders, enclosed in sealed envelopes and marked "Tender for Miscellaneous Tools and Stores," must be delivered not later than noon on Mar. 29.

Mar. 29. Hampton.—*Supply of the following material, for the Urban D. Council, for one year:—Hand-broken blue Guernsey, quonset, basalt or Cleve Hill stone; granite chippings; broken Kentish brown flints and Derbyshire limestone marble tar-paving material.* Forms of tender, conditions and all particulars can be obtained at the offices of the Council, Hampton, Middlesex, where tenders, duly filled up, must be delivered, sealed and endorsed "Tender for —," not later than 4 p.m. on Mar. 29.

Mar. 30. Manchester.—*Supply of the following materials for the Corporation waterworks:—Sluice valves, manhole frames, firecock boxes, &c., lead piping, oil and paints, hydraulic valves and fittings.* Particulars may be obtained on application to the Secretary, Waterworks Offices, Town Hall, Manchester. Tenders must be delivered to William Henry Talbot, town clerk, Town Hall, Manchester, 1.01 later than Mar. 30.

Mar. 31. Wath-upon-Deane.—*Supply of the following materials, for the Urban D. Council:—Granite and whinstone macadam; hand-broken furnace slag; machine-broken turnace slag; unbroken slag; limestone screenings; slag screenings, and lime.* Particulars and forms of tender may be obtained from H. Cecil Poole, engineer and surveyor, Town Hall, Wath-upon-Deane, to whom sealed tenders should be forwarded, endorsed "Tender for Materials," by Mar. 31.

Mar. 31. Thornaby-on-Tees.—*Supply of the following materials:—Broken whinstone; whinstone setts; stoneware pipes; York curb; cement; smithwork; lamp posts; gulleys; castings; picks; shovels; brooms; coals; pitch, tar; horse hire; cartage; disinfectants, &c.* Specifications may now be seen and forms of tender and other particulars obtained on application at the Borough Engineer's Office, Town Hall. Sealed tenders, properly endorsed as directed on tender forms, must be delivered at the Town Clerk's Office, Town Hall, Thornaby-on-Tees, not later than 10 a.m. on Mar. 31. No tender will be considered except on the forms provided.

Mar. 31. Nottingham.—*Construction of new tramways.* Contract No. 1 will comprise the supply and delivery of 450 tons of steel tramrails and 21 tons of fish-plates. Contract No. 2 will comprise the supply and delivery of 250 tramway poles and fittings. Contract No. 3 will comprise the supply and delivery of 10,000 tons of 3-in. by 3-in. granite setts. Drawings may be seen and copies of the specifications and forms of tender may be obtained on applying to Arthur Brown, M.I.C.E., city engineer, Nottingham, on payment of a deposit of £1 is. for each contract. Fair wages clause. Sealed tenders, endorsed "Tramrails," "Tramway Poles," or "Granite Setts," as the case may be, are to be delivered to Samuel G. Johnson, town clerk, Guildhall, Nottingham, by Mar. 31.

Mar. 31. Swinton.—*Supply of the following materials, for the Urban D. Council:—Welsh granite macadam; Welsh granite 6-in. by 3-in. setts; grit setts; flags and curbs; limestone chippings; brushes; lime, and 2-in. artificial (concrete) flags.* Specifications, forms of tender may be obtained on application to H. Entwistle, engineer and surveyor, Council Office, Swinton, Manchester. All tenders must be sent in the envelopes provided, endorsed "Tender for —," to W. T. Postlethwaite, clerk to the Council, Council Offices, Swinton, not later than Mar. 31.

April 3. Linton.—*Tools, gulleys and gratings, for the Rural D. Council.* Tenders to be delivered not later than noon on April 3, addressed to A. M. Cook, engineer and surveyor, Linton, Cambridgeshire.

April 3. Cork.—*Supply of the following stores, for the Harbour Commissioners:—Timber; iron; paints; oils; metal castings; nails; screws; files, &c., in accordance with printed forms prepared for same, which may be had on application at the Engineer's Office, Lapp's Quay, Cork.* A preference will be given to goods and materials of Irish manufacture. Tenders, marked "Tenders for —," to be deposited in the tender box provided for the purpose at the Commissioners' Offices, 9 and 10, Lapp's Quay, Cork, not later than 4 p.m. on April 3.

April 4. Herne Bay.—*Supply of the following material, for the Urban D. Council:—Disinfectants; stoneware pipes and stoneware goods; lias lime and Portland cement; tools, implements and general ironmongery; smith's works and repairs; gravel and flints, and castings.* Forms of tender, conditions and full particulars may be had on application to F. W. J. Palmer, surveyor to the Council, Town Hall, Herne Bay. Sealed tenders, endorsed "Tender for No. —," must be delivered to Joseph Jubb, clerk to the Council, Clerk's Office, Town Hall, Herne Bay, by noon on April 4.

April 7. Bedford.—*Two tip wagons for the removal of house refuse, two street watering vans and three general purpose carts, for the Corporation.* Full particulars can be obtained upon application to the Borough Surveyor, Town Hall, Bedford. Sealed tenders, endorsed "Tender for New Vans, &c.," and addressed to the Chairman of the Streets and Buildings Committee, to be delivered at the Borough Surveyor's Office by noon on April 7.

April 9. Edinburgh.—*Supply of the following materials for the Edinburgh and Leith Corporations' Gas Commissioners:—Oils and paints, timber, meters, wrought-iron tubes and fittings, cast-iron pipes and connections, gas fitters' stores, iron, steel and implements, iron castings, &c., &c., caseway repairs, required for their various undertakings during the year from Whitsunday.* Tender forms and all information can be had on application to the Chief Engineer and Manager, at the Gasworks, New Street. Offers must be lodged not later than 10 o'clock on April 9, in sealed envelopes, marked "Tender for Oils and Paint," and addressed to James M'G. Jack, clerk 25, Waterloo Place, Edinburgh.

April 10. Portsmouth.—*Supply of the following materials, for the Corporation:—Ballast, sand and grit; Portland cement; brooms and brushes; timber, &c.; and engine-room stores and general ironmongery.* The specification and printed form of tender with regard to each of the above items may be obtained at the Town Hall. Fair wages clause. Sealed tenders on the prescribed form, endorsed "Tender for —," are to be delivered to Alexander Hellard, town clerk, Town Hall, Portsmouth, not later than 10 a.m. on April 10.

April 11. Stoke-upon-Trent.—*Stores for the gas committee.* Particulars and form of tender may be obtained on application at the Gas Offices. Tenders to be sent in addressed to F. Geen, chairman of the Gas Committee, not later than April 11, sealed and endorsed "Tender for Stores."

April 12. Maidstone.—*Furniture and equipment, for the two new patients' blocks at the Kent County Lunatic Asylum, Barming Heath, near Maidstone.* Drawings, specifications and schedules may be seen at the office of W. J. Jennings, architect, 4, St. Margaret's Street, Canterbury, where copies of specifications and schedules may be obtained on depositing with him the sum of £5. Tenders in the form prescribed in the schedules are to be delivered to Francis R. Howlett, clerk to the Kent County Asylums Committee, 9, King Street, Maidstone, not later than 10 a.m. on April 12.

Builders' Notes.

Building Trade Inspectors.—The March report of the United Builders' Labourers' Union states that the society has received a communication from the Home Office asking for their views on the question of building trade inspection. This necessary reform, it is hoped, is now within measurable distance of accomplishment.

Evading the Fair Contract Clause.—The workmen in the contracting trades at Bradford have persuaded themselves and the local trades council that they have a serious grievance in the shape of systematic boycotting of some old men by the masters, and evasion of the fair contracts clause. Under the auspices of the Bradford Trades Council a special conference of building trade employees was held on Friday night last, when it was determined to form a vigilance committee to get up details of cases of the kind suggested and to bring the matter to the attention of the city council through the socialist and labour members of the body. 8½

Limmer Asphalte Paving Co.—At the annual general meeting of this company Mr. H. Holloway remarked that the turnover for the past year had been a record one. The bonus of 5 per cent., which for some years had been paid in addition to the 10 per cent. dividend, was not, however, to be paid, because of the recent increase in capital. Previously the capital was small and the profits correspondingly large, and the directors considered that it would be an advantage to all concerned if instead of a small capital and high dividend they had an enlarged capital upon which a moderate return was made. Despite the excessive competition and the increase in the share capital from £30,000 to £50,000, the profits admitted of the payment of a dividend of 10 per cent., at the same time adding £1,000 to the reserve and carrying forward £2,000 to the next account.

The Annual Dinner of the Norwich and District Master Builders' Association was held last week, the chair being occupied by the newly-elected president, Mr. John Hurn. In giving the toast of "The Association," Mr. R. Jewson said it was with dismay and surprise that he read the decision of the town council last December to take upon itself a large contract which, in his opinion, was legitimately the work of one of the master builders of the city. He did not think the council could justify that decision on the score of efficiency. Although they were all proud of the city engineer, yet, with his multitudinous duties, he could hardly look after a large contract more efficiently than some of the members of the Master Builders' Association. The reason the contract was undertaken by the council was because they wished to find some work for the unemployed. He did not know what the inference was. He supposed the building was going to be erected by the expenditure of a certain amount of labour, whereas it was apparently thought that the master builders would erect it by machinery. He could not see any difference between giving the master builders a chance to put on unemployed labour, or leaving it to the city engineer to do so. At any rate the effect seemed to be that the deserving labour had possibly to be thrown on to the unemployed, while those workmen who were perhaps not quite so deserving were given employment by the city engineer. They did not wish to pass a vote of censure upon the town council, but he suggested to the master builders that the time had come when they should have a representative of their own on the council to state their views irrespective of party politics.

The National Engineering and General Trades' Exhibition is to be held at Bingley Hall, Birmingham, from to-morrow, March 29th, to June 9th next. This exhibition will be of the same character as previous exhibitions held under the same management, the last having been in 1904.

Building Trades Conciliation Board.—The Northern Centre of the Building Trades' Conciliation Boards, embracing Lancashire, Yorkshire, Cheshire and the other counties in the North of England, recently met at Leeds. At present this centre consists of twelve employers and two members from six trade-union societies, the latter number being composed of three joiners, two bricklayers and one mason. So far the plumbers and plasterers are outside the organization, but they are expected at no distant date to be included. Mr. Wilson, of Middlesbrough, was appointed president, and Messrs. Tomlinson (Preston) and Gould (Hull) joint secretaries. The annual meeting will be held in May. The local conciliation board is expected to meet shortly.

Tenders.

Addressed postcards on which lists of tenders may be stated will be sent post free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Fetter Lane, E.C. Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Belfast.—For carrying out the following works at the Abbey Sanatorium, for the Guardians:—(a) Erecting four one-storeyed pavilions, laying water-mains, constructing drains, walks, tanks, &c.; (b) erecting a two-storeyed hospital for a mortuary, and also for additions and alterations to administrative buildings:—

	Pavilions, &c. Hospital, &c.
R. Colwell	£11,300 ... £13,756
W. Geddis	10,696 ... —
J. Lees	10,450 ... 12,850
Courtney & Co.	10,377 ... 12,348
McRoberts & Armstrong	10,350 ... 12,000
H. Lavery & Sons	10,342 ... 12,584
W. J. Campbell & Son	10,290 ... 12,640
J. Henry & Son	10,100 ... 11,900
McLaughlin & Harvey	9,890 ... 11,450
J. Kidd	9,868 ... 13,350
R. Corry & Co.	9,600 ... 11,250
H. & J. Martin	9,593 ... 11,472
J. & R. Thompson	9,598 ... 11,697
H. Keith	9,844 ... 11,800
J. & W. Stewart	9,475 ... 11,245
W. Dowling*	9,432 ... 10,928

* Accepted. [All of Belfast.]

Carlisle.—For the erection of a small-op hospital, administrative block, mortuary, &c., at Belle Vue, for the Corporation. Mr. Henry C. Marks, M.I.C.E., city engineer and surveyor:—

J. Baty & Sons	£3,642 10 0
W. Latimer	3,484 2 6
G. Hill	3,386 16 6
W. Martin	3,365 0 0
W. Baty	3,305 7 7
J. Beatty	3,300 10 0
J. Laing & Sons	3,296 0 0
J. H. Reed & Sons	3,293 14 10
J. & R. Bell	3,281 0 0
E. J. Hill	3,263 17 7
J. Beatty	3,256 9 7
J. Hindson,* Finkle Street, Carlisle	3,173 0 0

* Accepted.

Consett.—For the erection of a Baptist church and schools. Messrs. G. Baines & Son, architects, 5, Clement's Inn, Strand, W.C.—

	A.	B.
Middlemiss Brothers	£3,188 2 8	£1,794 0 8
E. R. Davison	2,922 8 7	1,530 17 3
J. B. Stott	2,900 0 0	1,370 0 0
North Durham Stone Co.	2,777 8 7	1,537 17 7
E. Taylor	2,731 12 6	1,485 10 1
J. Robson	2,720 0 0	1,570 0 0
J. Guthrie & Son*	2,639 8 6	1,343 14 0
W. Ayton & Sons	2,598 8 4	1,595 9 5

* Accepted with modifications for estimate A.

Gorseinon.—For the erection and completion of twenty houses on Gorswaddan estate. Mr. Charles T. Ruthen, architect, Bank Chambers, Heathfield Street, Swansea:—

T. D. Jones, Swansea	£4,500 0 0
A. & A. Thomas, Pontardulais	4,300 0 0
W. Rogers & Sons, Ammanford	4,180 0 0
Thomas & Jones, Morriston	4,100 0 0
Morgan & Gough	3,990 0 0
Thomas Brothers, Pontardawe	3,980 0 0
W. Lacey, Swansea	3,875 15 0
H. Billings, Swansea	3,610 0 0
Fuge & Rosser, Swansea	3,510 10 0
R. Thomas & Sons, Loughor	3,387 0 0
J. Fry	3,380 0 0
B. & D. C. Jones	3,260 0 0
T. Lewis*	3,200 0 0

* Accepted. [Rest of Gorseinon.]

Hull.—Accepted for the erection of a new post office:—

Arnold & Son, Doncaster.

Llandudno.—For the erection of a county school. Mr.

G. A. Humphreys, F.R.I.B.A., architect, Llandudno:—	
T. & J. Owen	£9,560 3 10
E. Hughes	8,782 0 0
E. Jones & Son, Plas Dolydd	8,615 0 0
T. Huxley, Malpas	7,950 0 2
J. T. Jones, Cefn Ruabon	7,883 0 0
J. Dalow & Son, Blackheath	7,823 0 0
H. Smith, Kidderminster	7,760 0 0
T. Jones	7,722 0 0
W. Gradwell & Co., Barrow-in-Furness	7,586 0 0
E. Owen	7,475 12 0
R. L. Roberts	7,345 0 0
G. Roberts & Brother	7,287 0 0
R. Costain & Sons, Liverpool	7,196 0 0
G. Roberts	7,155 0 0
Hughes & Stirling, Liverpool	6,986 0 0
H. Hughes*	6,362 0 0

* Accepted. [Rest of Llandudno.]

London, E.C.—For the Claremont Institute extension, White Lion Street, Finsbury. Mr. Alfred Conder, architect, Palace Chambers, Westminster. Quantities by Mr. Charles Blomfield, 40, Finsbury Square, E.C.:—

Hudson Brothers	£5,329
G. S. Williams & Son	5,072
McCormick & Son	4,987
L. & R. Roberts	4,986
H. Young	4,758
F. & H. F. Higgs	4,745
J. Grover & Son	4,738
E. Lawrance & Sons	4,685
W. Akers & Co.	4,675
Holloway Brothers	4,670
Chessum & Sons	4,395

Nottingham.—Accepted for the erection of a house at Edwalton Hill. Messrs. A. R. Calvert & W. R. Gleave, architects, 18, Low Pavement, Nottingham:—

F. W. Thompson & Son £1,372

Pantygwyr.—For the erection of a Baptist chapel, lecture hall, vestry and other premises in Glanbridan Avenue, for the Gorse Lane Baptist Church. Mr. Charles T. Ruthen, architect, Bank Chambers, Heathfield Street, Swansea:—

D. Davies, Cardiff	£5,564 0 0
J. & E. Weaver	5,240 0 0
L. Jenkins	5,182 0 0
J. Marles & Sons	5,052 0 0
C. Marles	5,000 0 0
G. Davies	4,993 4 7
J. & D. Jones	4,978 7 0
G. Mercer, Llanelly	4,968 0 0
T. Richards	4,800 0 0
H. Billings	4,800 0 0
J. Williams	4,750 0 0
Lloyd Brothers,* Argyle Steam	
Joinery Works	4,710 0 0

* Accepted. [Rest of Swansea.]

Poole.—For the erection of a new secondary school at Seldown, for the Education Committee. Mr. G. A. Bligh Livesay, architect, Fir Vale Chambers, Old Christchurch Road, Bournemouth:—

S. Brown & Sons	£11,400 0 0
George & Harding	10,847 0 0
W. E. Jones & Son	10,798 0 0
W. Hoare	10,729 0 0
Jenkins & Sons	10,318 0 0
W. J. Cross	10,095 0 0
Jesty & Baker	10,077 0 7
A. & F. Wilson	10,025 0 0
Miller & Sons	9,995 0 0
H. W. Pollard	9,800 0 0
Burt & Vick	9,840 0 0
Jones & Seward	9,495 0 0

Sketty (Swansea).—Accepted for the erection of fifteen houses in De-la-Becche Road. Mr. Charles T. Ruthen, architect, Bank Chambers, Heathfield Street, Swansea:—

J. Marles & Sons, Richardson Street Yard, Swansea £6,435

Soberton.—For the erection of an engine-house, boiler-house, machine shop, coal store, chimney-shaft, superintendent's house, cottages and other works at Soberton, Hants, for the Gosport Waterworks Co. Mr. E. T. Hildred, A.M.I.C.E., engineer:—

R. H. B. Neal, Ltd., Plymouth	£6,208
H. Jones, Southsea	5,945
Playfair & Toole, Southampton	5,848
C. M. Dash, Gosport	5,805
H. J. Sanders, Southampton	5,757
J. H. Vickers, Nottingham	5,699
F. Corke, Southsea	5,640
C. J. Lear & Sons, Gosport	5,593
J. Crockerell, Southsea	5,550
J. Croad, Gosport	5,365
H. Stevens & Co., Southampton	5,360
J. Hunt, Gosport	5,345
Jenkins & Sons, Southampton	5,287
H. Sweetland, Gosport	5,065
F. Osman,* Southampton	4,989

* Accepted.

Wallsend.—Accepted for the erection of a mortuary and urinal in Portugal Place, for the Corporation. Mr. G. Hollings, borough surveyor, Corporation Offices, Wallsend:—

J. T. Charlton, Elsdon Road, Gosforth £3,330 4 3

Warwick.—For the erection of a grand stand to seat 5,000, in Warwick Castle Park. Mr. Francis P. Trepses, architect Warwick. Quantities by the architect:—

Barnley, Birmingham	£2,875 0 0
G. F. Smith, Leamington	2,800 0 0
Harper, Birmingham	2,528 16 6
Glover & Sons, Warwick	2,457 0 0
Bailey, Leamington	2,250 0 0
Tallis, Warwick	1,997 0 0
Diamond, Leicester	1,969 3 10
Giles & Son, Birmingham	1,815 0 0
Woodhouse, Nottingham	1,733 0 0
Fincher, Stratford-on-Avon	1,650 0 0
Sharp, Burton-on-Trent	1,565 0 0
Saunders,* Cirencester	1,550 0 0
Bowen† Leamington	1,470 0 0

* Accepted.

† Withdrawn.

Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

THE NUMBER OF ORDERS GAZETTED during February, 1905 and 1906, in various trades and occupations were respectively as follows:—Builders 32 as against 22; decorators, painters, plumbers, &c., 13 and 9; engineers and founders, &c., 3 and 3; contractors, 4 and 2; carpenters and joiners, 1 and 5; stone, marble and monumental masons, &c., 1 and 3; architects and surveyors, 2 and 0; and timber merchants 0 and 4.

DURING THE WEEK ending March 23rd eighteen failures in the building and timber trades in England and Wales were gazetted.

WITT & MANN, builders, Bracknell. R.O. March 16th.
G. J. BAIGENT, builder, Haddenham (late Great Marlow). P.E., Aylesbury County Hall, April 9th, at 11.

T. BIDDULPH, builder, Hulme, Manchester. Adj. March 15th.

E. DENNY, builder, Grange-over-Sands. R.O. March 12th.

C. A. WATSON, builder and contractor, Spalding. R.O. March 14th.

A. HOOKHAM, builder and decorator, Willesden Green. Adj. March 16th.

T. WEEKS, slate merchant, Willesden. Adj. March 12th.

L. P. BARKER, stonemason, Bedford. P.E., Shirehall, Bedford, April 3rd, at 11.

C. H. FLACK, architect and surveyor, Wandsworth. P.E., London Bankruptcy Court, April 26th, at 12.

J. READING, builder and contractor, Barnes. P.E., Wandsworth C.C., April 5th, at 12.

G. H. MIGHALL, builder, West Hoathly. R.O. March 14th.

E. SECKERSON, builder and contractor, Dudley. P.E., Dudley C.C., April 3rd, at 11.

E. C. PIPE, builder, Lowestoft. Gross liabilities £2,222; expected to rank £188; assets £48.

W. WINNARD, contractor, Wigan and Southport. Deficiency £5,061.

J. CHARLES, bricklayer, Lincoln. Liabilities £237; assets nil.

E. W. LINTELL, builder and carpenter, Street. First meeting, O.R.'s, Bristol, March 28th, at 11.45. P.E., Wells Guildhall, April 10th, at 11.30.

HOSKEN BROTHERS, builders, decorators, &c., Richmond. First meeting, 132, York Road, S.E., March 28th, at 11.30. P.E., Wandsworth C.C., April 5th, at 12.

G. TOWNSEND, builder, Barnes. First meeting, 132, York Road, S.E., March 28th, at 12.30. P.E., Wandsworth C.C., April 5th, at 12.

S. LENNARD, builder, Bexhill. First meeting, Hastings C.C., April 10th, at 3. P.E., Hastings Town Hall, April 10th, at 11.

HAYWARD & SON, builders, Bournemouth. Liabilities £1,350, assets, estimated to produce £352, have only realised £26.

Current Market Prices.

FORAGE.

	per qr.	£ s. d.	£ s. d.
Beans ...	1 13 0	1 14 0	
Clover, best ...	3 12 0	4 2 6	
Hay, good ...	3 5 0	3 12 6	
Sainfoin mixture ...	3 5 0	3 15 0	
Straw ...	1 8 0	1 14 0	

MISCELLANEOUS.

Bricks Stocks, d/d to job	per 1,000	1 14 0	—
Do. Flettons on rail ...	do.	1 4 0	—
Do. Pressed Wire Cuts, d/d to job	do.	1 16 0	—
Do. Blue brindled wire cuts ...	do.	1 1 0	—
Do. do. wire cuts ...	do.	1 5 0	—
Do. do. pressed facings ...	do.	1 17 6	—
Coke Breeze, into carts at gasworks ...	per load	0 2 0	—
Do. d/d to job ...	do.	0 4 0	—
Sand ...	per yard	0 7 6	—
Ballast ...	do.	0 6 6	—
Granite Chippings ...	do.	0 10 6	—
Do. do. 2in. ...	do.	0 11 6	—
Cement ...	per ton	1 10 6	—
Lime ...	do.	1 4 0	—
Granite Broken, 1 1/2 in. ...	do.	0 15 6	—
Do. do. 2in. ...	do.	0 15 0	—
Do. do. 2 1/2 in. ...	do.	0 14 6	—
Do. Kerb, Norwegian, 6x12 and 12x6 in river ...	per foot	0 1 2	—
Do. do. do. circular ...	do.	0 1 5	—
Do. do. do. 12x8 in river ...	do.	0 1 5	—
Do. do. do. circular ...	do.	0 1 8	—
Do. do. Guernsey, 6x12 in river ...	do.	0 1 4	—
Do. do. do. circular ...	do.	0 1 6	—
Do. do. do. 12x6 do. ...	do.	0 1 6	—
Do. do. do. do. ...	do.	0 1 8	—
Do. do. do. 18x8 do. ...	do.	0 1 8	—
Do. do. do. do. ...	do.	0 1 10	—
Do. Pitchings, Norwegian, 3x6	per ton.	1 8 0	—
Do. do. do. 3x7	do.	1 10 0	—
Do. do. do. 3x5	do.	1 9 0	—
Do. do. do. 4x5	do.	1 8 0	—
Do. do. do. 4x4	do.	1 13 0	—
Do. do. do. 4x6	do.	1 5 0	—
Do. do. do. 5x6	do.	1 4 0	—

Deals, Pitchings, Norwegian, 5x7	per ton	£ s. d.	£ s. d.
Do. do. do. Special, 4x6	do.	1 11 0	—
Do. do. do. 5x7	do.	1 18 0	—
Do. do. Guernsey, 3x6	do.	1 10 0	—
Do. do. do. 3x7 & 3x9	do.	1 8 6	—
Do. do. do. 3x5	do.	1 10 0	—
Do. do. do. 4x5	do.	1 10 0	—
Do. do. do. 4x4	do.	1 13 0	—
Do. do. do. 4x6	do.	1 9 0	—
Do. do. do. 4x7	do.	1 6 6	—
Do. do. do. 5x6	do.	1 6 0	—
Do. do. do. 5x7	do.	1 5 0	—
Do. do. Specials add.	do.	0 6 0	—
Glass, English Sheet, in crates of stock sizes, 15 oz., 2nds ...	per sq. ft.	0 0 3 1/2	—
Do. do. do. 3rds.	do.	0 0 2 1/2	—
Do. do. do. 21 oz.	do.	0 0 5	—
Do. do. do. 2nds	do.	0 0 3 1/2	—
Do. do. do. 3rds	do.	0 0 6	—
Do. do. do. 26 oz.	do.	0 0 4 1/2	—
Do. do. do. 2nds	do.	0 0 8	—
Do. do. do. 3rds	do.	0 0 6	—
Do. do. do. 32 oz.	do.	0 0 8	—
Do. do. do. 2nds	do.	0 0 6	—
Do. English patent plain rolled plate in stock crates 3/4 ...	do.	0 0 2	—
Do. do. do. 3/8	do.	0 0 2 1/2	—
Do. do. do. 1/2	do.	0 0 2 1/2	—
Castor Oil, French ...	per cwt.	1 1 10	1 2 0
Colza Oil, English ...	do.	1 4 3	—
Copperas ...	per ton	2 0 0	—
Lard Oil ...	per cwt.	2 15 0	2 17 0
Lead, white, ground, carbonate ...	per ton	16 0 0	—
Do. red ...	do.	15 0 0	0 19 0
Linseed Oil, barrels ...	per gal.	0 0 9	—
Petroleum, American ...	do.	0 0 5 1/2	0 0 6
Do. Russian ...	do.	0 0 5 1/2	0 0 5 1/2
Pitch ...	per barrel	0 8 0	—
Shellac, orange ...	per cwt.	9 10 0	—
Soda, crystals ...	per ton	3 2 6	3 5 0
Tallow, Town ...	per cwt.	1 7 0	1 7 6
Tar, Stockholm ...	per barrel	1 5 0	—
Turpentine ...	per cwt.	2 7 0	—

METALS.

Standard Copper	per ton	81 10 0	82 0 0
Do. Strong sheets...	do.	93 0 0	93 10 0
Lead, Soft Foreign ...	do.	15 15 0	16 0 0
Do. English ...	do.	16 5 0	16 10 0
Do. pipes ...	do.	19 2 6	19 5 0
Do. sheets ...	do.	18 12 6	18 15 0
Galvanised Corrugated sheets ...	do.	12 7 6	12 10 0
Spelter G.M. ...	do.	24 15 0	25 0 0
Angles, Scotland... ..	do.	6 12 6	6 15 0
Bars do. ...	do.	7 12 6	7 15 0
Marked bars, Staffs ...	do.	9 0 0	—
Common bars do. ...	do.	7 5 0	—
Angles, M'boro. ...	do.	6 10 0	6 12 6
Joists do. ...	do.	6 7 6	6 10 0
Angles, Midlands ...	do.	6 15 0	7 0 0
Joists do. ...	do.	7 0 0	7 2 6
Girder plates, Midlands ...	do.	7 17 6	8 0 0
Angles, Foreign, c.i.f. Thames	do.	5 18 0	6 0 0
Tees do. do. do. ...	do.	6 2 6	6 5 0
Joists do. do. do. ...	do.	5 10 0	5 12 6
Channels do. do. do. ...	do.	5 15 0	—
Nails, Wire do. do. ...	do.	9 0 0	—
Tin, Foreign ...	do.	166 10 0	167 0 0
Do. English ingots ...	do.	167 0 0	168 0 0
Zinc, sheets, Silesian ...	do.	27 0 0	—
Do. do. Vielle Montaigne	do.	27 5 0	—

TIMBER.

Soft Woods.			
Fir, Dantzic and Memel	per load	2 15 0	5 0 0
Pine, Quebec, Yellow ...	do.	4 2 6	7 10 0
Do. Pitch, American ...	do.	2 19 0	5 0 0
Laths, log, Dantzic	per cu. fath.	4 0 0	6 0 0
Deals, Altappan, Yellow, 2nd, 4x11	per std.	9 0 0	—
Do. Mesane, White, 2nd, 3x11	do.	11 10 0	—
Do. Kem, Yellow, 2nd, 3x9	do.	15 15 0	—
Do. do. do. 3rd, 3x11	do.	10 15 0	—
Do. Galatz, White, Unsorted, 3x11	do.	8 10 0	—
Do. do. do. 3x9	do.	8 15 0	—
Do. St. Petersburg, Yellow, 1st, 3x9	do.	13 0 0	—
Do. Räfsö, Yellow, 1st, 3x9	do.	14 10 0	—
Do. Ljusne, Yellow, 3rd, 3x7	do.	10 0 0	—
Do. Petschora, Yellow, 3rd, 3x9	do.	8 15 0	—
Do. Bure & Skelleftea, Yellow, 5th, 4x9	do.	9 10 0	—
Do. do. do. 2nd, 2 1/2x7	do.	9 15 0	—
Do. Skelleftea, Yellow, Inf. 5th, 3x8	do.	8 5 0	—
Do. do. do. Unsorted, 2 1/2x8	do.	9 5 0	—
Do. Montreal, Yellow Pine, Dry, 4th, 3x10	do.	10 5 0	—
Do. do. do. 4th, 3x9	do.	10 0 0	—
Do. Quebec, Spruce, 1st, 3x9	do.	14 15 6	—
Do. do. do. 1st, 3x8	do.	12 0 0	—
Do. do. Bright Spruce, 1st, 3x8	do.	12 15 0	—
Do. do. do. 1st, 3x7	do.	13 0 0	—

Deals, Quebec, Spruce,	per std.	£ s. d.	£ s. d.
2nd, 3x9	do.	9 10 0	—
Do. do. do. 2nd, 3x9	do.	10 5 0	—
Do. do. do. 3rd, 3x9	do.	9 5 0	—
Do. do. Red Pine, 2nd, 3x9	do.	10 5 0	—
Do. do. do. 4th, 3x11	do.	8 10 0	—
Do. do. Bright pine, 3rd, 3x8	do.	10 0 0	—
Do. do. do. 3rd, 3x7	do.	10 0 0	—
Do. Ingrampont, Yellow, Unsorted, 4x9	do.	7 0 0	—
Do. do. do. 4x8	do.	7 5 0	—
Do. do. do. 4x7	do.	7 10 0	—
Do. do. do. 3x9	do.	8 0 0	—
Do. Archangel, White, 2nd, 3x11	do.	11 10 0	—
Do. do. do. 2nd, 3x9	do.	10 10 0	—
Do. do. Yellow, 2nd, 3x11	do.	17 0 0	—
Do. do. do. 3rd, 3x11	do.	8 15 0	—
Do. do. do. 3rd, 3x9	do.	10 5 0	—
Do. do. do. 3rd, 3x9	do.	11 10 0	—
Do. do. do. 4th, 3x9	do.	8 15 0	—
Battens, Lulea, Yellow, 2nd, 2 1/2x6 1/2	do.	8 5 0	—
Do. Räfsö, Yellow, 2nd, 2 1/2x6 1/2	do.	10 10 0	—
Do. Sandarne, Inf. Yellow, 5th, 2x9	do.	8 10 0	—
Do. Quebec, Bright Pine, Dry, 3rd, 3x6	do.	9 0 0	—
Do. do. Spruce, Unsorted, 2x6	do.	8 0 0	—
Do. do. Red Pine, 2nd, 2x7	do.	10 5 0	—
Do. do. do. 2nd, 1 1/2x9	do.	9 15 0	—
Do. Christianssand, Yellow, Unsorted, 3x4	do.	7 5 0	—
Do. Norrsundet, Yellow, 4th, 2x8	do.	8 15 0	—
Do. Mo, Yellow, 2nd, 2x7	do.	0 10 0	—
Do. do. do. 4th, 1 1/2x11	do.	8 0 0	—
Do. Sandarne, White, 1st, 1 1/2x11	do.	12 0 0	—
Do. do. do. 1st, 1x9	do.	10 15 0	—
Do. do. do. 2nd, 1x9	do.	10 0 0	—
Do. Skelleftea, Yellow, Unsorted, 2x6	do.	8 15 0	—
Do. do. do. Inf. 5th, 2x6	do.	8 0 0	—
Do. Bure & Skelleftea, White, 1st & 2nd, 2x4	do.	8 5 0	—
Do. Skonvik, Yellow, 1st and 2nd, 1x9	do.	9 15 0	—
Do. Umba, Yellow, 4th, 1 1/2x8	do.	8 10 0	—
Do. Transgund, 1st & 2nd, 2x3 1/2	do.	8 20 0	—
Do. Pernoviken, 1st & 2nd, 2x4 1/2	do.	8 5 0	—
Do. Archangel, Yellow, Unsorted, 2x3 1/2	do.	8 15 0	—
Do. Attu (Abo), Yellow, Unsorted, 2x5	do.	8 0 0	—
Do. do. do. 2x4 1/2	do.	8 0 0	—
Do. Abo, Yellow, Unsorted, 2x4 1/2	do.	8 0 0	—
Flooring Gelfe, Yellow, 2nd, 1 1/2x7	per square	0 13 3	—
Do. do. do. 2nd, 1x7	do.	0 10 6	—
Do. do. do. 2nd, 3x7	do.	0 8 0	—
Do. do. do. 2nd, 3x6	do.	0 7 9	—
Do. Norrköping, Yellow, 1st & 2nd, 1 1/2x5 1/2	do.	0 11 9	—
Do. Sandarne, White, 1st, 3x7	do.	0 8 6	—
Do. do. do. 2nd, 3x7	do.	0 8 3	—
Do. do. Yellow, 2nd, 1 1/2x6 1/2	do.	3 13 6	—
Do. Skonvik, Yellow, Extra, 1st, 1x6	do.	0 11 6	—
Do. Sundswall, Yellow, 3rd, 1x5 1/2	do.	0 9 0	—
Do. do. do. 3rd, 1x5	do.	0 8 9	—
Do. do. do. Dry, 3rd, 1x6	do.	0 9 9	—
Do. Fridriksstad, White, 1st & 2nd, 2x5 1/2	do.	0 8 3	—
Do. do. Yellow, 3rd, 3x7	do.	0 8 3	—
Do. do. Mixed Yellow, 1x5	do.	0 8 0	—
Do. do. do. 1x4 1/2	do.	0 7 9	—

HARD WOODS.

Ash, Quebec	per load	4 0 0	7 15 0
Birch, New Brunswick...	do.	2 7 6	4 10 0
Do. Quebec do. ...	do.	2 12 6	5 0 0
Box, Turkey	per ton	7 0 0	20 0 0
Cedar, Cuba	per ft. sup.	0 0 3	0 0 4
Do. Honduras	do.	0 0 7 1/2	—
Do. Tobasco	do.	0 0 5 1/2	—
Do. Brazilian	do.	0 0 4 1/2	—
Elm, Quebec	per load	4 5 0	8 10 0
Jarrah, plank	per ft. cu.	0 2 6	0 3 0
Mahogany, Average Price for Cargo, Honduras...	per ft. sup.	0 0 4 1/2	—
Do. Tobasco	do.	0 0 5 1/2	—
Do. Cuba	do.	0 0 8 1/2	—
Do. African	do.	0 0 3 1/2	—
Do. Lagos	do.	0 0 3 1/2	—
Oak, Wainscot	per log.	3 15 0	7 5 0
Teak, Indian, logs	per load	10 0 0	19 0 0
Do. do. planks	do.	13 0 0	20 0 0
Whitewood, American, logs	per ft. cu.	0 1 3	0 1 6

Builders' Current Price List of Specialities.

WE have received numerous letters and verbal suggestions from readers pointing out the various difficulties they experience in ascertaining the cost of the many specialities employed in buildings. Their requirements range themselves under the following heads:—

- (1) A record of fluctuations in the price of specialities to be published more frequently than the yearly builders' price-books.
- (2) A list of new specialities with registered names which give no indication of their makers or agents, as well as of older goods still on the market.
- (3) A price list of new materials and goods which will serve to place such goods prominently before the attention of architects and contractors.
- (4) More direct means of inter-communication between buyer and seller.

Architects when preparing drawings and writing specifications require to know what goods are available, and their cost, while builders often have to prepare estimates hurriedly, without sufficient time to write for quotations. Estimating then becomes guesswork, and a contractor often learns his tender is out of the running, or else learns after he has obtained a contract that he is bound to lose on certain items.

Yearly price-books have been published with the idea of offering a ready means of consultation for estimating purposes. These are no doubt valuable for roughly approximating prices of goods, but are quite unreliable for practical estimating, because the prices of specialities fluctuate so quickly.

We believe this list will meet these requirements. Our space is restricted, but in future numbers the list will be enlarged and the prices of other goods substituted,

so that by keeping these special monthly issues of "The Contractors' Supplement" contractors and other purchasers will have ready to hand an accurate compendium of prices for quick consultation.

We shall be glad to receive from readers suggestions as to any improvements and additions to this list of prices which would render it of still greater service to the architectural profession and the building trade.

This list is not intended to promote under-cutting, and prices are subject to discounts for a quantity and for cash. Readers are advised to write for these. Where prices for goods are standardised and fluctuation takes place in trade discounts, our prices have the discounts deducted. In some cases it is difficult for firms to quote prices, and we have stated where they will be pleased to send catalogues and quotations immediately on application.

Goods.	Description.	Merchants or Manufacturers.	Address.	Size.	Weight.	Quantity. per	Price		
							On Rail.	D'vrd. at London Termini.	D'vrd. to Buyer.
Baths:									
Iron	Rolled edge, white vitreous enamelled.	Doulton & Co., Ltd.	Lambeth, London	5ft. 6in. insi le.	—	each	£4 7s. 6d	—	—
Bath Room Suites	Complete as advertised	Standard Sanitary Manufacturing Co.	22, Holborn Viaduct, London.	—	—	—	—	—	£18 18s.
Blinds:									
"Japa"	Sanitary	Japa Blinds, Ltd.	55, Barbican, London, E.C.	All sizes	7½ long 35 wide.	—	—	From 1s 6d. to 16s. doz.	Free.
Boilers:									
Saville	Wrought-iron for hot-water heating and supply.	Hartley & Sugden, Ltd.	Halifax	30 x 11 to 72 x 30.	3 cwt. to 17 cwt.	each	£9 5s. to £52.	Free in Great Britain.	—
Bricks:									
Blue	Staffordshire pressed	Hathern Station Brick and Terra Cotta Co., Ltd.	Loughborough	9 x 4½ x 2½	3½ tons	1000	£2 15s.	£3 13s.	—
Facing	Blue and brindled	G. Woolliscroft & Sons, Ltd.	Hanley, Staffs.	9 x 4½ x 3	3½ tons	1000	35s. to 37s. 6d.	£4 3s. to £3 5s. 6d.	—
Facing	Red terra-cotta	G. Woolliscroft & Sons, Ltd.	Hanley, Staffs.	9 x 4½ x 3	3½ tons	1000	£2 10s.	£3 18s.	—
Stocks	Sand stocks	Gibbs Brothers	Loughborough	9 x 4½ x 2½	2½ tons	1000	£2	£2 15s.	—
Casements and Sashes:									
Metal Casements	Iron, steel, and bronze	George Wragge, Ltd.	London and Manchester	Registered sections.	—	each	From 15s	16s.	—
Metal Sashes	Ditto	Ditto	Ditto	Ditto	—	ft. super.	From 6d.	—	—
Cement, Lime, &c.:									
Cement	Portland	Associated Portland Cement Manufacturers (1900), Ltd.	Dixon House, 72, Fenchurch Street, E.C.	—	—	—	Prices on application.		
Lime	—	Associated Portland Cement Manufacturers (1900), Ltd.	Dixon House, 72, Fenchurch Street, E.C.	—	—	—	Prices on application.		
Chimney Cows:									
Terra-cotta and Metal	Various	Acme Ventilating and Heating Co.	Liverpool	9 to 12 diam., &c.	—	each	From 13s.	From 14s.	—
Perry's	Galvanized iron and terra-cotta.	Perry's Certainty Smoke Curing Cowl Co.	58, Pall Mall, London, S.W.	3ft. (ins.)	—	each	—	£1 1s.	—
Chimney Pieces:									
Carved Oak	With iron grate and fire-bricks and marble surround.	Bromsgrove Guild	Bromsgrove	—	—	complete	From £15.	From £16 5s.	—
Marble	—	J. & H. Patteson	7, Bayley Street, Bedford Sq., London, and Oxford St., Manchester.	—	—	—	Prices on application.		
Closets:									
Cisterns, Seats, &c.	For houses	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	set, with fittings.	£2 to £10	—	—
Latrines	For schools and workmen	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	stall each	30s. to 70s.	—	—
"Simplicitas"	—	Doulton & Co., Ltd.	Lambeth, London	—	—	—	£1 15s.	—	—
Columns	Cast-iron	Measures Bros., Ltd.	53B, Southwark Street, London, S.E.	stock patterns.	—	ton	£7	£7	—
Compoboard	Swedish	Messers, Ltd.	79½, Gracechurch Street, E.C.	4ft. x 8 to 18ft. x 8in. and 1in.	1 ton	2,000ft. super	Prices on application.		
Concrete:									
Armoured	Floors and roofs	Trussed Concrete Steel Co.	11, Tothill Street, London	—	—	sq. yard	—	—	8s.*
Conduits:									
"Simplex" steel	Light gauge, ordinary	Simplex Steel Conduit Co., Ltd.	Garrison Lane, Birmingham.	½ to 2 diam.	20lbs. to 140lbs.	100ft.	—	—	5s. to £1 15s.
Door Furniture:									
Door Springs	With silent check	Robert Adams (patentee)	3 & 5, Emerald Street, London, W.C.	For medium doors.	—	each	D.A. 46s.	D.A. 46s.	—
Sliding Door Fittings	Top and bottom rollers and guide rails.	John Bousfield	Bar Ironworks, York	various	—	each	S.A. 42s.	S.A. 42s. rollers from 6s. 6d.	—
Drain:									
Testing Apparatus	For smoke or air test	Burn Brothers	Rotunda Works, 3, Blackfriars Rd., London, S.E.	No. 358	About 30lbs.	each	£4 4s.	—	—
Elevators:									
"Otis"	Electric and hydraulic	Otis Elevator Co., Ltd.	4, Queen Victoria Street, London.	—	—	—	Prices on application.		
Enamels:									
"Sanaline"	Pure white or colours	Aspinall's Enamel, Ltd.	New Cross, London	—	—	gallon	—	—	18s.
Enamels:									
White and coloured	For elevations	Alfred Whitehead	Prudential Build'gs, Leeds	—	—	sq. yard	74s. 6d.	79s.	—

* Erected.

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Builders' Current Price List of Specialities—(continued).

Goods.	Description.	Merchants or Manufacturers.	Address.	Size.	Weight.	Quantity. per	Price		
							On Rail.	Delvrd. at London Termini.	Delvrd to Buyer
Fans:									
Fans, Blowers, and Motors.	Belt, electric or steam driven.	Matthews & Yates, Ltd.	Cyclone Works, Swinton, Manchester.	all sizes	—	—	Prices on application.		
Felt:									
Ruberoid Sacking Felt	High-grade inodorous felt	Robert W. Blackwell & Co., Ltd.	59, City Road, London, E.C.	36 x 72	44lbs.	roll,	—	—	13s. 6d.
Fencing:									
Iron	"Greenhill" patent automatic railing.	Hill & Smith	Brierley Hill Iron Works, Staffs.	3½ ft. high ¾ verticals.	40lbs. yd.	24sq. yds. yard	4s. 5d.	4s. 9d.	—
Fireproofing (See also Partitions):									
Terrawode Brickwood Columbian	Fireproof floors	Jabez Thompson & Sons	Northwich, Cheshire	4ins. thick	—	sq. yd.	6s.	7s.	—
Steel Sheeting	Reinforced concrete floors and roofs.	Columbian Fireproofing Co.	37, King William Street, London.	—	—	—	Prices on application.		
Expanded Steel	For partitions, reinforced concrete, damp course, &c.	The Fireproof Co., Ltd.	10, York Buildings, Adelphi, W.C.	all sizes	all weights.	sq. yard	from 1s. 3d.	from 1s. 3d.	plus rail charge
Floors and Roofs	Reinforcement for every description of concrete work.	New Expanded Metal Co.	York Mansion, York Street, Westminster, S.W.	up to 16ft. x 8ft.	2lbs. to 30lbs.	sq. yard	5d. to 4s. 9d.	Price list on application.	
Floors and Roofs	Steel concrete	Homan & Rodgers	17, Gracechurch Street	—	—	sq. yd.	—	—	7s. 9
Floors and Roofs	Reinforced concrete	Trussed Concrete Steel Co.	11, Tothill Street, London	—	—	sq. yd.	—	—	8s. 8
Floors and Roofs	Reinforced concrete	Potter & Co., Ltd.	66, Victoria Street, London, S.W.	—	—	sq. yard	—	—	6s. and up- wards.*
Floors:									
Columbian	Concrete fireproof floors and roofs.	Columbian Fireproofing Co.	37, King William Street, London.	—	—	—	Prices on application.		
Euboelith	Patent flooring	Euboelith Patent Flooring	3, Victoria Street, Westminster, S.W.	—	—	yard sup.	5s. to 6s.	—	—
Galvanised Iron:									
Sheets	Corrugated	Baldwins, Ltd.	5, Fenchurch St., London, E.C.	5ft. to 9ft. x 2ft. x 22 or 24 G.	—	ton	—	£14 10s.	—
Sheets	Flat	Baldwins, Ltd.	5, Fenchurch St., London, E.C.	72 x 24 to 36 x 20 or 24 G.	—	ton	—	£15	—
Buildings	Of every description	Baldwins, Ltd.	5, Fenchurch St., London, E.C.	—	—	—	Prices on application.		
Gas Generators:									
Acetylene	Five-light portable	Strode & Co.	48, Osnaburgh Street, London.	15ins. diameter, 24ins. high.	—	each	—	£3	—
Glass:									
Stained	Memorial and other windows	E. E. Oldacre & Co.	Stirling Place, Hove	—	—	ft. super.	Prices on application.		
Guards, Wire:									
Straight Lattice	Half mesh	Richard Johnson, Clapham, & Morris, Ltd.	Manchester	6ft. x 3ft.	14lbs.	sq. ft.	5d.	5½d.	5½d.
Hooks:									
Hat and Coat	"Schola" pattern for schools, &c.	Brookes & Co., Ltd.	4, Cateaton Street, Manchester.	—	—	—	Prices on application.		
Joinery:									
Panelling	High class r-in. Austrian oak panelling.	Elliott's Moulding & Joinery Co., Ltd.	Newbury	3ft. to 7ft. high.	—	ft. super.	2s.	2s. 1d.	—
Joists:									
Steel	Broad flange beams	H. J. Skelton & Co.	71, Finsbury Pavement, London, E.C.	—	—	ton	—	£6 10s.	—
Steel	English and foreign	Columbian Fireproofing Co.	37, King William Street, London.	—	—	—	Prices on application.		
Steel	Belgian and German	Measures Bros., Ltd.	53B, Southwark Street, London, S.E.	3 to 20 deep.	—	ton	£6 10s. basis sections, £20 to £110.	£6 10s. basis sections, £20 15s. to £112 10s.	—
Laundry Machinery:									
Washing Machines	Improved rotary	W. Summerscales, Ltd.	Keighley, Yorks	many sizes	—	—	—	—	—
Lavatories:									
Glazed Ware	For schools, workmen, and private houses.	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	set, with fittings.	£1 10s. to £4.	—	—
Leaded Lights									
Lights	All descriptions	E. E. Oldacre & Co.	Stirling Place, Hove	—	—	ft. super.	Prices on application.		
Hand-power	All kinds, for all purposes	George Johnson	227, St. John's Hill, London, S.W.	—	—	—	Prices on application.		
"The Premier"	Dinner and service lift to raise ½ cwt.	The Lift and Hoist Co.	Premier Iron Works, Prince Street, Deptford, S.E.	Cage inside 2ft. wide, 1 ft. 6 deep. 2 ft. 6 high. ¾ x ¾ and upwards.	—	—	—	£9 10s.	—
Lightning Conductors									
Copper tape	—	Joseph Lewis	5 & 6, Great Winchester Street, London, E.C.	—	—	foot run	from 1s.	—	—
Locks:									
Coin Collecting	Bright brass or bronzed	New Century Co.	235, High Holborn, London, W.C.	14ins. x 4½ins. x 1½ins.	—	each	—	—	35s.
Kaye's Patent	Four lever mortice, iron and brass.	Joseph Kaye & Sons, Ltd.	93, High Holborn, London, W.C.	—	—	each	—	—	7s. 6d. 10s. 6d.
"C. and B."	Registered mortise Nos. 1, 2, and 3.	Colledge & Bridgen	Midland Works, Wolverhampton.	6 inch	—	dozen	—	—	£3 6s. £2 5s. £1 9s.
Mantelpieces:									
White Wood	With overmantel	The Hardware Trading Co.	12, New Oxford Street, London, W.C.	Opening 38 x 38.	72ins.	each	£2	—	—
Marble, Mosaic, and Stone Work:									
Glass Mosaic	Coloured art	The Cloisonné Glass Co.	40, Berners Street, W.	—	—	sq. ft.	—	From 3s. upwards.	—
	Plain or to design	J. & H. Patteson	7, Bayley Street, Bedford Square, London, and Oxford Street, Manchester.	—	—	—	Prices on application.		
Motor Wagons									
Steam	—	St. Pancras Ironworks Co., Ltd.	171, St. Pancras Road, London, N.W.	—	4 tons 19cwt.	each	—	From £530.	—
Paint:									
"Japonika," Enamel	Elastic, impervious, covers goyds. sup. per gal.	John Line & Sons, Ltd.	Alfred Place, Tottenham Court Rd., London, W.C.	—	—	gallon	18s.	—	—
Anti-corrosive, &c.	"Bitumastic" solution and enamel.	Wailles, Dove & Co., Ltd.	Newcastle-on-Tyne, London, Liverpool, Cardiff, Birmingham, and Glasgow.	—	—	—	Prices on application.		
Partitions:									
Dovetail Corrugated Steel Sheeting.	For partitions, reinforced concrete, &c.	The Fireproof Co., Ltd.	10, York Buildings, Adelphi, W.C.	All sizes	All weights.	sq. yard	From 1s. 3d.	From 1s. 3d.	rs. 3d. plus rail.
Partitions	"Kulm" slabs	H. W. Cullum & Co.	Craven House, Kingsway, London, S.W.	—	—	sq. yard	Prices on application.		
Patent Plaster	Hollow interlocking blocks	Havelock Patent Plaster Partition Co.	63, Finsbury Pavement, E.C.	29 x 17	70lbs. super. yard.	super. yard.	3s. 6d.	4s. 6d.	6s.*
Plaster	Partition slabs	Jabez Thompson & Sons	Northwich, Cheshire	12 x 12 x 2	—	sq. yard	3s. 6d.	4s.	—
Porous Brick	Porous terra-cotta blocks	Hempstead Patent Brick Co.	Nemel Hempstead	9 x 12 x 1½	—	sq. yard	2s.	2s. 4d.	—
Terrawode Brickwood School	Partition bricks	Jabez Thompson & Sons	Northwich, Cheshire	9 x 4½ x 3	2 tons	1000 sq. ft.	£3 5s.	£4 9s.	—
	—	John Stones	"Rosside," Ulverston	—	—	—	Prices on application.		

* Executed.

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Builders' Current Price List of Specialities—(continued).

Goods.	Description.	Merchants or Manufacturers.	Address.	Size.	Weight.	Quantity. per	Price		
							On Rail.	Delvrd. at London Termini.	Delvrd. to Buyer.
Pavement Lights	Prismatic	St. Pancras Ironworks Co., Ltd.	171, St. Pancras Road, London, N.W.	—	—	per ft. super.	—	From 4s. 6d.	—
Photo Prints, Copies, &c.:									
"True to scale"	(Dorel system)	W. F. Stanley & Co., Ltd.	13, Railway Approach, London Bridge, S.E.	Imperial	—	2 copies	2s.	—	2s. 3d. p. free
True scale	Dorel and photo-litho methods.	Vincent, Brooks, Day & Son, Ltd.	48, Parker Street, Kingsway, London, W.C.	—	—	—	Prices on application.		
Autocopyist	Simple method for duplicating plans, &c.	Autocopyist Co.	64, Queen Victoria Street, London, E.C.	Various	—	—	—	—	From 35s.
All Kinds	On any material	London Drawing and Tracing Office.	98, Gray's Inn Road	—	—	—	Prices on application.		
Pipes:									
Columbian	Armoured cement for water and sewage conveyance.	Columbian Fireproofing Co.	37, King William Street, London.	—	—	—	Prices on application.		
Drain (iron)	Immense assortment of fittings stocked.	Burn Bros.	Rotunda Works, 3, Blackfriars Rd., London, S.E.	stocked 2 to 6	L.C.C.* weights.	—	Prices on application.		
"Wisconsin" Graphite	Pipe joint paste	G. F. Hopkins & Co.	112, Westminster Bridge Road, London, S.E.	—	—	1 lb. to 60 lbs.	1s. 1d. to 6½d.	—	—
Plaster:									
Fibrous, &c.	For relief decoration	G. and A. Brown, Ltd.	167, Hammersmith Road, W.	—	—	—	Prices on application.		
Keenes & Parian	—	Associated Portland Cement Manufacturers (1900), Ltd.	Dixon House, 72, Fenchurch Street, E.C.	—	—	—	Prices on application.		
"Pytho"	For interior plastering	Plaster, Brick, and Stone Co., Ltd.	Wall Grange, near Leek, Staffs.	—	1 ton	—	37s. 6d.	42s. 2d.	—
Rain Water Heads and Pipes:									
Rain Water Heads	Cast lead and iron	George Wragge, Ltd.	London and Manchester	stock designs.	—	each	From 16s. 6d.	17s. 6d.	—
Roofs:									
Ruberoïd Roofing	High-grade prepared roofing	Robert W. Blackwell & Co., Ltd.	59, City Road, London, E.C.	36 x 72	40lbs. to 100lbs.	216 sq. ft.	—	½ ply, 17s. 4d.; 2 ply, 18s. 6d.; 3 ply, 19s. 6d.	1 ply, 20s. 6d.; 2 ply, 21s. 6d.; 3 ply, 22s. 6d.
Steel	—	E. F. Blakeley & Co.	Vauxhall Ironworks, Liverpool.	—	—	ft. super.	—	From 6d. upwds.*	—
Sanitary:									
Syphons and Tanks	Automatic flushing	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	each	£1 to £3	—	—
Waste Preventors	"Paisley," painted	Doulton & Co., Ltd.	Lambeth, London	2 gallon	—	each	£1 3s. 6d.	—	—
Waste Preventors	"Well," painted	Doulton & Co., Ltd.	Lambeth, London	2 gallon	—	each	16s.	—	—
Scaffolding:									
Putlogs	Hewn birch	Vigers Bros.	67-68, King William Street, E.C.	—	—	dozen	5s. 3d. in docks.	—	—
Shutters:									
Revolving	No. 7 convex wood lath	Clark, Bunnett & Co., Ltd.	New Cross Road, London, S.E.	—	—	ft. super.	1s. 6d.	—	—
Sinks:									
Glazed Ware	"Kraton," "Helios," Belfast, and Edinburgh.	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	each	10s. to £5.	—	—
Slates:									
"Arlon"	Unfading green	Pearson Bros. & Campbell	18, Water Street, Liverpool	—	—	—	Prices on application.		
Buttermere or Cumberland and Westmoreland Green Slates.	Light sea green, olive, and dark.	Buttermere Green Slate and Stone Works.	Keswick	30 to 12 long.	—	ton	£4 5s.	£5	—
Slatting and Tiling	All kinds—green slating speciality.	Roberts, Adlard & Co.	London, Faversham, Brighton, &c.	as required	—	1,000	Prices on application.		
Sound Proofing:									
Deafening Quilt	Cabots' double ply	Arthur L. Gibson & Co.	19/21, Tower Street, Upper St. Martin's Lane, London, W.C.	—	120 lbs.	bale, 500sq. ft.	36s. 6d.	—	—
Springs:									
Door Checks	"Blount"	Charles Winn & Co.	Birmingham	—	—	—	Prices on application.		
Stone:									
Bramley Fall	Sandstone, light and grey	B. Whitaker & Sons, Ltd.	Horsforth, near Leeds	any sizes	14ft. to 1 ton.	cube ft.	rod.	1s. 9d.	—
Granite	Architectural and monumental.	Kirkpatrick Brothers	Trafford Park, Manchester	—	—	—	Prices on application.		
Dark-Bed Hopton-Wood	Hard limestone, colour grey	J. Hodson & Son, Ltd.	Nottingham	random blocks.	—	foot cube	1s. 2d.	2s.	—
Staircases, Spiral	—	St. Pancras Ironworks Co., Ltd.	171, St. Pancras Road, London, N.W.	From 3ft. 6in. in diameter.	—	per ft. rise.	—	From 13s.	—
Terra-cotta:									
Window Heads	Buff or red	Walwyn T. Chapman	Cleethorpes	3 x 9 4½ x 10.	1cwt.	each	5s.	—	—
Tiles:									
Coloured Enamelled	Best quality in brown, blue, green, &c.	Carter & Co.	Encaustic Tile Works, Poole.	usual sizes	1 ton	55yds. sup.	10s. 6d. per yd.	11s. per yd. sup.	11s. 2d. per yd.
Tessellated	Best quality any plain pattern	Carter & Co.	Encaustic Tile Works, Poole.	usual sizes	2 tons	80yds. sup.	5s. per yd. sup.	5s. 4d. per yd.	5s. 6d. per yd.
Decorative	Floor	Craven, Dunnill & Co., Ltd.	Jackfield, R.S.O., Shropshire.	every size	56lbs.	sq. yard	from 3s. 6d.	4s. 6d.	4s. 6d.
Wall	—	Ditto	Ditto	—	40lbs.	—	from 5s. 6d.	6s. 4d.	6s. 4d.
Mosaic	—	Ditto	Ditto	—	48lbs.	—	from 13s. 9d.	15s.	15s.
Faience	—	Ditto	Ditto	—	170lbs.	—	from £1 3s.	£1 5s.	£1 5s.
"Opalite"	Opal glass, with Skelmerdine backing.	Wm. Griffiths	126, Hamilton Ho., Bishops-gate St. Without, E.C.	9 x 3 and 6 x 5.	—	sq. yard	—	—	10s. 6d.†
Wall	Patent undercut back	T. & R. Bote, Ltd.	Burslem	6 x 5	50 lbs.	sq. yard	6s.	6s. 6d.	6s. 9d.†
"Duro-lite"	Glass tiles, with patent fire-proof backing to prevent surface cracking.	Duro-lite, Ltd.	36, Camomile Street, London, E.C., and St. Helens, Lancashire.	white and tinted 6 x 6 and 9 x 3 marbles 12 x 6 30ins. x 24yds. 30, 36, 40, 42, 30ins. x 20yds.	—	sq. yd.	—	—	whitened, tinted, 11s. 6d. mbrls.† 12s. 6d. 17s.
Tracing Cloth:									
"Ivorie"	Pure white	Norton & Gregory, Ltd.	Castle Lane, Westminster	—	—	roll	Prices on application.		
"Koh-i-noor"	—	L. & C. Hardmuth	12, Golden Lane, London, E.C.	—	—	roll of 24yds.	—	—	11s.
"Triumph" Brand	Blue	Norton & Gregory, Ltd.	Castle Lane, Westminster	—	—	—	—	—	—
Urinals:									
Glazed Ware	Circular slab and T-backs	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	stall, with fittings.	£3 to £15	—	—
Ventilators:									
Boyle's Patent	Latest "air-pump" ventilators (Design No. 175).	Robert Boyle & Son	London and Glasgow	12ins. diam.	—	each	—	—	25s. to £18 18s.
Vices:									
"Lightning"	Instantaneous action	C. Nurse & Co.	181-183, Walworth Road, London, S.E.	54ins. diam. jaws 9 ins. opening 12	50 lbs.	each	17s.	—	—

* Erected.

† Approximate price fixed, complete, in London.

‡ Executed.

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The Question of the Moment. A SPECIAL general meeting of the Royal Institute of British Architects was held last night to consider the report and recommendations of the Registration Committee; but owing to the exigencies of publication we are unable to give the result of that meeting in the present issue. We can, however, deal with the report of the Committee, who, as the result of their deliberations and the evidence given by twenty-four architects from various parts of the kingdom, record that they are impressed with the desire of many architects, especially those who are practising in the provinces, that a legal status should be secured for duly qualified practitioners in architecture. They are of opinion that this can be met by applying to Parliament for a legal diploma of membership of the Royal Institute, it being made compulsory that after, say, 1912 all architects before receiving this diploma must have passed through a definite course of architectural education in a recognized school. The Committee state—as we have said on other occasions—that unless the profession can approach Parliament with approximate unanimity there is little chance of such a measure being passed. They recommend, therefore, that at present the Institute should confine itself to attempting to obtain Parliamentary recognition for its membership instead of supporting the present draft Bill before Parliament. If such State recognition were obtained the temporary necessity of granting a statutory title to unqualified men would be avoided. The *modus operandi* which the Committee propose is that the title of the Institute should be changed to “The Royal College of Archi-

itects,” and that a temporary “third-class” of professional members should be established, these members to be called licentiates, who would be required to pay a small fee. Members of societies of architects found eligible by the council would be admitted as licentiates without election. All admission to this class would be closed within a year after the passing of the Act, and everyone would have to sign a declaration and obligation as to professional conduct. The affixes F.R.I.B.A., and A.R.I.B.A. would be changed to F.R.C.A. and A.R.C.A., while the licentiates would use L.R.C.A. These three classes would be defined as professional members. The Bill, it is proposed, should enact that the present charters and the aforesaid titles should be given statutory force, the scale of charges legalized, and municipalities and other public bodies required to employ a professional member. We need not repeat the names of the committee, nor those of the twenty-four representative architects. It is clear, however, that after all the report has been arrived at in a very one-sided manner. The members of the committee were mostly members of the Institute, and the representative architects were leading practitioners or men of artistic eminence. The smaller practitioner was not represented, and though it may be well enough for the Institute to decide that all architects to be registered who are not members of that body shall be placed in an inferior rank to their own members by giving them the title of licentiate, we doubt if Parliament would endorse this favouritism. If architects are to be registered by the State there must be no differentiation. The proposals still leave the matter somewhat in doubt in reference to the knowledge which shall be required of future architects in order to enable them to be licensed by the State. The opponents of the present proposals argue that though examinations might fairly test a man's constructive knowledge, they could not fix a standard in art. The suggestion that architects before receiving a diploma should have passed through a definite course of architectural education in a recognized school does not meet the argument squarely. That an architect must be trained needs no proof, but that he should be compelled to pass through a recognized school seems arbitrary and a restriction on originality. Besides, it may not always be possible for a student to attend a school for training, though he may be able to obtain quite as good instruction, if not better, from other sources. In fact, there is no reason why he should not educate himself from books and the study of existing buildings and those in course of construction. We fully agree with the proposal to admit to registration without examination students who have passed through a school, but we think that there should be afforded an opportunity, by an examination sufficiently elastic to

weaken as much as possible the inherent defects of the examination system, for the chance student to prove his qualifications for entering the profession of architecture.

A Call for Tudor. WHIPPING a dead horse is proverbially useless, but the whipper's excuse might be that he did not know the horse was dead. We are in somewhat the same position with regard to some recent remarks of that usually well-informed new daily paper “The Tribune.” The remarks in question were contained in an article on “The Aldwych Site.” It was deplored that we were to be supplied with a Renaissance building, in a foreign style—French Renaissance to wit. The writer demanded a building in Tudor Gothic! The argument advanced was that this style was English whereas classic architecture was a horrid importation from Italy. When challenged by a correspondent, the editor of the paper stated that his contention was “that national interest in architecture died with the introduction of the foreign ideas, and, this being so, it would seem that the best hope of reviving that interest lies in picking up that form of later Gothic which is applicable to the needs of modern life and developing from that.” It just happens that late Gothic is as dead as a door-nail, and the thread cannot be picked up. Architects of great learning and ability have tried and failed. Renaissance is the only style in which there is any life to-day apart from the tradition we are building up in domestic work. Even in church work Gothic is lifeless, and is only awakened by the introduction of Renaissance thought. Modern industry, modern thought and modern methods are antagonistic to the Gothic spirit. French Renaissance is a wide term, embracing very dissimilar elements. Modern French Renaissance is, however, closely allied to English work. We are becoming more and more cosmopolitan, and when our students investigate the same examples of past architecture with the education and outlook that now differs so very little in all civilized nations, can we expect to see such different results? The architectural profession sees no danger in the suggested treatment of the Aldwych site, and would infinitely prefer it to the absurdity of a Tudor building in direct association with Somerset House and the two fine Renaissance churches in the Strand.

Our Contract List. A FEW weeks ago, our readers will remember, we revised our list of Contracts Open, publishing it in much more extended form, with particulars of each contract, instead of in abridged table form, as hitherto. Imitation is said to be the sincerest form of flattery, and we therefore acknowledge the compliment which our esteemed contemporary “The Builder” pays us in its issue for Friday last, wherein the same form is followed as that in our pages.

REINFORCED CONCRETE.

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IN our issue for March 14th we gave an extract from a paper read by Mr. William Blackadder, B.Sc., C.E., Harbour Engineer's Office, Aberdeen, before the Association of Civil Engineers, Aberdeen, entitled "Reinforced Concrete Beams: Theory and Experiment." This extract dealt with experiments made by the writer, and gave a full description of the machine designed to conveniently break the beams, and also to give accurate results. It is proposed here to deal with the first portion of the paper.

At the commencement a short account was given of the gradual growth of this type of construction; examples of a few systems now in use, working drawings of actual structures, and lantern views of some during construction being shown.

Several methods of calculation of the strength of beams were gone into, that more fully developed being the method described by Considère in his treatise, "Experimental Researches in Reinforced Concrete." It is unnecessary here to repeat an account of Considère's experiments as to how he determined the strength of the concrete, the adhesion of the steel and concrete, the ratio of the modulus of elasticity of concrete in tension and compression and their ratio to that of steel, the stress-strain diagram of concrete in compression which he adopts as a "straight-line diagram" in preference to the "parabolic diagram," and especially the behaviour of concrete in tension when reinforced as regards its extensibility and corresponding stress. We will assume the fundamental results of these experiments, reproduce his theory of calculation, apply it to some cases, and show some interesting results proceeding from the application of this theory.

Absolute accuracy cannot be obtained in engineering calculations, but the engineer will always desire that the proportioning of his structures should if possible be based on some sound and scientific principle, guided by his practical judgment, in preference to relying on purely empirical formulæ. Cases occur where the latter method is necessary, for sometimes no theory can cover the many changing conditions which occur in practice; but it is satisfactory to know that many designers of this class of work use methods of calculation similar to that developed here, the chief difference being the adoption of the parabolic stress-strain diagram for the concrete in compression in preference to the straight-line diagram as recommended by Considère.

Fundamental Equations.

Adopting the stress-strain diagram as in Fig. 1 and section of beams as in Fig. 2, with dimensions as there shown, we can find the moment of resistance of the section, thus:—Let c , t and f = maximum intensity of stress on the concrete in compression and tension and on the reinforcement; c , r and r = total stress on the concrete in compression and tension and on the reinforcement; p = ratio of area of reinforcement to area of cross-section of the beam; E_c = modulus of elasticity of concrete in compression = k , E_s = modulus of elasticity of reinforcement. Then, since strain is proportional to the distance from the neutral axis, and stress is proportional to strain and the modulus of elasticity,

$$\frac{c}{kf} = \frac{1-x}{x-u} \quad \dots (1)$$

Since total compression above the neutral axis equals total tension below it,

$$\frac{c(1-x)}{2} = tx + fp,$$

and in terms of c and t this becomes from (1)

$$\frac{c(1-x)}{2} = tx + \frac{cp}{k} \cdot \frac{x-u}{1-x} \quad \dots (2)$$

and similarly in terms of f and t we have from (1)

$$\frac{kf}{2} \cdot \frac{(1-x)}{x-u} = tx + fp \quad \dots (2')$$

Either (2) or (2)' is used according as we know c or f .

The moment of resistance is found from Fig. 1 by taking moments about the point o , and, in terms of c and t , is given by

$$M = bd^2 \left(tx \frac{4-x}{6} + \frac{cp}{k} \cdot \frac{x-u}{1-x} \cdot \frac{x-3u+2}{3} \right) \quad \dots (3)$$

and, in terms of f and t , it is given by—

$$M = bd^2 \left(tx \frac{4-x}{6} + fp \frac{x-3u+2}{3} \right) \quad \dots (3')$$

Equation (3)' is first determined by above method and (3) obtained by substitution of value of f in terms of c from (1).

As before, (3) or (3)' is used according as we know c or f . Equations (3) and (3)' are rather long, but this is not due to the introduction of practically speaking negligible quantities, thus aiming at unwarranted refinement in calculation, but to the fact that we have three different maximum stresses to take into account.

These three fundamental equations, (1), (2) and (2)', (3) and (3)', can now be employed to give curves which enable us to find quickly the size of beam necessary to develop any moment of resistance; for from (3) or (3)' we see that if m = moment of resistance of a beam of unit dimensions, that of a beam of dimension $b \times d$ as in Fig. 2 is given by

$$M = m \cdot bd^2.$$

Thus we need merely to find the moment of resistance of a beam of unit dimensions for varying percentages of reinforcement.

To determine the ultimate strength of a beam we will take $u = \frac{1}{10}$; $\frac{E_c}{E_s} = k = \frac{1}{10}$;

$c = 2,140$ lbs. per sq. in.; $t = 170$ lbs. per sq. in.; $f = 30,000$ lbs. per sq. in.,—the elastic limit being the ultimate strength of the reinforcement (steel) so far as it is of use in this construction. Any variation of these values may be used if desired, but the principle of calculation remains the same.

Fig. 3 represents by the curve the values of m for different percentages of reinforcement, Fig. 4 shows position of the neutral axis, and Fig. 5 gives the corresponding stress on the concrete and reinforcement, the full lines being taken in all cases. The curves are obtained from the three fundamental equations by the following method, and all other cases of similar curves are worked out in the same way:—

With some percentage of reinforcement both reinforcement and concrete will develop at the same time their maximum allowable stresses. Putting $c = 2,140$ and $f = 30,000$ in (1) gives $x = .625$; this value of x in (2) or (2)' gives $p = \frac{0.98}{100}$ or .98 per cent. This is the

point where the bend takes place in the curve. Next putting these values of p and x along with the adopted values of u , k , c , t , and f in (3) or (3)' we find $m = 292.3$ ins.-lbs., which is the value for a unit beam, while that of a beam of dimensions $b \times d$ is $M = 292.3 bd^2$. The stress on the concrete or steel is 2,140 or 30,000 lbs. per sq. in., as in Fig. 5. Of particular interest is the point where the bend takes place; it is termed the "critical" or "economic" percentage. Below this percentage of reinforcement the steel is fully stressed to its maximum value of 30,000 lbs. per sq. in.; above it the concrete is fully stressed to its maximum value of 2,140 lbs. per sq. in. and the steel falls below its maximum value, as shown in Fig. 5. This is natural when we consider that the critical percentage is obtained by putting in just sufficient reinforcement to take full value out of the concrete. Hence, below the critical percentage the steel is fully stressed and the

concrete is below its full value; above it we have matters reversed and the stress on the steel falls more and more as its percentage increases (see Fig. 5), thus being very inefficiently employed, as will be seen in dealing with double reinforcements.

As examples of calculation, if $p = \frac{1}{2}$ per cent., from (2)', $x = .68$, as we know $f = 30,000$ and $t = 170$; this value in (3)' gives $m = 182.4$ ins.-lbs., and finally from (1) $c = 1,650$ lbs. per sq. in.—that is, below its maximum value. We use (2)' and (3)' since we know $f = 30,000$; had we used (2) and (3) with $c = 2,140$ we would have obtained a greater value of m , as c is not so high as 2,140; this greater value being inadmissible since it would entail f having a much higher value than 30,000. And when above the critical percentage—say, $p = 2$ per cent.—from (2), $x = .535$, as now we know $c = 2,140$ and $t = 170$; this value in (3) gives $m = 355.6$ ins.-lbs., and finally from (1) $f = 20,345$ lbs. per sq. in.—that is, below its maximum value.

Effect of Neglecting Tension on Concrete.

It is sometimes proposed that, as the tension strength of concrete is an uncertain and unreliable quantity, it should be neglected in calculations. This may be done by putting $t = 0$ in the fundamental equations. It simplifies the calculation and gives curves of m , position of the neutral axis, and stress on steel and concrete, as shown in dotted lines in Figs. 3, 4 and 5. The critical percentage is now .133; it must rise, since r alone has now to balance c . But from Fig. 3 it is seen that beyond this percentage the strength of the beam so calculated is practically the same as when the tension of the concrete is taken into account. This result is easily explained; for we have introduced into the fundamental equations a mathematical condition and must enquire as to its mathematical effect on the distribution of the forces at the section of the beam.

First, since r alone has now to balance c , the neutral axis clearly must rise. Consider first a case where the percentage of reinforcement is above the critical. See Fig. 6, which is a stress diagram at the section of the beam considered—the stress on the reinforcement

being ab or ac multiplied by $\frac{1}{k}$. The full

line represents the case where $t = 170$, and the dotted line where $t = 0$. The neutral axis rises from o to o' , but, being above the critical percentage, $c = 2,140$ lbs. per sq. in.

in both cases, and f increases from $ab \times \frac{1}{k}$ to $ac \times \frac{1}{k}$. The total compression and tension

at the section decreases, but from the figure it is seen that the lever arm of these two forces increases. The gain of moment of resistance due to this latter circumstance is nearly balanced by the loss due to the first-mentioned, and so it happens that the nett value is not much reduced. Also in this case the total value of the tension below the neutral axis is not reduced by r , since r now increases due to the increase of f . This is not so, however, when we take a case below the critical percentage of .133. The neutral axis again rises (Fig. 7), but f cannot now increase, since it is at its maximum already, and the stress diagram across the section is as shown; that is, c decreases from ab to ac . The lever arm of the forces still increases; but the decrease of the total compression and tension is much greater than in the former case; it now decreases by the whole value of r , since f cannot increase. Hence there is a greater proportionate decrease in the forces of the couple, and it is found that the nett value of m , as compared with taking $t = 170$, is a considerable reduction.

As a numerical example with reinforcement 2 per cent., we find that the neutral axis is .465 in. from the top of the (unit)

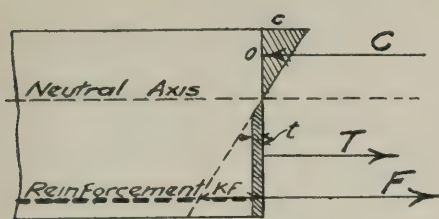


Fig. 1

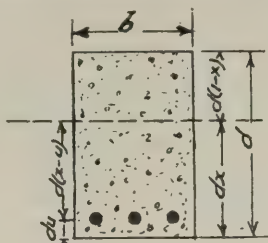


Fig. 2

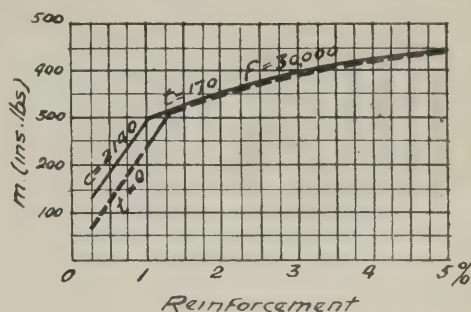


Fig. 3

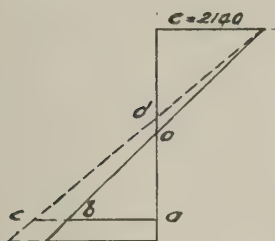


Fig. 6

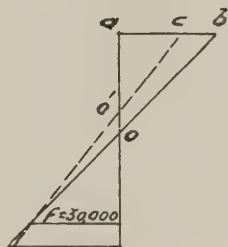


Fig. 7

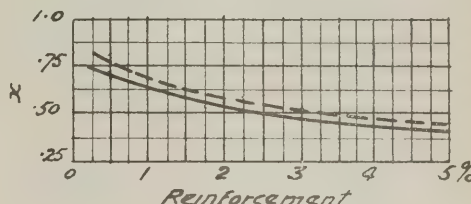


Fig. 4

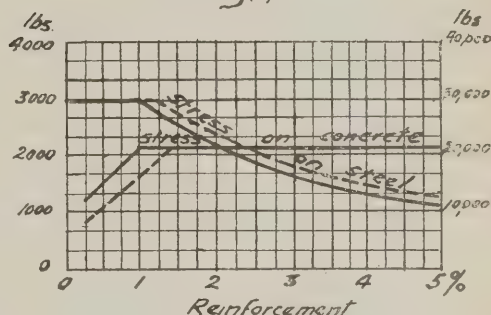


Fig. 5

beam, and $f = 20,345$ lbs. per sq. in. Hence

$$c = \text{rin.} \times .465\text{in.} \times \frac{2140}{2} = 497.8 \text{ lbs.,}$$

$$T = \text{rin.} \times .535\text{in.} \times 170 = 90.9 \text{ lbs.,}$$

$$F = \frac{2}{100} \times 20345 = 406.9 \text{ lbs.,}$$

$$\text{and } T + F = 497.8 \text{ lbs.}$$

And when $t = 0$ the neutral axis is .435in. from the top of the (unit) beam, and $f = 23,372$ lbs. per sq. in.; hence

$$c = \text{rin.} \times .435\text{in.} \times \frac{2140}{2} = 465.45 \text{ lbs.,}$$

$$F = \frac{2}{100} \times 23272 = 465.44 \text{ lbs.,}$$

that is, a decrease of 32.35 lbs.; but the lever arm (as regards c and F) increases from .745in. to .755in.

Taking moments about a point in the line of c , we have for the moment of resistance in the first case—

From reinforcement

$$m = 406.9 \times .745\text{in.} = 303.14$$

From concrete in tension

$$m = 90.9 \times .577\text{in.} = 52.45$$

$$\text{Total} = 355.59 \text{ ins.-lbs.}$$

And similarly in the second case—

From the reinforcement

$$m = 465.44 \times .755 = 351.41 \text{ ins.-lbs.}$$

If now we take a case below the critical percentages at, say, $p = \frac{1}{2}$ per cent., we would have the neutral axis .32in. from the top of the (unit) beam, and $c = 1,650$ lbs. per sq. in.

$$\text{Hence } c = \text{rin.} \times .32\text{in.} \times \frac{1650}{2} = 264 \text{ lbs.}$$

$$T = \text{rin.} \times .68\text{in.} \times 170 = 115 \text{ ,,}$$

$$F = \frac{1}{200} \times 30000 = 150 \text{ ,,}$$

$$265 \text{ lbs.}$$

When $t = 0$ the neutral axis is .254ins. from the top of the (unit) beam, and $c = 1,180$ lbs. per sq. in.

$$\text{Hence } c = \text{rin.} \times .254\text{in.} \times \frac{1180}{2} = 149.8 \text{ lbs.}$$

$$F = \frac{1}{200} \times 30,000 = 150 \text{ lbs.}$$

The lever arm of c and F has increased from .793in. to .815in., a greater increase than before, but the forces of the couple have decreased to a much greater degree; on calculating the moment of resistance we have—

$$m = 150 \times .793\text{in.} + 115 \times .553\text{in.}$$

$$= 182.4 \text{ ins.-lbs.,}$$

and when $t = 0$

$$m = 150 \times .815 = 122.25 \text{ ins.-lbs.}$$

Effect of Variation of the Modulus of Elasticity of the Concrete.

This is a very variable quantity, and we have taken an average value, namely, $\frac{1}{10}$ th that of the steel reinforcement. It is interesting to see the effect a large variation of this has on the calculated strength of a beam. Taking $k = .08$ and .12, and $t = 0$, in both cases we obtain values of m which can be plotted to give a curve similar to that of Fig. 3. The curves are so close to that of Fig. 3 that they cannot well be shown on the same diagram. Taking $k = .08$ as basis, we have increased it to .12, that is, 50 per cent. The greatest difference in the values of m is at about $1\frac{1}{2}$ per cent.; it decreases from 345 to 300, or a difference of 45 in 345. This is only about 13 per cent.—a most satisfactory result, as we cannot, in making concrete, have very great control over its modulus of elasticity. The fact can be explained as in the case of neglecting tension; we have introduced into the calculation a condition which has two compensating effects, and thus the value of m is not much altered as compared with the variation of k . Fig. 6 will again show the change in stress distribution at a section when the value of k rises from .08 to .14, the percentage of reinforcement being above the critical. The full line represents the case where $k = .08$ and, considering the figure as a strain diagram, the strain ab produces enough stress to enable F to balance c . If k rises the modulus of elasticity of the reinforcement decreases relatively to that of the concrete, and the strain will no longer produce sufficient stress to enable F to balance c . Hence the neutral axis must rise to o^1 . Since $c = 2,140$ in both cases the values of r , c and also f have now fallen—even though the strain on the reinforcement has increased. But we have again the increase in the lever arm of the forces of the couple, and as before this compensates in some measure the loss of moment due to the decrease of the forces of the couple. Thus the variation in the value of m will be less than that of k .

Safe Load Curves.

If we decide that the factor of safety on a beam is to be, say, 4 we can construct safe load curves by reducing the ordinates of m in Fig. 3 to one-fourth their value; on the other hand, such curves are sometimes constructed thus. Seeing that concrete is a material very variable in its strength we may take it for a factor of safety of about 4; the steel being a more reliable factor, may be

used with a factor of safety of about 2. Thus we can obtain m curves with $c = 600$, $t = 2.5$, $f = 16,000$. The disadvantages of this method are, first, that the actual factor of safety varies—in this case from $3\frac{1}{4}$ to $3\frac{3}{4}$; and, secondly; that while we know the factors of safety on each material we do not actually know the factor of safety on the beam itself.

If in our calculations we make $t = 0$, we see from equations (2) and (2)' that x is independent of c or f . Below the critical percentage we have for the value of the moment of resistance

$$m = fp \frac{x - 3u + 2}{3}$$

which shows that for a given value of p , m is proportional to f ; so we would have a factor of safety of 2 when the percentage is below the critical of the safe load curve; when above the critical percentage we have

$$m = \frac{cp}{k} \frac{x - u}{1 - x} \frac{x - 3u + 2}{3}$$

and now for a given value of p , m is proportional to c ; hence the factor of safety is 4 when the percentage is above the critical of the ultimate load curve; and between these two critical percentages it will lie between 2 and 4. Calculation with definite stresses and drawing the curves of m so found will clearly illustrate this.

It would seem that, if the ultimate value of m agrees with experiment, it is better to design from this value with a constant factor of safety rather than to construct curves by giving various safe values to c , f and t , and thus having this factor varying according to the percentage of reinforcement and unknown as to its exact value as compared with those chosen on the constituent materials.

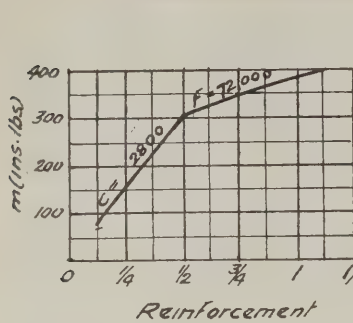


Fig. 8

Expanded Metal.

This type of reinforced concrete work is largely used in this country, and it would be interesting to apply the above methods of calculation to it. It is a very efficient type of reinforcement; for when the steel has reached its elastic limit it will not, owing to the larger deformation thereafter, behave as a reinforcement of steel rods—that is, slide through the concrete and so lead to the failure of the beam. Its form prevents any sliding and thus the strength of the steel is used to its ultimate value. The value of f is no longer the elastic limit, but the ultimate strength, which is from 30 to 32 tons per sq. in. We have now to settle on a value of c for this class of work. Many experiments on slabs with this reinforcement have been made, but the breaking loads so found vary to a large extent; this may be due partly to the manner of loading—a case is considered later on—but here average values will be taken. The example below shows how to find the necessary stress intensity on both steel and concrete to develop a moment of resistance equal to the bending moment applied.

In the catalogue of the Expanded Metal Co. the following test on a slab is given:—

Span 3 ft. 6 ins., thickness 3 ins., reinforcement $\frac{7}{32}$ in. by $\frac{3}{32}$ in. by 3 ins. mesh, breaking load (in one case) 12 cwts. per sq. ft.

The bending movement due to this is about 26,400 lbs. on a slab 12 ins. broad.

$$\therefore m = \frac{M}{bd^2} = \frac{26400}{12 \times 3 \times 3} = 244 \text{ ins.-lbs.}$$

Cross-section of beam = 12 ins. \times 3 ins. = 36 sq. ins.

$$\text{Area of steel} = 8 \times \frac{7}{32} \times \frac{3}{32} = \frac{21}{128} \text{ sq. ins.}$$

$$\therefore p = \frac{21}{128 \times 36} = 0.46 \text{ per cent.}$$

Taking $t = 0$ in all calculations from equation (2) or (2')—we can use either equation now since we see from these equations that x is independent of c or f when $t = 0$ —we find for this percentage that $x = .755$.

From equation (3) we have

$$244 = f \times \frac{.46(.755 - .3 + 2)}{100 \times 3}$$

whence $f = 64,800$ lbs. per sq. in., or about 29.0 tons per sq. in., and putting this value in (1) gives $c = 2,420$ lbs. per sq. in. These results are of course with former values of k and u . Subject to our fundamental equation and conditions these are the stresses necessary; and dealing with several tests we find values of c and f which, put in the equations, will give values of m agreeing with the average of these tests. So doing we find we can take $c = 2,800$ and $f = 72,000$ lbs. per sq. in. Values of m can then be calculated and are shown in Fig. 8, and comparing the curve with results of experiments we have Table I. In the average result of experiment the higher values of m in brackets are neglected; for instance, in one case of 0.46 per cent. the value of m rose to 376 by experiment; this involves on calculation the exceedingly high values of $c = 3,720$ lbs. per sq. in. and $f = 44.4$ tons per sq. in. An increase of m so much above the average

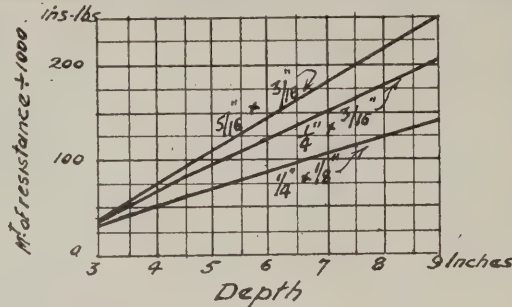


Fig. 9.

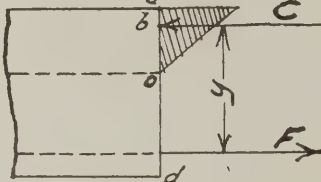


Fig. 10

would give rise to doubt as to the full weight of the load being freely distributed over the slab, and is considered later on. The critical percentage is also about $\frac{1}{2}$, agreeing well with experiment. In all these cases t is taken as zero, which, as seen, will reduce the calculated value of m below the critical percentage; but in the case of expanded metal, which stretches to the breaking point before giving way, it is doubtful if at that time the tension strength of the concrete has any appreciable value.

TABLE I.

Value of m .			
	Experiment.	Average of experiment.	Curves.
.46 per cent.	232, 303, 303, (376)	279	275
.70 " "	310, 362, 380	340	330
.76 " "	327, 334, 334, 350, (408)	336	338

Perhaps a more convenient method of representing the strength of different gauges of expanded metal in various depths of concrete is that shown in Fig. 9. It shows, for 3 gauges of expanded metal, the moment of resistance of a slab 12 ins. wide and of thickness in the figure. It is easily deducible from Fig. 8; for in a slab 12 ins. by $4\frac{1}{2}$ ins. with expanded metal No. 8 gauge or $\frac{1}{4}$ in. by $\frac{1}{4}$ in. by 3 ins. mesh the concrete is 54 sq. ins. in section; the metal is $\frac{1}{4}$ sq. in., and so $p = 0.46$ per cent. From Fig. 8 $m = 275$, and hence $M = 275 \times bd^2 = 275 \times 12 \times 4\frac{1}{2}^2 = 66,800$ ins.-lbs.

With a thickness of concrete of about 4 ins. this gauge will form the critical percentage of reinforcement, which explains the bend

(scarcely perceptible to this vertical scale) in the curve there; the position of this bend will vary for the different gauges of expanded metal used.

The values of m given in Fig. 8 may be compared with corresponding values deduced from the safe load for various spans and gauges of expanded metal as given in the company's catalogue. This comparison is shown in the accompanying table II. and gives practically the factor of safety of 4 as there stated. For a load of 3 cwts. per sq. ft. on a slab 12 ins. broad we have the results shown.

Modulus of Rupture of Concrete in Compression.

It may be said that in the fixing of values of c and f for the calculation of expanded metal slabs we have fitted in such values as, conforming to our fundamental equations and conditions, will make experiment and calculation agree. This is analogous to the value of f used, for example, in calculation of timber or cast-iron beams in the well-known equation $\frac{f}{y} = \frac{M}{I}$, f being the modulus

of rupture or transverse strength as distinguished from the direct tension or compression strength. The value of c may be called the modulus of rupture of concrete in compression, which would be expected to be higher than the direct compression strength. If it is considered that this may not be the actual stress, but merely one suitable to make experiment and calculation agree, we may dispense with the condition that strain and stress are proportional to the distance from the neutral axis both above and below, and without this limitation we can from equations (2) and (3) determine very early what must be the total stress on the concrete.

However variable the materials forming a beam may be, one absolutely true condition of equilibrium of the forces acting at any section is that the horizontal forces of tension and compression must balance, provided that vertical forces only act on the beam; and a second is that the moment of the couple so formed must equal the moment of the forces on either side of the section—that is, the bending moment. Taking a case where the reinforcement broke, we have, from an experiment of the writer's, $p = 0.70$ per cent. and $m = 380$.

Since the reinforcement broke,

$$F = f \times p = 72,000 \times \frac{.7}{100} = 504 \text{ lbs.}$$

$\therefore c = 504$ lbs. also.

If y = mean distance between c and F (Fig. 10), or the lever arm of the couple, $504y = 380$. $y = .754$ ins.

Taking $u = \frac{1}{10}$ again, $db = .854$ ins.

Though strain and stress are not now proportional to distance from the neutral axis—we have, if we adopt distribution of compression stress as in figure, $\frac{1}{3}ao = 1 - .854 =$ or $ao = .438$ ins.

TABLE II.

Span.	Bending moment.	Strand. Mesh 3 ins.	Concrete.	Area of steel.	Area of concrete.	p .	$m = \frac{M}{bd^2}$.	m (from Fig. 8).	Factor of safety.
Ins.	Ins.-lbs.		Ins.	Sq. ins.	Sq. ins.	Per cent.			
48	8,064	$\frac{3}{16}$ by $\frac{1}{8}$	3	$\frac{3}{16}$	36	.52	74.7	303	4.06
60	12,600	$\frac{3}{16}$ by $\frac{1}{8}$	4	$\frac{3}{16}$	48	.52	65.6	303	4.62
72	18,144	$\frac{3}{16}$ by $\frac{1}{8}$	$4\frac{1}{2}$	$\frac{3}{16}$	54	.58	74.6	312	4.18
84	24,696	$\frac{3}{16}$ by $\frac{1}{8}$	5	$\frac{3}{16}$	60	.52	82.3	303	3.70
96	32,256	$\frac{3}{16}$ by $\frac{1}{8}$	6	$\frac{3}{16}$	72	.52	74.6	303	4.07

TABLE III.

Reinforcement.	m .	db (Fig. 10).	c .	For c .	Remarks.
Percentage.			Lbs. per sq. in.	Lbs.	
0.46	244	.836	1,346	331	$u = \frac{1}{10}$ $f = 72,000$.
0.46	376	.723	—	—	Ditto.
0.70	380	.854	2,302	504	Ditto.
0.70	380	.900	3,173	476	$u = \frac{1}{10}$ $f = 68,000$.
0.76	408	.848	2,400	547	$u = \frac{1}{10}$ $f = 72,000$.
0.76	408	.888	3,070	518	$u = \frac{1}{10}$ $f = 68,000$.

So $\frac{1}{2}c \times .438 = 504$ lbs.
 $c = 2,302$ lbs. per sq. in.

This is less than the rupture value, as the concrete did not fail.

Taking now a case where the expanded metal did not break, we have by an experiment $p = 0.76$ per cent. and $m = 408$. We do not know f , but assuming it at present at 72,000 lbs. per sq. in., and calculating from these data, $c = 2,400$ lbs. per sq. in.; but as f did not reach this value (the reinforcement not breaking) we will assume next $f = 68,000$. We now find $c = 3,070$ lbs. per sq. in., which is more likely nearer the actual stress than the previous value. Treating experiment in this way, we may find values of c and y which cannot be far wrong. These are shown in Table III., and it must be noted that they are most likely not so great as the modulus of rupture, and are on the small side as regards the actual stress, as it is doubtful if the whole area of the reinforcement is at the moment of failure at 32 tons or 72,000 lbs. per sq. in., since the reinforcement tends to break strand by strand and so reduces the average stress; while, as we see, a decrease in f causes a rise in the value of c . If we assume the stress above the neutral axis to vary as the ordinates of a parabola the values of c will be reduced by about 16 per cent.

These values are not for use in the three fundamental equations, since we have, in order to find a more probable value, dispensed with the perhaps too stringent condition that stress is proportional both above and below to the distance from the neutral axis, but they show that the previously adopted value of c is not excessive.

As regards the second line, where $p = 0.46$ per cent. and $m = 376$, this is the case referred to previously; we find $y = 1.13$ and $db = 1.23$, or the lever arm of the couple necessary is greater than the depth of the unit beam; and this is so even though we give a reasonable value to the tensile resistance of the concrete. It is difficult to see how the moment could actually have been applied to the beam; doubtless much of the load was transferred to the side of the span by an interlocking of the load, and so the actual moment would be less than estimated.

(To be concluded.)

Obituary.

Mr. Thomas C. Hay, borough assessor, of Edinburgh, died recently in his sixtieth year.

Mr. John Walker, builder and contractor, of Derby, who died on January 10th last, left estate which has been valued at £11,895 nett.

The new **Ivanhoe Hotel**, at the corner of Bloomsbury Street and Great Russell Street, London, has been completed from designs by Mr. T. Duncan Rhind, A.R.I.B.A., of Edinburgh, the general contractors being Messrs. William Howard & Co., of London. The interior wood finishings were supplied by Messrs. Scott, Morton & Co., of Edinburgh. The hotel comprises twenty suites of rooms and 250 bedrooms. Wood floor covering has been executed by the Lithic Fireproof Flooring Co.

A new **Jewish Synagogue at Stockton** is being erected, in Hartington Road, at a cost of £1,000, from designs by Mr. T. W. T. Richardson, architect. On either side of the vestibule will be men's and women's cloak-rooms, and from the latter a staircase will give access to the gallery, accommodating fifty women. The synagogue will seat seventy-four men. The ark will be built into a recess on the east wall, with the usual platform in front. At the rear of the synagogue will be a classroom.

ARCHITECTURE AT THE GLASGOW INSTITUTE OF FINE ARTS.

THE forty-fifth annual exhibition of the fine arts is now being held in the Institute Galleries in Sauchiehall Street, Glasgow. The architectural works include a number of

Churches.

foremost among which perhaps is that of St. James, Kilmalcolm, by Mr. William Leiper, a dignified composition in the later Gothic style, with a large corner tower and much fine detail. Mr. Alexander Cullen shows two churches—an interior illustrated by a fine drawing, and an exterior with a saddle-backed tower and two doorways which are rather commonplace. The much-vexed cathedral at Iona is shown by Messrs. Honeyman, Keppie & Mackintosh by a splendid drawing from the pen of Mr. Alexander McGibbon. Additions to the Catholic Apostolic Church at Glasgow are exhibited by Messrs. Salmon, Son & Gillespie, in their usual style with original detail; Ruchill U.F. Church, Maryhill, is shown by Mr. N. C. Duff; Bridgeton Baptist Church by Messrs. Miller & Black—a pleasing design in the Perpendicular style; and Messrs. Watson & Salmon the Wesleyan Methodist Halls at Paisley, of good design, and photographs of a church for the same at Girvan.

Other Work.

A new hotel at Arrochar, of which Mr. A. N. Paterson is the architect, is illustrated by three fine photographs; Mr. Paterson also shows in conjunction with Mr. Campbell Douglas the perspective of their design for the rebuilding of King's College Hospital, London. Messrs. Walker & Ramsay are represented by a city hall front, and Messrs. Burnet, Boston & Carruthers by "Redholm"—a residence for the late lord provost of Glasgow. A dainty colour perspective of Martin's Bank, Bromley, Kent, is shown by Mr. Ernest Newton, who also exhibits a house at Wokingham, Berkshire. Mr. H. R. Taylor shows a design for Stirling public library, and Mr. D. Andrew, junr., a new school at Dalmauir which is much above the average of school architecture and distinctly to be preferred to the Scotland Street School of Messrs. Honeyman, Keppie & Mackintosh. Messrs. Watson & Salmon show three photographs of the entrance gateway to Tulliallan Castle—a very interesting piece of architecture.

A large wash drawing is exhibited of a design for a Victoria Memorial in obelisk form by Mr. F. E. E. Schenck. Mr. J. K. Hunter shows a frame of three photographs of a mansion-house in Wigtownshire, in good style, while Mr. J. Austen Laird is represented by three coloured elevations of a Kilmalcolm house. Two perspectives of good colour and appropriate design are shown by Mr. J. C. McKellar of a large house at Troon, and three thoughtful interiors—photographs—by Mr. James A. Morris.

The Pavilion, Dunoon, is shown by Mr. W. Fraser—a fine but somewhat flattering drawing, and the Pavilion at Ayr by Messrs. Babbie, Bonn & Hamilton Scott.

Messrs. Leadbetter & Fairley show their addition to Edinburgh University, the Usher Institute, in a wash drawing of a pleasing design, and also their reconstruction of "Carling," Ayrshire; while Messrs. Gardner & Miller exhibit two houses, one in South Africa. These exhibits and also the house at Polmont by Mr. J. C. Reid, and the double villa at Troon by Mr. G. Galloway, are distinctly encouraging examples from younger Glasgow firms.

The exhibition is well worth a visit, and might be still more so if Glasgow architects were to unite in making it a record of the year's work, if not also a forecast of the years to come.

Enquiries Answered.

The querist's name and address must always be given, not necessarily for publication.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Correspondents are particularly requested to be as brief as possible.

Reinforced Concrete.

EASTBOURNE.—C. D. H. writes: "Kindly explain the meaning of the term 'reinforced concrete.' In your issue for March 14th, p. 138, you refer to certain test beams of concrete reinforced from $\frac{1}{4}$ to $1\frac{1}{2}$ per cent. How reinforced; by what process?"

See article in this issue.

Plaster Slab Partitions.

WOKING.—F. A. writes: "I have erected some partitions with 'Mack' slabs. Before applying the finishing coat of Sirapite and lime putty, the slabs were treated with a weak Portland cement wash to prevent suction. As the work dries the finishing coat blisters and falls from the slabs. Please state the cause of this, and the best way to finish these goods."

The makers, Messrs. J. A. King & Co., state that "the method your correspondent adopted is very largely followed. Another method, however, to stop the suction is to use a wash of size water instead of a Portland cement wash. Certainly something must be at fault if the finishing coat comes out in blisters. We think, however, that we can understand how this has occurred. The lime in the putty must have been of inferior quality. It is a well-known fact that when the lime is not all that it should be, blistering will occur in ordinary plastering, even on brick walls."

Calculating Tee Rafter for Steel Roof.

BUCKS.—PUZZLED writes: "In calculating the strength for Tee iron rafters of an iron trussed rafter roof truss with four bays, 50ft. span and $\frac{1}{2}$ in. rise with an ordinary glazed roof, and allowing 40 lbs. per ft., including wind-pressure, with the formula

$$W = \frac{16s}{1 + \frac{l^2}{ad^3}} = 1500$$

and a factor of safety of 4, the result is $5\frac{3}{4}$ sq. ins. Is this correct? It seems too much. Is the allowance of 40 lbs. sufficient? For a lantern to the above the members for the same work out to such small dimensions that I suppose it is advisable to keep to the size given in examples in text-books, &c."

The sectional area of Tee rafter is stated as $5\frac{3}{4}$ sq. ins. To obtain this area a 5 in. by $4\frac{1}{2}$ in. by $\frac{3}{8}$ in. steel Tee would be required, but as the largest out of ordinary stock is 4 ins. by 5 ins. by $\frac{1}{2}$ in., two unequal angles, each $4\frac{1}{2}$ ins. by $2\frac{1}{2}$ ins. by $\frac{7}{16}$ in., bolted back to back, may be used. Assuming the given rafter to be divided into unsupported lengths of 7 ft., and using the formula given by querist,

$$W = \frac{16s}{1 + \frac{l^2}{ad^3}} = \frac{16 \times 5\frac{3}{4}}{1 + \frac{84^2}{1500 \times 4 \cdot 5^3}}$$

= say 73 tons breaking thrust, or allowing the correspondent's factor of safety of 4 = about 18.2 tons safe thrust on rafter. The allowance of 40 lbs. per sq. ft. on the surface of roof will be sufficient if it is not in an exposed position, but a better allowance is $\frac{1}{2}$ cwt. per ft. super., as this leaves a fair margin for contingencies.

HENRY ADAMS.

Furnace Clinker for Concrete.

LONDON.—B. H. writes: "Is the refuse furnace clinker from gasworks suitable for making concrete to be used in foundations?"
Yes.

Illuminating.

ROTHERHAM.—LUX writes: "Please name a good book to help me in the preparation of illuminated addresses."

"Illuminating," by W. J. Loftie (Blackie & Son, price 6s.), or "A Primer of the Art of Illumination," by F. Delamotte (Crosby, Lockwood & Son, price 6s.).

Smoky Grates.

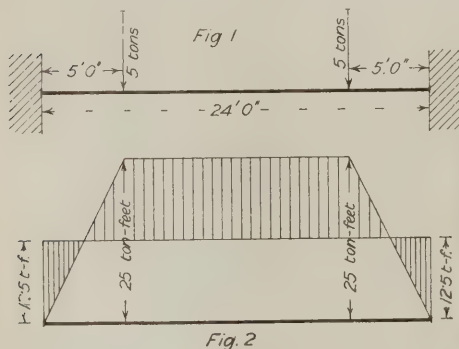
ABBEY WOOD.—K. writes: "In a house partly surrounded by tall trees on the south-west and north-east I wish to alter the existing old-fashioned open firegrates with hobs, as at all times they smoke a little into the rooms. The smoke is not due to sudden puffs of wind, but to want of draught. What kind of closed grates should I use, and how can I prevent them smoking? At present the chimneys are capped with the ordinary earthenware pots."

We should not favour any particular form of closed grate. You may suit your fancy. We think it important, however, to fix one of the many patent chimney pots which increase the draught; several are advertised in this journal.

Concentrated Load on Fixed Beam.

LAMBETH.—OLD SUBSCRIBER writes: "How can I obtain the bending moments at ends and under weights in the case of a beam fixed at either end, 24ft. span, and having loads of 5 tons at distances of 5ft. from each end?"

This condition of loading is not among any of the published illustrations known to the writer, but the bending moments would appear to be correctly given by the diagrams herewith, where Fig. 1 shows the conditions and Fig. 2 the bending moment diagram.



In the latter the close ordinates indicate tension in upper flange and the open ordinates compression in upper flange, the stresses in the lower flange being reversed. The junctions between the two sets of ordinates show the points of contrary flexure.

HENRY ADAMS.

Coloured Rough-cast.

HALTWHISTLE.—E. H. writes: "What are the ingredients mixed with rough-cast to give it a coloured finish?"

The metallic oxides should be used. The yellow, brown or red ochres, which are oxides or hydrated oxides of iron, are generally employed.

R.I.B.A. Preliminary Examination.

NEWPORT.—W. J. writes: "What books do you advise me to get for studying the different subjects required in the R.I.B.A. preliminary examination?"

See the R.I.B.A. Kalendar, price 2s. 6d. from the offices of the Institute, 9, Conduit Street, W.

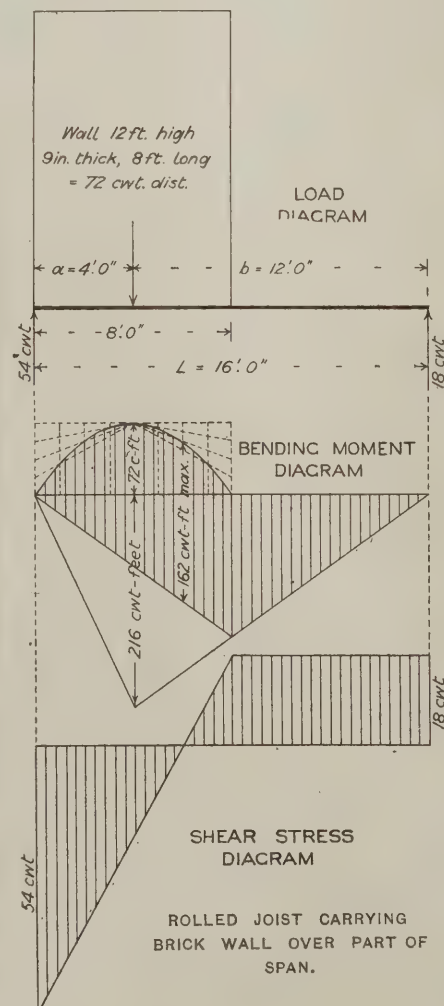
Rolled Joist carrying Brick Wall over Part of Span.

BRADFORD.—SHEBOR writes: "A beam with a clear span of 16ft. carries a 9in. brick wall 12ft. high over half its length from one support. Draw a bending moment diagram and a shear stress diagram, and find the reaction at each support: scales $\frac{1}{4}$ in. to 1ft., 100ft.-cwts. to 1in., and 20 cwts. to 1in. Assuming that a rolled steel joist is to be adopted, what strength-modulus of section would be required so that the maximum stress on the outer fibres should not exceed 8 tons per sq. in.?"

The word "strength" in the expression "strength-modulus of section" should be omitted, as it is likely to lead to misunderstanding. The modulus of section is a value depending upon the sectional area and the arrangement of its parts about the neutral axis. The modulus of transverse rupture is a value depending upon the nature of the material, and is sometimes called "extreme fibre stress." The expression "moment of resistance in square inches" in some rolled-joist section books should read "modulus of section." In the section submitted the graphic diagrams will be as shown and the calculations as follows:—Weight of wall $8 \times 12 \times 75 \times 1 = 72$ cwts. Height of

$$\text{parabola} = \frac{WL}{8} \div \frac{72 \times 8}{8} = 72 \text{ cwt.-ft. Depth of triangle} = \frac{wab}{L} = \frac{72 \times 4 \times 12}{16} = 216 \text{ cwt.-ft.}$$

Bending moments as shown in diagram, maximum scaling 162 cwt.-ft. Reactions at supports $= \frac{wa}{L} = \frac{72 \times 14}{16} = 18$ cwts., and $\frac{wb}{L} = \frac{72 \times 12}{16} = 54$ cwts. at wall end. Shear stresses as shown in diagram. For modulus



of section, $\frac{WL}{8} = zC$, but $\frac{WL}{8} = 162 \text{ cwt.-ft.}$

and $c = 8 \text{ tons} = 160 \text{ cwts.}$, whence $z = \frac{162}{160}$

$= 1' 0' 125$ in foot-units, or $1' 0' 125 \times 12 = 12' 15$ modulus in inch-units. A $7 \times 3\frac{1}{2} \times 18$ lb. rolled steel joist has a modulus of 11' 99 units and an $8 \times 4 \times 19$ lb. rolled steel joist has a modulus of 14' 12 units; the latter must therefore be adopted.

HENRY ADAMS.

Concrete Walling.

KETTERING.—H. C. L. writes: "To what extent do concrete walls transmit sound; also, can a 14in. concrete wall built between waling be relied upon to resist the roof thrusts as well as the same thickness of brick walling?"

Yes; in fact it is rather better.

Books on Libraries and Ironwork.

PETERSFIELD.—V. G. writes: "Are there any books dealing with the planning of small libraries?"

See an article by Mr. Maurice B. Adams in "Specification No. 6," price 5s. 9d. post free from our offices.

GLASGOW.—W. B. writes: "Which are the best books to study to become a structural engineer's draughtsman? I am an architectural draughtsman, but desire to learn the structural work. I would like to know how to calculate the weights and stresses on beams, girders, roofs, &c., before I went into a structural engineer's office."

"Practical Designing of Structural Ironwork," by Prof. Henry Adams (price 8s. 6d.), and Birkmore's "Skeleton Construction in Buildings" (price 12s. 6d.). These books can be obtained post free for the prices named from our offices.

Junction of Tiles and Wood Frames.

BLACKETT writes: "What are the most satisfactory and watertight methods of forming the junction between hung tiles and wood frames?"

Several methods are adopted. The tiles are sometimes bedded in cement, but the latter comes slightly away from the frame. The most satisfactory method is to dress lead round the sides of the frame (nailing to the latter) and under the tiles, or "Ruberoid" may be used in the same way. The tiles above the window should be carried out from the face of the wall by tilting pieces so as to project beyond the window frame.

Architectural Employment Abroad.

BURNLEY.—G. A. B. writes: "I am desirous of gaining an appointment abroad (not necessarily the Colonies). I have had over ten years' general experience in the architectural profession, and during the last four years more particularly in the planning and erection of cotton mills. With a view to further experience in the latter, I should like to gain an appointment in America and other European countries where the cotton industry exists. Please give me the names of various American and Continental magazines, and the source where I may gain enlightenment as to the best mode of procedure to gain the end I have in view."

We do not think your prospects of obtaining a situation abroad by advertising in foreign publications are very promising. The only possible chance that we can see of your obtaining work in the planning and erection of cotton mills is to go to America, France, Belgium or Germany and call on architects engaged in this class of buildings with examples of your work. You might, perhaps, try the experiment of advertising in "The American Architect" and "La Construction Moderne" (published in Paris).

R.I.B.A.

Two Papers on Woodcarving.

A MEETING of the Royal Institute of British Architects was held on Monday evening at 9, Conduit Street, W., the chair being occupied by Mr. Leonard Stokes, F.R.I.B.A.

Papers on "Woodcarving" were read by Mr. W. Aumonier and Mr. A. W. Martyn.

Mr. Aumonier's Paper.

Mr. Aumonier confined himself to the essentially practical side of his subject. Dealing with panel work in its relation to architecture, he said that very fine effects could be obtained by a light and shade treatment, putting some parts very low on the ground and keeping others high. Even a bad design might be made to look tolerable by the way the work was "thrown about," while a really fine design might have no interest if carved with no sense of relief or proper variety of surface. Mr. Aumonier said a design should never be too elaborate, though he felt that in these days of a distinct, and to some architects disquieting, revival of the Grinling Gibbons sort of work, one could not ignore altogether the sumptuous effects arrived at by swags, &c., boldly applied to the surface of plain panels.

Architectural decoration might often be improved by giving more thought to the suitable treatment of carved mouldings—for instance, keeping some very delicate in effect, and some much stronger as a whole.

Caps to columns or pilasters should never be overcrowded, but should show the bell plainly, thus revealing the strength of the column, going right up to the abacus.

As to carving generally, Mr. Aumonier deprecated all mechanical means of getting effect. No part of the ground should ever be absolutely smooth like a planed board, and no part of the surface of the carving itself ever robbed of all expression by the brutal use of glass-paper or fish-skin.

Mr. Martyn's Paper.

Mr. Martyn treated his subject from the historical and critical points of view. He briefly sketched the history of woodcarving, deducing that the best work in all periods had been inspired by religious enthusiasm. He emphasized the point that it was the architect who made the carver. The architect must know what he wanted, and must be able to inspire his carver with his requirements. Grinling Gibbons was cited as an example of an artist in wood who, when left to himself, simply became a clever expert with his tools—as witness the altar-piece at St. James's Church, Piccadilly; whereas, on the other hand, much of the same artist's work in St. Paul's Cathedral, though not nearly so well carved nor so dexterous, had control, had architectural harmony, was part of the architecture and, what was more, part of the architect.

Turning to the educational side of his subject, Mr. Martyn said that though real, useful, living knowledge was being given to students at some of the schools of art, we had no central leading authority to found or carry on any given school of carving. The school of Gibbons was created by his personal force in his work, which was lifted right away from its immediate surroundings to a height carving had not reached for two hundred years. Since his time carving had steadily depreciated. We had now to look for some artist to lead us along the line of progress; and if this could not be done alone, it might be achieved by united efforts.

A gold medal might be founded, on the lines of the Royal Gold Medal for Architecture, and presented annually, or even triennially, as an award of merit to the individual who had done something to raise the

standard of his art, be it in mural decoration, stained glass, plasterwork, woodcarving, or any other branch of architectural work; and the recognition should be public, so that the award should carry with it the good opinion of the art-loving public. But the opportunity should be created for continued study; there should be a central school directed by men of knowledge; always remembering that the architect was the master, the carver the servant, though a direct and living sympathy must at all times exist between them if the best results were to be obtained.

Mr. George Hubbard proposed a vote of thanks to the lecturers for the papers they had read, which was seconded by Miss Eleanor Rowe, and supported by Messrs. J. D. Crace, Inigo Triggs, W. H. Atkin Berry and the chairman.

OUR PLATES.

A REVIEW of the competition for the King Edward VII. secondary school to be built at Lytham, on the Lancashire coast, will be found on p. 89 of our issue for February 14th, where a detailed description of the first-, second-, third- and fourth-premiated designs is given. We need not now repeat the particulars, but for the convenience of readers the following facts may be stated:—Lytham possesses a large endowment vested in governors, who decided recently to spend a considerable sum on the erection of a school, designs for which were invited from thirteen architects resident in the North of England—Liverpool, Hull, Manchester and elsewhere. As initial outlay, £22,000 was allotted for the site and £30,000 for the first instalment of buildings. The site faces the sea and has an area of more than thirty acres. It is a very exposed site, subject to storms of wind and sand of great violence, and this fact has largely governed the lay-out of the plan. The conditions required a group of buildings for day scholars, boarders' and headmaster's residence; staff, including masters, matrons and servants; science and lecture rooms; a large hall to seat 700 or 800 persons; workshops for wood, metal, &c.; a large dining hall with kitchen; and a number of other rooms—all ranged around a quadrangle. The successful architects are Messrs. Briggs & Wolstenholme, of Blackburn, to whom the first premium of £250 was awarded by the assessor, Prof. Beresford Pite.

Law Cases.

A "Bad" L.C.C. By-law as regards Mortar.—At Greenwich Police Court last Wednesday Mr. Baggallay dismissed, with fifty guineas costs, a summons by the London County Council against a firm of Lewisham builders, Messrs. H. & G. Taylor, for using mortar not of proper proportions of lime and sand in the erection of some houses in Boyne Road. Mr. Baggallay said the mortar used was composed of 1 of lime to 3 of sand or grit if it were measured with slaked lime; if unslaked the proportion was about 1 to 5. Many builders had treated the by-law on the basis of measuring slaked lime. It was argued that the by-law was bad because no one could understand what it meant. The builders satisfied him that the meaning of the expression "lime" alone might be either slaked or unslaked. The by-law ought to say how the proportions should be taken, and he was inclined to hold that the by-law was bad on that ground. It did not seem to him unreasonable that "lime" might mean slaked lime, and, therefore, he could not hold that the builders had broken the by-law.

Notes and News.

Mr. F. L. Dove is the new president of the Institute of Builders, and Messrs. W. F. Wallis and F. Higgs vice-presidents.

The Works of Sir Christopher Wren were dealt with by Mr. John Swarbrick, A.R.I.B.A., in a paper which he read before the Manchester Society of Architects on March 27th.

Mr. Jesse Horsfall, F.R.I.B.A., of Todmorden and Manchester, has been appointed architect for the proposed new secondary school to be built on the Stile Estate at Todmorden.

Hotels, Ancient and Modern.—A paper on this subject was read on Thursday last at the Auction Mart, Cardiff, before the Cardiff, South Wales and Monmouthshire Architects' Society, by Mr. Ernest Runtz, F.R.I.B.A.

Motor Warehouses at Nos. 132, 133, 134 and 135, Long Acre, W.C., are being erected by Messrs. Patman & Fotheringham, Ltd., of Theobald's Road, W.C., and Park Street, Islington, N. The architect is Mr. William Woodward, F.R.I.B.A.

Stevenage Grammar School.—The new buildings for this school were opened on Wednesday last by Dr. Butler, Master of Trinity College, Cambridge. The architect is Mr. F. T. W. Goldsmith, F.R.I.B.A., of 1, Verulam Buildings, Gray's Inn, W.C., and the builders are Messrs. Willmot & Sons, of Hitchin, Herts.

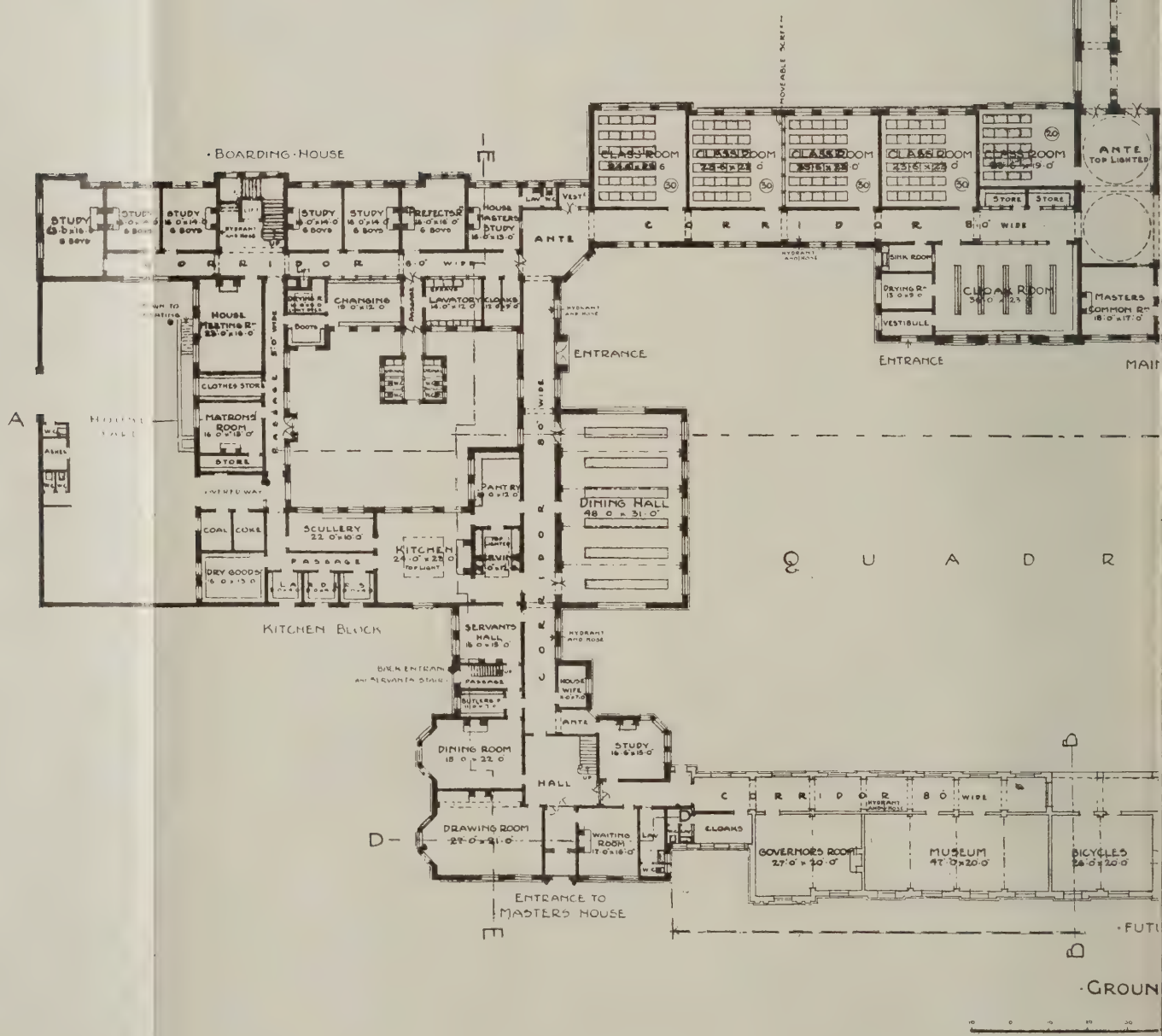
Dissolutions of Partnership.—The partnership which has existed for about five years between Mr. R. S. Balfour and Mr. William A. Pite, F.R.I.B.A., has been dissolved as from February 24th last.—The partnership existing between Mr. Benjamin Gale and Mr. Alfred Gale, carrying on business as carpenters and builders, at 865, Old Kent Road, S.E., has also been dissolved, as and from March 20th.

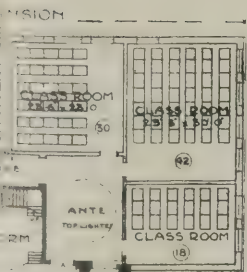
"British and American Building Methods" were dealt with by Mr. J. Roxburgh Sharman, A.M.I.C.E., before the Edinburgh Architectural Association last week. The remarkable growth of the use of steel construction in this country was referred to, and also how American methods were modifying the older practice of British architects. At the same time Mr. Sharman indicated that the best practice in both countries was coming very much into line. The lecturer also discussed the question of loads, and thought probably a safe and good practice would be found in adopting loads somewhere between the extremes of America and Glasgow—dwelling-houses and tenements, 80lbs. per sq. ft.; theatres and hotels, 100lbs.; halls, schools, churches, &c., 100 lbs.

The Builders' Clerks' Benevolent Institution celebrated its twenty-seventh annual dinner at the Holborn Restaurant, W.C., on Tuesday, March 27th. The function was a most successful one, the attendance numbering between 400 and 500. Mr. Howell J. Williams, L.C.C., the president, was in the chair, and in proposing the toast of the evening referred to the humble beginnings of the Institution, which now required an income of between £700 and £800 to support it. He commended the objects of the Institution to all builders' clerks, who, he understood did not support it as they should. Mr. E. Brooks, in replying, mentioned that the work of the Institution was restricted owing to lack of funds. The invested funds now amounted to £7,000, which he should like to see much increased. During the evening about £500 was collected, this sum including £100 from the chairman, £10 10s. each from the Worshipful Company of Carpenters, the Institute of Builders, Mr. W. Curling Anderson, and Messrs. Trollope & Colls, and £5 5s. from the ex-president, Mr. J. Carmichael.

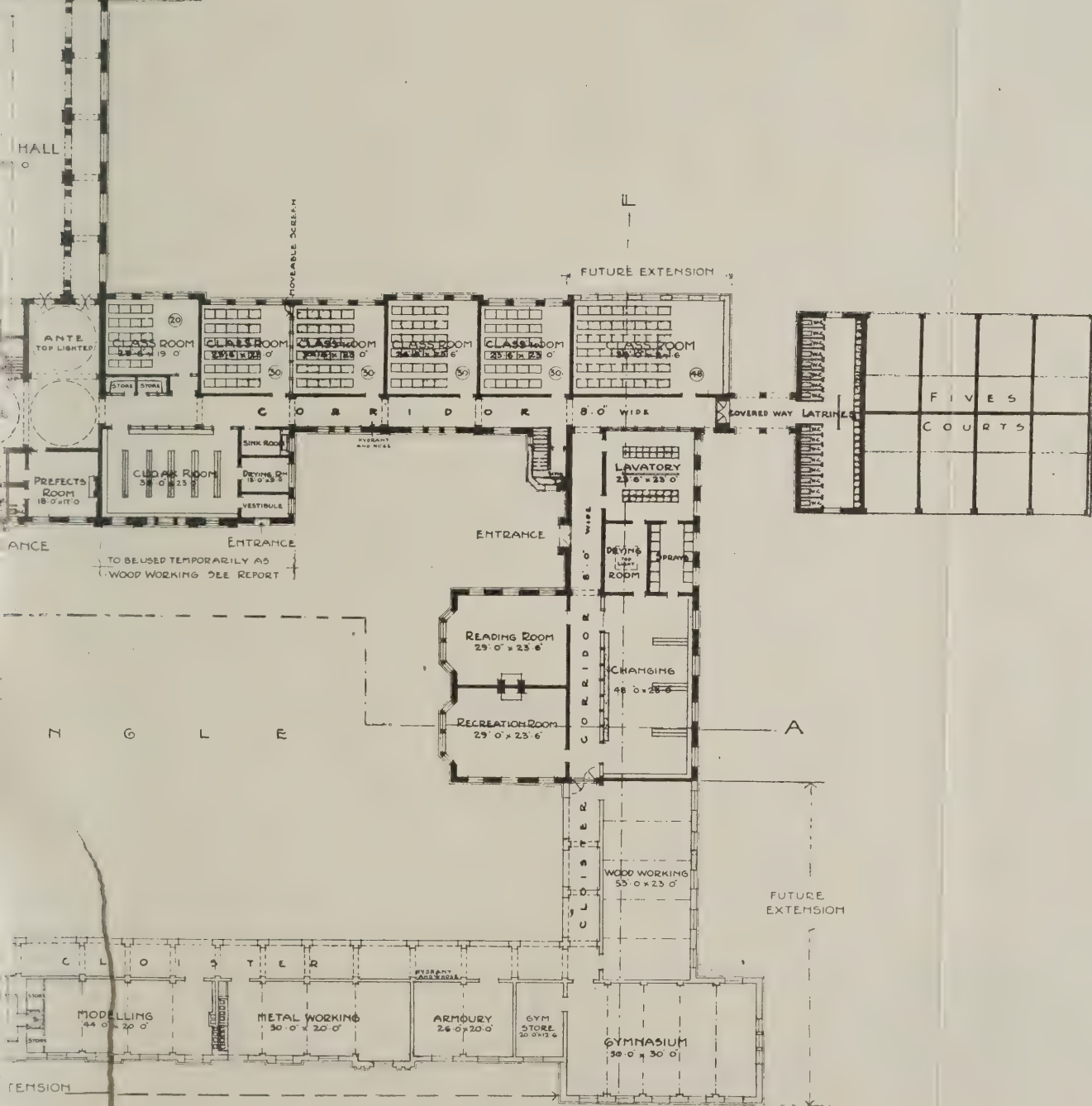


ELEVATION TO CENTRAL HALL AND SCIENCE BLOCK - EAST





KING EDWARD VII. SCHOOL, LYTHAM, LANCs.: FIRST-PREMIATED DESIGN.
BRIGGS AND WOLSTENHOLME, ARCHITECTS.



NOTES ON COMPETITIONS.

A Scottish Competition.

Forty-three designs were submitted in the competition for new buildings of the Institution of Engineers and Shipbuilders in Scotland to be erected at the corner of Elmbank Street and Elmbank Crescent, Glasgow. They were on exhibition in the Wellesley Buildings, Sauchiehall Street, last week. The successful design is No. 16, sent in by Mr. John B. Wilson, architect, of 92, Bath Street, Glasgow.

This competition has been a very successful one. The site is in every way a suitable one. The conditions of competition were very well drawn up, the only condition that might be objected to being that restricting the competition to architects practising in Glasgow. No premium is to be paid to the successful architect Mr. Wilson, but the second design in order of merit by Messrs. Mitchell & Whitelaw is awarded £75, the third by Mr. H. E. Clifford £50, and the fourth by Mr. W. F. McGibbon £25. The accommodation required was a large hall, a small hall, library, reading-room, smoking-room, coffee-room, two council rooms, and several rooms for meetings, secretary's office, &c. It was suggested that the building should not exceed three storeys and basement, that the library, reading-room and secretary's office should be on the ground floor, while the large hall should be on the top floor. These conditions have been fairly well adhered to by the competitors, and several good designs have been sent in besides the premiated ones. The design by Mr. Alex. Cullen is excellent, the elevations being especially fine, and that of Messrs. Honeyman, Keppie & Mackintosh would have made a very fine if somewhat original building. The advising architect was Mr. G. Washington Browne, of Edinburgh, who placed first Messrs. Mitchell & Whitelaw's design. The competition committee, however, have seen fit to change the order of the first and second architects, because of the greater commodiousness of Mr. J. B. Wilson's plan and its greater suitability to their purposes. The building is estimated to cost about £15,500.

The Mitchell Library, Glasgow.

This competition can hardly be said to be so satisfactory as that for the engineers and shipbuilders. After the competition had been won by Mr. William B. White, of Glasgow, he was asked to prepare amended plans, so that the plans which have now been adopted by the Council are, as one of the members stated at the meeting, both internally and externally to the average man new plans altogether. The alterations include the placing of the entrance in the centre of the North Street elevation and the addition of a dome, as shown by the illustration below.



The estimated cost now as approved by the Corporation is £52,850. The accommodation provided includes a main reading hall, 110ft. by 51ft., arranged for 300 readers; a students' room for fifty readers; a ladies' room for fifty readers; a magazine room for 200 readers; and suitable apartments for the Jeffrey Reference Library, for the Glasgow Collec-

tion, and for the Burns Library and Scottish Poets' Corner. Provision is made for the convenient storing of about 400,000 volumes, and for the necessary administrative offices. A considerable space has been left behind the library for future extension of the buildings.

Proposed new Club Rooms for Kirkintilloch Conservative Association.

The conditions just issued for this small competition can hardly be called satisfactory. The proposed rooms are only to cost £1,800, including architects' and measurers' fees, no plan of the site is furnished, nor any premium offered, and, finally, "the Association do not bind themselves to accept any plan."

Bolton School Competition.

The Bolton Town Council held a special meeting recently, when, after prolonged discussion, they decided to throw over the selection made in the competition for a new Council school, for which the design of Messrs. Wright, Garnett & Wright had been accepted by the Education Committee, and also to reject the tender of Mr. H. Fairclough, amounting to £11,418, recommended for acceptance. We shall deal with this affair next week.

Central Library, St. Pancras.

On the selection of Mr. John Belcher, P.R.I.B.A., the Borough Council have invited the following six London architects to submit designs for a new central public library for St. Pancras:—Mr. J. S. Gibson, Messrs. Mallows & Cross, Messrs. Wills & Anderson, Mr. Maurice B. Adams, Mr. Edmund Wimperis, and Messrs. Russell & Cooper.

Edmonton Infirmary.

The following five architects have been invited to submit designs for a new infirmary at Edmonton to accommodate 800 patients—Mr. W. A. Pite, Mr. A. E. Pridmore, Mr. Marcus Collins, Mr. Stuart Hall—these of London—and Mr. W. H. Ward, of Handsworth, Staffs. Each of the competing architects will receive an honorarium of seventy-five guineas. The successful competitor will be paid 5 per cent. on the first £100,000 and 3 per cent. on the remainder, his honorarium to merge in the commission.

Wesleyan Hall and Schools at Lytham.

The design of Mr. Herbert Wade, of Blackpool, and Mr. Walter Wade, of St. Anne's, joint architects, has been selected in competition for the East End Wesleyan Mission Hall and Schools to be built at Lytham at a cost of £2,500.

Baptist Church School, Peterborough.

From four plans submitted for a new Baptist church school to be built in Queen's Road, Peterborough, those by Messrs. Dotteridge & Walford, of Leadenhall Street, London, E.C., have been selected by the congregation.

Competitions Open.

The following is a list of competitions open:—

DATE OF DELIVERY.	COMPETITION.
April 14	SCHOOL AT OSSETT.—Premium of £50 (to merge). Particulars from the Secretary at the Education Office, Ossett.
" 15	PEACE PALACE AT THE HAGUE.—Particulars from the office of the Carnegie Foundation, Noorderinde 33, The Hague.
May 31	NATIONAL CONGRESS HALL FOR BRAZIL.—Premiums of 15,000, 10,000 and 5,000 milreis (equivalent to about £1,685, £1,125 and £562 respectively). 5,000 milreis also for designs not premiated but desirable to be acquired. The conditions of the competition can be seen at the offices of the Commercial Intelligence Branch of the Board of Trade at 73, Basinghall Street, E.C.
No date	ALTERATIONS TO BLOCK OF LONDON BUILDINGS.—Premium of £25. Particulars from Mr. J. H. Batten, 39, Victoria Street, Westminster.

NEW LONDON BUILDINGS.

AT yesterday's meeting of the London County Council the Building Act Committee reported the following applications under the London Building Act, 1894, their recommendations as to consent or refusal being appended in *italics*:—

Extension of the period within which the erection of three houses with one-storey shops in front, on the site of No. 63, Dartmouth Road, Forest Hill, and the erection of additional storeys over the existing shops at Nos. 55 and 55A, Dartmouth Road, were required to be completed, on the application of E. C. Christmas. (*Consent.*)

Greenhouse at the rear of No. 24, Shepherd's Bush Green, Hammersmith, to abut upon Camden Gardens, on the application of G. Stone. (*Consent.*)

Buildings, with projecting one-storey shops, on the eastern side of The Grove, Hammersmith, on the site of Nos. 2 and 2A, on the application of L. V. Hunt, on behalf of F. Britton. (*Consent.*)

Projecting sign in front of No. 11, Long Acre, on the application of Windover, Turrill & Sons. (*Consent.*)

Addition to No. 1, Cochrane Street, St. John's Wood, to abut upon Wellington Place, on the application of Woodrow & Helsdon, on behalf of J. K. Tinson & Son. (*Consent.*)

House with barge-boards on the eastern side of Mount Ephraim Lane, Streatham, to abut upon Norfolk House Road, on the application of Chapple & Utting. (*Consent.*)

Extension of the periods within which the erection of buildings on the east side of Bromley Road and the south side of Sangle Lane, Catford, was required to be commenced and completed. (*Consent.*)

Enclosure of a portion of the portico in front of No. 21, Hill Street, Berkeley Square, on the application of Keeble, Ltd., on behalf of Captain H. S. Clay. (*Refusal.*)

Deviation from the plan approved on April 18th, 1905, for the erection of buildings upon the site of No. 106, Heath Street, Hampstead, so far as relates to an alteration in the height and length of the flank wall abutting upon New End, on the application of J. D. Hunter, on behalf of Miss G. Elsdon. (*Consent.*)

Wooden screen at the rear of Nos. 6 to 10, Garden Place, Aldgate, City, at less than the prescribed distance from the centre of the roadway of Aldgate Avenue, on the application of J. Hood and Sons, on behalf of G. Horwitz. (*Refusal.*)

Retention of an iron and concrete timber drying stage at Tredegar Works, on the south-west side of Ordell Road, Bow, on the application of Perry & Co. (*Consent.*)

Retention of two wood and iron buildings on a site on the western side of Ladimer Road, Hammersmith, on the application of A. Dawkins, on behalf of W. J. Moore. (*Refusal.*)

Extension of the periods within which the erection of buildings between Nos. 65 and 69, South Side, Clapham Common, Clapham, was required to be commenced and completed, on the application of Horner & Lucas. (*Consent.*)

Oriel window in front of No. 88, Goswell Road, Finsbury, on the application of P. B. Tubbs, on behalf of F. Gough. (*Consent.*)

Retention of a greenhouse at the rear of Siebert House, Glenluce Road, Greenwich, abutting upon Westcombe Hill, on the application of E. Mills. (*Consent.*)

Retention of two wooden sheds on a site abutting upon the northern side of Elmer Road and upon the western side of St. Fillan's Road, Catford, on the application of E. Wright, on behalf of M. H. Amey. (*Refusal.*)

Retention of a wood and iron building at the rear of No. 1, Upper Phillimore Place, Kensington, at less than the prescribed distance from the roadway of Phillimore Mews, on the application of W. G. Hunt, on behalf of R. MacMahon. (*Refusal.*)

Buildings to abut upon Regency Street, Chapter Street, Frederick Street and Hide Place, Westminster, on the application of Clutton, on behalf of the Ecclesiastical Commissioners. (*Consent.*)

Modification of the provisions of that section with regard to open spaces about buildings, so far as relates to Nos. 3 and 5, Rushey Green, Catford, with irregular spaces at the rear, on the application of A. L. Guy. (*Consent.*)

Modification of the provisions of that section with regard to open spaces about buildings, so far as relates to the proposed erection of a block of dwellings on the western side of Rupert Street, Whitechapel, on the application of R. W. Hobden, on behalf of Hickman, Ltd. (*Refusal.*)

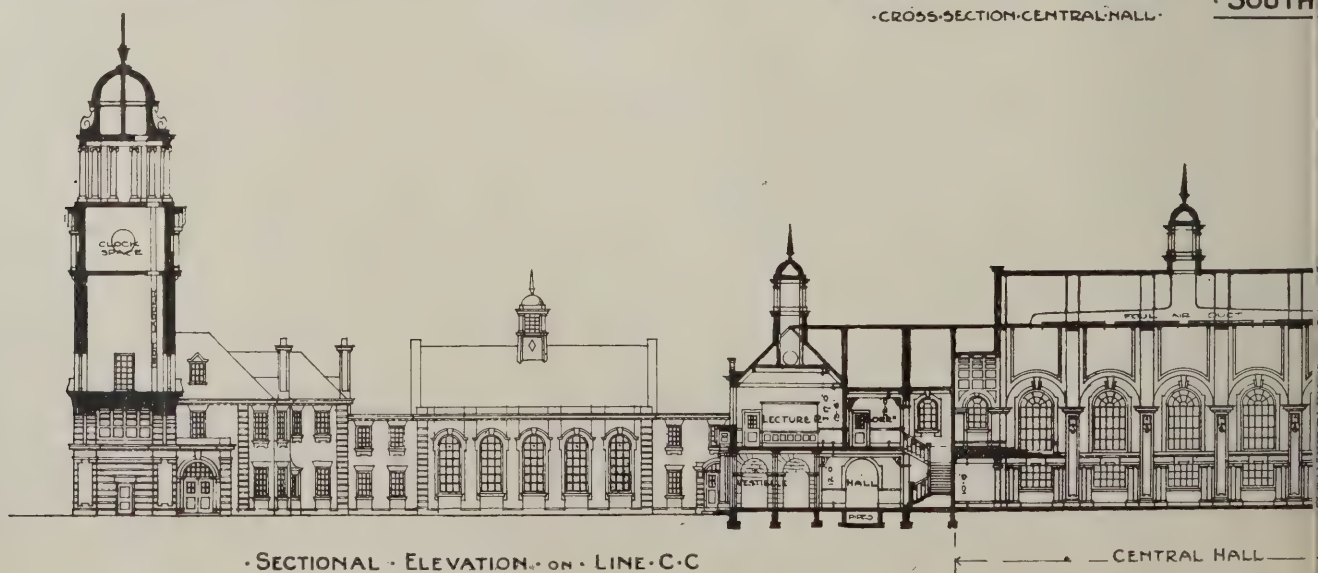
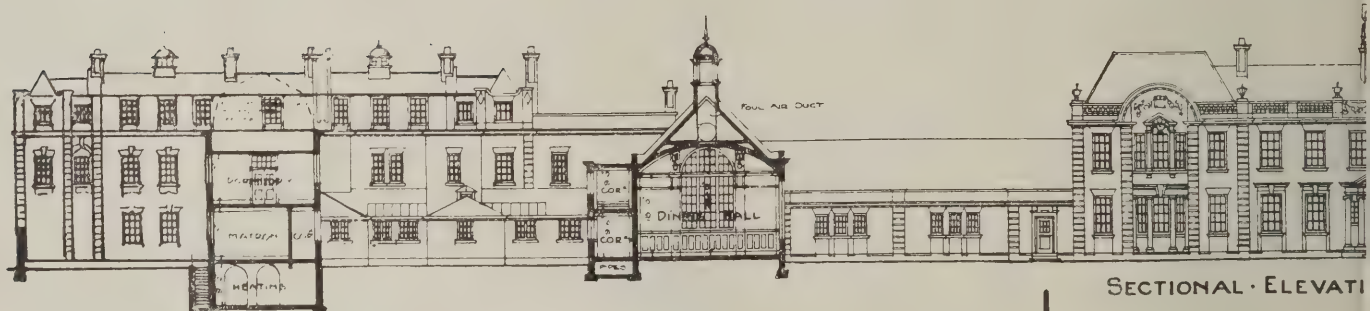
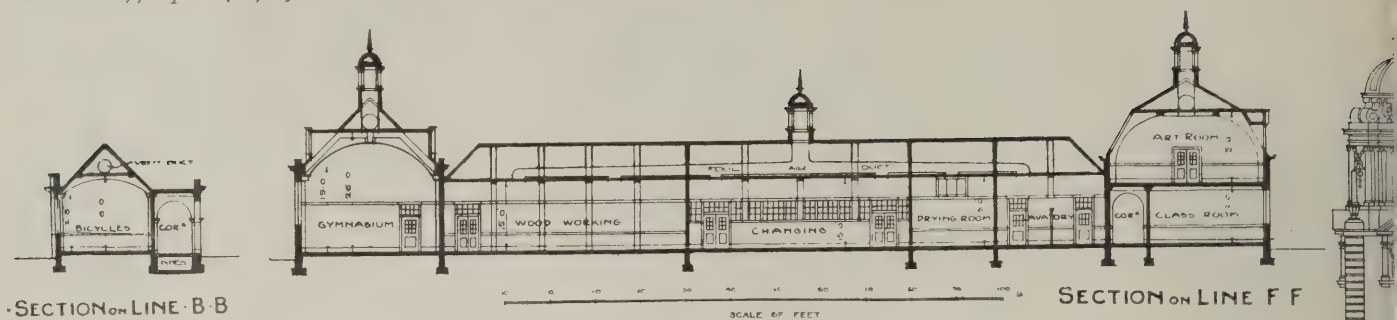
Deviations from the plans certified by the district surveyor so far as relates to the proposed erection of buildings upon the site of Nos. 28 and 29, Lisle Street, and Nos. 28 and 29, Little Newport Street, Strand, on the application of Philip E. Pilditch. (*Consent.*)

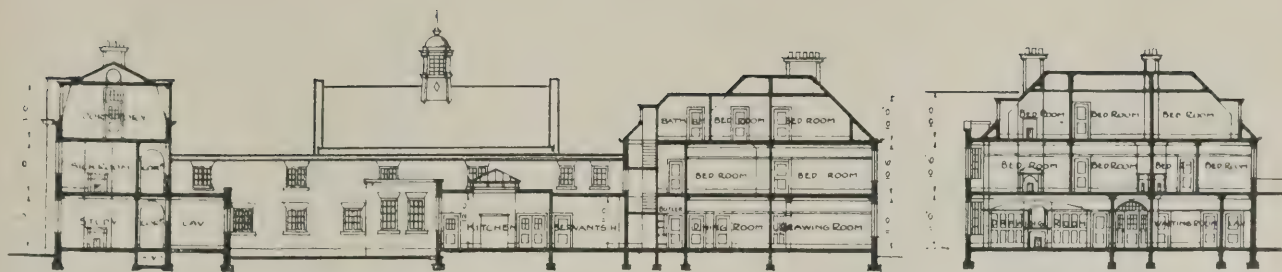
Two-storey workshop buildings upon land at the rear of houses in St. Paul's Road and Elm Road, Camden Town, St. Pancras, and in connection therewith the formation or laying-out of a street, on the application of S. G. Castleman, on behalf of H. G. Regnart. (*Consent.*)

Deviation from the plans approved on August 30th, 1905, for the formation or laying-out of new streets for carriage traffic on the Furzedown Park Estate, Back (or Rectory) Lane, Streatham, so far as relates to an alteration in the gradients of two of the proposed streets, on the application of Milner, Son & White. (*Consent.*)

Building Societies' Deficit.—The Chief Registrar of Friendly Societies reports the liabilities of the building societies of England and Wales at £49,784,070 for the year 1904 and the assets at £49,683,436, showing a deficit of £100,634.

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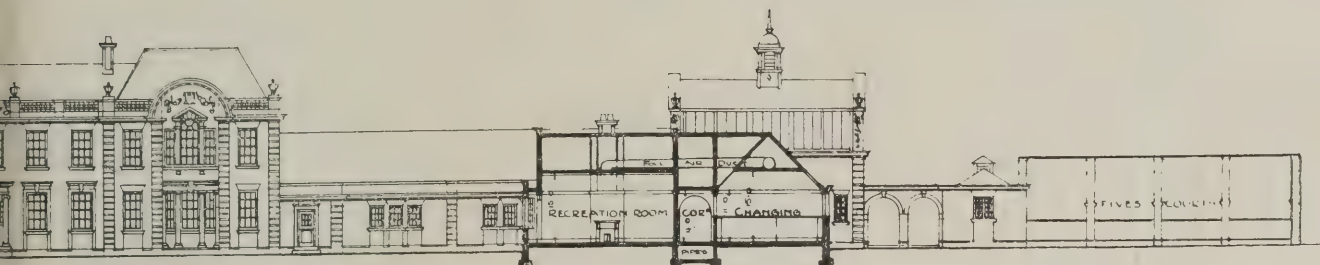


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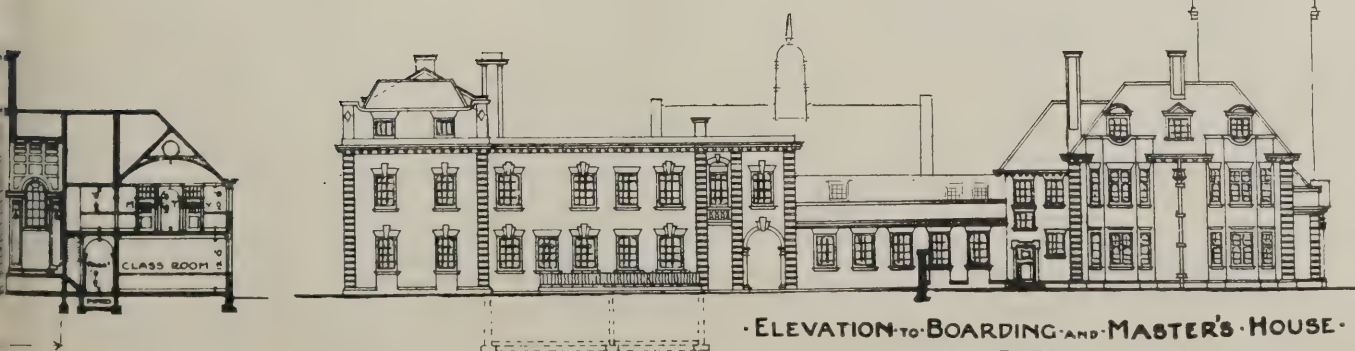


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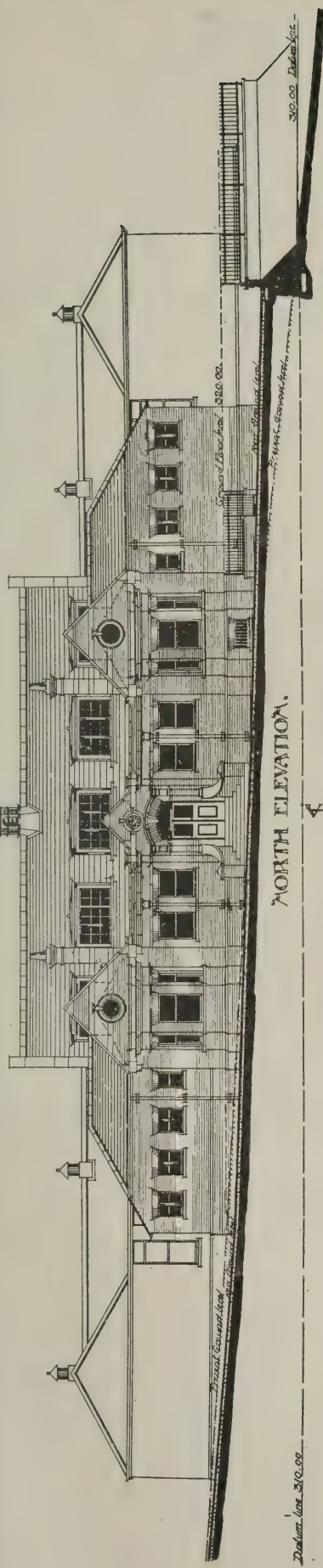
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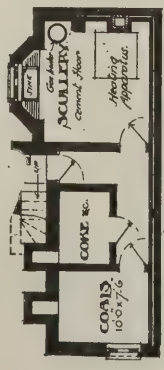
ELEVATION TO BOARDING AND MASTER'S HOUSE - EAST

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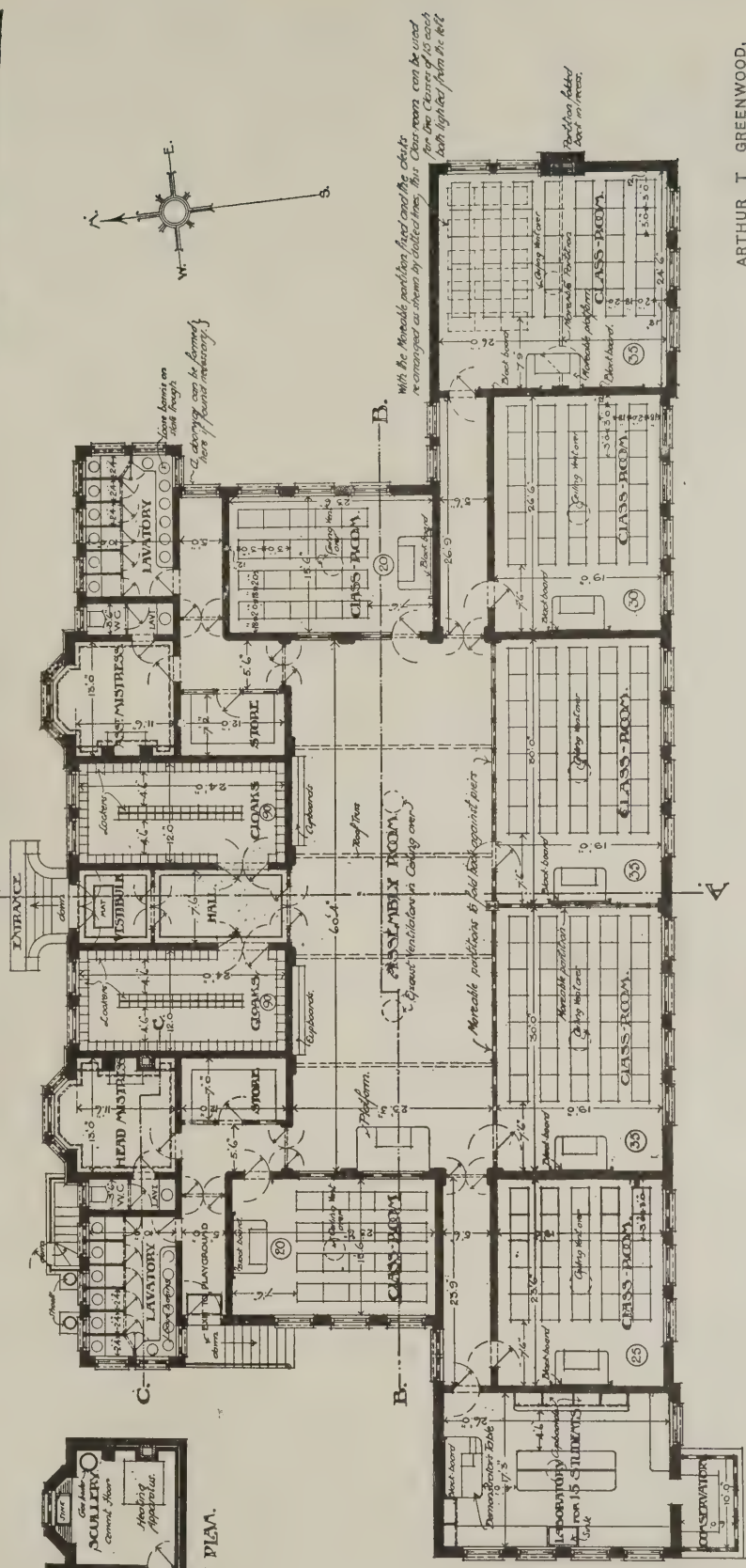
GIRLS' SECONDARY SCHOOL, CHEPPING WYCOMBE.



NORTH ELEVATION.



BASEMENT PLAN.



GROUND FLOOR PLAN.

ARTHUR T. GREENWOOD,
ARCHITECT.

Scale: Eight feet to an inch.

This building is now in course of erection. The design was selected in competition in June, 1903, in which sixteen sets of designs were submitted. The builder is Mr. J. T. Harris of High Wycombe, whose contract amounts to £3,229. The total cost is estimated at about £5,000. The school will accommodate 175 students. It is being built of red bricks, with terra-cotta dressings, the roof to be covered with blue Bangor slates. One or two modifications have been made in the above plan (which we are able to reproduce by the courtesy of the "South Bucks Free Press"), the principal alteration being the transposition of the laboratory and conservatory from the western to the eastern end of the building, while the classroom as shown on the east of the plan is removed to the west. The architect is Mr. Arthur T. Greenwood, of Highfield, Gorton, Manchester.

Complete List of Contracts Open.

With a few exceptions, news of Contracts Open are not repeated after they have been published once in these columns, so that readers will find particulars in our previous issue of other contracts that still remain open.

Unless expressly stated to the contrary all deposits required for bills of quantities, &c., are returned on receipt of *bona-fide* tenders.

The words "Fair Wages Clause" inserted in certain paragraphs signify that persons tendering must conform to a fair-wages clause in the contract, which requires them to pay the rates of wages current in the district.

BUILDING.

April 5. Newcastle-on-Tyne.—*Proposed county offices at the Moothall, Newcastle-on-Tyne.* Contractors desirous of tendering for the whole of the works required in the erection of the above offices are requested to send in their names to the undersigned on or before Mar. 19. Bills of quantities will be forwarded after that date on payment of a deposit of £3 3s. Applications to be sent to J. A. Bean, county architect, The Moothall, Newcastle-on-Tyne, where the drawings can be seen. Sealed tenders (sent in the envelopes provided) to be delivered not later than 4 p.m. on April 5.

April 5. St. Ervan.—*Repairs for the Cornwall Education Committee, according to the specification which may be seen at the said schools or at the office of the architect, B. C. Andrew, Biddick's Court, St. Austell.* Forms upon which all tenders must be made may be had from the architect or the secretary. Sealed endorsed tenders to be sent to F. R. Pascoe, secy., Education Office, Truro, by April 5.

April 5. Woodbridge.—*Ventilating and making small alterations to the board-room, for the Guardians.* Plans and specifications of the proposed work may be seen at the office of Brown & Burgess, architects, Arcade Street, Ipswich. Sealed tenders, endorsed "Alterations to Board-room," to be delivered at the board-room not later than 10 a.m. on April 5.

April 5. Portleven.—*Work at the school for the Cornwall Education Committee, according to plans and specifications which may be seen at the schools.* Any further information relating to the work may be obtained from Sampson Hill, architect to the Committee, Green Lane, Redruth. Forms upon which all tenders must be made may be had from the architect or the secretary. Sealed endorsed tenders are to be sent to F. R. Pascoe, secretary, Education Office, Truro, by April 5.

April 5. Pontlottyn.—*Converting present premises into three shops, for M. Morgan, Railway Inn.* Plans and specification can be seen at the Railway Inn or at the office of T. Roderick, architect, Ashbrook House, Aberdare. Endorsed tenders to be sent to M. Morgan not later than April 5.

April 5. St. Albans and Harpenden.—*New waiting-rooms and awnings, for the Midland Railway Co.* Plans and specifications may be seen, quantities and particulars obtained, on application at the Engineer's Office, Derby Station. Sealed tenders to be forwarded by post to the Secretary of the Way and Works Committee, Midland Railway, Derby, not later than 9 a.m. on April 5.

April 5. Ruthrieston.—*New public school for the Aberdeen School Board.* Estimates are invited for executing the carpenter, slater, plasterer, plumber, painter and glazier, blacksmith and electrical engineering works required in connection therewith. Copies of the specifications and schedules of quantities may be had from J. A. O. Allan, the Board's architect and master of works, with whom also the plans and general conditions of contract may be seen. Sealed and marked tenders must be lodged with Thomas Hector, clerk, 22, Union Terrace, Aberdeen, by noon on April 5.

April 6. East Grinstead.—*New works, repairs, painting, decorating and ventilating in connection with the Wesleyan Church.* Specification and further particulars may be obtained on application to H. Criswell, 57, Queen's Road, East Grinstead. Tenders, endorsed "Tender for Painting," to be sent to Rev. J. G. Gill, York House, East Grinstead, not later than 10 a.m. on April 6.

April 6. Chesterfield.—*Alteration and conversion into sale shops of the premises known as the Market Hall Vaults, with adjoining premises, situate in the Market Hall.* Plans and specifications may be inspected and all further information obtained on application at the office of the Borough Surveyor. Sealed tenders, endorsed "Market Hall Vaults Alterations," are to be delivered to J. Middleton, town clerk, Chesterfield, by noon on April 6.

April 6. Kemplar.—*Rebuilding a small bridge a Kemplar, near the village of Dufton, for the East Westmoreland Rural D. Council.* Plans and specifications may be seen at the Surveyor's Office, Kirby Stephen. Sealed tenders, endorsed "Dufton Bridge," must be delivered at the office of William Hewitson, Appleby, the clerk to the said Council (where also plans and specifications may be seen), not later than April 16.

April 6. Boyndie.—*New central school and teacher's house for the School Board.* Plans and specifications to be seen with John McCulloch, clerk to the School Board, Boyndie, and offers, marked "Tender for School Buildings," to be lodged with the clerk of the Board not later than April 6.

April 6. Kimberley.—*Building a bulwark stone boundary wall in Factory Lane, for the Basford R.D.C.* Specifications and particulars may be obtained from G. W. Hanley, highway surveyor, at the Council's Offices, Burton Buildings, Parliament Street, Nottingham, to whom sealed tenders, endorsed "Tenders for Walling," must be sent not later than April 6.

April 7. New Aberdour.—*New dwelling-house.* Estimates are wanted for the mason, carpenter, slater and plasterer works. Plans and specifications to be seen at Joseph Coutts, blacksmith, New Aberdour, to whom tenders for the works may be lodged up to April 7.

April 7. Morley.—*Erection of a jam factory, in Baker Street, Morley, for Metcalfe & Bradshaw.* Plans and specifications may be seen and quantities obtained at the offices of T. A. Buttery and S. B. Birds, Queen Street, Morley, to whom tenders must be sent by noon on April 7.

April 7. Bradford.—*Alterations and renovations to the Old Dolphin Wesleyan Chapel, Clayton Heights, near Bradford.* Plans, &c., may be seen and quantities obtained up to April 7, on application to Sam Spencer, architect, Old Bank Chambers, Great Horton, Bradford.

April 7. Whitley Bay.—*New Congregational church and vestries.* Contractors desirous of tendering for the erection of above (stone building) are requested to send their names to Davidson and Phillipson, architects, Pearl Buildings, Newcastle-on-Tyne, on or before April 7. Bills of quantities will be supplied to such applicants only.

April 7. Holyhead.—*Alterations and additions to the Tabernacle Congregational Chapel, Thomas Street.* Plans and specification may be seen at the offices of J. Owen, architect, at Holyhead and Menai Bridge. Tenders, sealed and endorsed, to be sent to R. J. Jones, Regent House, Holyhead, on or before noon on April 7.

April 7. Stockport.—*First portion of an observation block, at Dialstone Lane Hospital.* The general conditions, specifications, &c., will be supplied by the architect, G. H. Brady, Borough Chambers, St. Petersgate, after Mar. 24, on payment before that date of a deposit of £1 1s. Fair wages clause. Sealed tenders, endorsed "Hospital Building Contract," addressed to the Chairman of the Health Committee, must be delivered to Robert Hyde, town clerk, Town Clerk's Office, Stockport, by noon on April 7.

April 7. Ashill.—*Repairs at the Council School.* Specification and further particulars at the office of Samson & Cottam, architects, Bridgewater. Sealed tenders must reach the County Education Office, Weston-super-Mare, before noon on April 7.

April 7. Puriton.—*New offices and for alterations at the Council School.* Plans, specifications and further information at the office of Samson & Cottam, architects, Bridgewater. Sealed tenders must reach the County Education Office, Weston-super-Mare, before noon on April 7.

April 9. Dartford.—*Enlargement of the county police station, ordered by the Standing Joint Committee.* Plans and specification can be seen and bill of quantities and tender form obtained, on deposit of £2, at the office of the County Architect, 86, Week Street, Maidstone. Sealed tenders, endorsed "Dartford Police Station," are to be delivered to Charles Turner, clerk, Sessions House, Maidstone, by 5 on April 9.

April 9. Dorking.—*Increased accommodation at the Isolation Hospital.* Plans, specification and conditions of contract may be obtained at the office of the architect, W. Shearburn, South Street, Dorking. Quantities will be supplied on a payment of 10s. 6d. to architect. Tenders, marked "Tender for Hospital," to be sent to W. J. Hodges, 35, High Street, Dorking, by April 9.

April 9. Rainford.—*New offices and parish room, for the U.D.C.* Quantities and particulars may be obtained at the office of J. & W. Gandy, Masonic Buildings, St. Helens, on a deposit of £2. Sealed tenders to be sent to B. Smith, clerk to the Council, Rainford, not later than 2 p.m. on April 9.

April 9. Kingston-on-Thames.—*Pulling down of old premises and erection of new offices and workshops for Knapp, Drewett & Sons, Ltd., as follows:*—New premises for the "Surrey Comet" offices, at No. 20, Clarence Street, Kingston-on-Thames; new workshops on land at rear of No. 18, Church Street, Kingston-on-Thames (adjoining above-named premises). In accordance with specifications, quantities and drawings prepared by William H. Hope, C.E., architect and surveyor, of Hampton Wick, Middlesex, and Billingham, Sussex, who will give any further information required. The plans may be seen and copies of specification and quantities obtained on application to the Secretary, Knapp, Drewett & Sons, Ltd., 20, Clarence Street, Kingston-on-Thames. A deposit of £2 2s. for these particulars is required by the Company. Sealed tenders, duly endorsed, to be delivered to the Secretary as above, not later than 10 a.m. on April 9.

April 9. Lancaster.—*Alteration and extension to the administrative block at the Sanatorium.* Plans and conditions may be seen, and bills of quantities obtained, on application at the office of J. C. Mount, borough surveyor. Sealed tenders to be delivered to T. Cann Hughes, town clerk, Town Hall, Lancaster, by 9 a.m. on April 9.

April 9. Salford.—*Storerooms and pump-house at the Electricity Station, Frederick Road, Pendleton.* Drawings may be seen, forms of tenders and bills of quantities obtained at the Borough Engineer's Office, Town Hall, Salford. Tenders, endorsed "Storerooms, Electricity Station," addressed to the Chairman of the Electricity Committee, must be delivered to L. C. Evans, town clerk, Town Hall, Salford, by 5 p.m. on April 9.

April 9. Cheshunt.—*Public library at Turners' Hill, in accordance with the plans and specification prepared by J. Myrtle Smith, 8, Trafalgar Square, Chelsea, S.W.* Persons desirous of tendering are requested to

forward their names and addresses to the Clerk of the Council, Manor House, Waltham Cross, together with a deposit of £5. Forms of tender and bills of quantities will be forwarded, the persons having made such deposit. Plans and specification can be seen at the office of the Architect as above, and also at the offices of the Council, between 10 and 5, Saturdays 10 to 1. Sealed tenders, endorsed "Tender for Public Library," to be addressed to the Chairman, General Purposes Committee, Cheshunt Urban D. Council, Manor House, Waltham Cross, and delivered not later than 4 p.m., on April 9.

April 9. Itchen Woolston.—*Additions to St. Mark's Girls' and Infants' Council School, for the County Council.* Persons desirous of tendering may see drawings, specification and conditions of contract, and obtain bills of quantities and all necessary information, at the office of W. J. Taylor county surveyor, The Castle, Winchester, between 9 and 5 (Saturdays 9 and 1). A deposit of £2 2s. will be required for a copy of the bills of quantities. Deposits must be made by cheque, payable to Hants County Council and crossed Bank of England, or particulars will not be sent. Tenders, endorsed "Proposed Additions, Itchen Woolston, St. Mark's Girls' and Infants' Council School," are to be delivered to H. Barber, clerk of the County Council, The Castle, Winchester, by 10 a.m. on April 9.

April 10. South Shields.—*Public elementary school, situated in Dean Road, in accordance with plans and specification prepared by J. W. Donald, A.R.I.B.A., 13, West Keppel Street, South Shields.* Contractors desirous of tendering are requested to forward their names and addresses to the Architect, with a deposit of £3 3s. Forms of tender, and bills of quantities prepared by J. P. Allen & Partners, of Newcastle-on-Tyne, will be forwarded to contractors who make the aforesaid deposit. Plans can be seen at the offices of the Architect between the hours of 10 a.m. and 4 p.m. Sealed tenders, endorsed "Tenders for Dean Road School," must be addressed to the Secretary, Education Office, Ocean Road, South Shields, and delivered not later than 4 p.m. on April 10.

April 10. Armley.—*Erection of sheds, boiler-house, and roof chimney to works in Canal Road, Armley.* Plans may be seen and quantities obtained at the offices of Beckwith & Webster, 2, Basinghall Square, Leeds, to whom tenders must be sent by April 10.

April 10. Pontypridd.—*Erection of a mission-hall at Hawthorn, Pontypridd, for Calvary Baptist Church.* Plans and specifications may be seen at the office of Arthur Lloyd Thomas, A.M.I.M.E., architect and engineer, Church Street Chambers, Pontypridd, to whom sealed and endorsed tenders must be sent by April 10.

April 10. Hastings.—*Four cottages in the parish of Brede, adjoining the pumping station of the New Waterworks, for the Corporation.* Drawings and specification may be seen and form of tender and bill of quantities obtained at the office of the borough engineer, P. H. Palmer, M.I.C.E., Town Hall, Hastings, between 10 and 5, on payment of a cheque for £1 1s. Sealed tenders, endorsed "Tender for Cottages at Brede," must be delivered at the Town Clerk's Office, Town Hall, Hastings, not later than noon on April 10.

April 10. London, S.E.—*Improving the Alverton Street School, Deptford, S.E., by providing new classrooms, teachers' rooms, halls, staircases, cloak-rooms, lavatories, w.c.'s, covered playground, new drainage scheme, &c., for the London County Council.* Persons desiring to submit tenders may inspect the drawings and specification and obtain the bills of quantities, form of tender and other particulars at the Education Offices (Architects' Department), Victoria Embankment, W.C., on payment to the cashier of the sum of £5. Tenders must be upon the official forms, and the printed instructions contained therein must be strictly complied with. Fair wages clause. Each tender must be enclosed in an envelope (which will be provided) and delivered at the Education Offices (Room 148), Victoria Embankment, W.C., not later than 11 a.m. on April 10.

April 10. London, W.—*Working men's flats.* The Council of the royal borough of Kensington invite tenders for the demolition of the existing houses, Nos. 4, 6 and 8, Hesketh Place, and 5 and 6, Thomas Place, Notting Dale, and the erection on the site thereof of two buildings, to contain respectively eighteen and eight one-room tenements, in accordance with specification and drawings, which can be obtained at the office of Town Clerk, Town Hall, Kensington High Street, W. Persons proposing to tender will be required to deposit £3 3s. with the borough treasurer at the Town Hall, when applying for a form of tender. Fair wages clause. Sealed tenders, and endorsed "Tender for Working Men's Flats," must be delivered at the Town Clerk's office not later than 4 p.m. on April 10.

April 11. Bradford.—*Construction of stabling sheds at St. James's Market.* Drawings and general conditions of contract may be seen, and bills of quantities and form of tender obtained, on application to the City Architect, Whitaker Buildings, Brewery Street. Fair wages clause. Sealed and endorsed tenders must be delivered to Frederick Stevens, town clerk, Town Hall, Bradford, by noon on April 11.

April 11. Old Clevee.—*New residence, with stabling, &c., for T. P. Carlisle, near Old Clevee.* The plans, specification, and form of contract may be inspected by appointment at the office of Hawkes & Andrew, Williton, and tenders in writing may be

delivered on or before 10 a.m. on April 11 to T. H. Andrew, architect, Minehead.

April 11. London, S.W.—*New wing to almshouses in the Fulham Palace Road, S.W.*, for the Trustees of the Fulham Waste Lands and Lygon Almshouses Charity. Bills of quantities, prepared by T. Woodbridge Biggs, of 10, Clifford's Inn, Temple Bar, E.C., may be obtained from F. C. Cole, Town Hall, Fulham, S.W., on payment of a deposit of £5. Fair wages clause. The bills of quantities are to be filled up and returned with the tender at or before 6 p.m. on April 11.

April 11. Rochester.—*Pulling down and removal of certain houses in High Street, Strood Intra.* Particulars and conditions of contract and form of tender may be obtained of the City Surveyor, Guildhall, Rochester. Tenders are to be delivered to Apsley Kenneth, town clerk, Guildhall, Rochester, before 4 p.m. on April 11.

April 12. Spreyton.—*Pair of cottages for George Lambert.* Plans and specifications may be seen at the office of Harbottle Reed, architect, 12, Castle Street, Exeter, to whom tenders must be sent by April 12.

April 12. Newquay.—*Alterations and improvements at the council schools for the Cornwall Education Committee, according to the specification which may be seen at the schools, or at the office of the architect, B. C. Andrew, Biddick's Court, St. Austell.* Forms, upon which all tenders must be made, may be had from the architect or the secretary. Sealed endorsed tenders to be sent to F. R. Pascoe, secretary, Education Office, Truro, by April 12.

April 12. Hazlemere.—*New Free Methodist Chapel.* Plans and specifications can be seen at H. Tilling's, Wycombe Marsh, to whom all tenders must be sent, marked "Tender," not later than April 12.

April 12. Kendal.—*Proposed alterations and additions to Broom Close, Kendal.* Plans may be seen and quantities and specifications obtained at the office of John F. Curwen, F.S.A., F.R.I.B.A., architect and sanitary engineer, 26, Highgate, Kendal, to whom tenders must be sent not later than noon on April 12.

April 12. Antrim.—*Labourers' cottages in the rural district, for the Rural D. Council, in accordance with plans and specifications, which can be seen at the office of the clerk of the Council, or at the office of the architect, W. T. R. Taggart, Scottish Provident Buildings, Belfast, as follows:*—Two cottages at Townparks, Antrim, on the lands of Dr. Gawn; two cottages at Townparks, Antrim, on the lands of Mrs. Young; one cottage at Islandbawn, Muckamore, on the lands of John Clark; one cottage at Ballyearl, Carmoney, on the lands of William Houston; one cottage at Ballyrobin, Muckamore, on the lands of Scott Gilliland; one cottage at Killyfad, Randalstown, on the lands of John Fulton; one cottage at Annaghmore, Toomebridge, on the lands of B. O'Boyle; one cottage at Portlee, Toomebridge, on the lands of Mrs. McCann; two cottages at Ballynamullen, Toomebridge, on the lands of Felix Laverty; one cottage at Tamnadrigh, Randalstown, on the lands of James Gilbert; four cottages at Cranfield, Randalstown, on the lands of James Charleton; two cottages at Cranfield, Randalstown, on the lands of Bernard O'Kane; one cottage at Cranfield, Randalstown, on the lands of Mrs. Hume; two cottages at Ballydonagh, Crumlin, on the lands of John McClurg; two cottages at Ballyshanagill, Crumlin, on the lands of John Nelson; two cottages at Feehogue, Randalstown, on the lands of Lord O'Neill; four cottages at Lurgan West, Randalstown, on the lands of Lord O'Neill; one cottage at Ballygrooby, Randalstown, on the land of G. L. Young; two cottages at Craigmore, Randalstown, on the lands of J. H. Mulligan; two cottages at Ballymacilhoyle, Crumlin, on the lands of W. S. Thompson. Persons tendering may do so for any or all of the different blocks, but they must name the particular site or sites on their tender. Tenders are to be lodged with J. Clark, clerk of Council, Union Office, Antrim, by 10 a.m. April 12.

April 14. Wakefield.—*New school at Normanton Woodhouse and alterations to Normanton Woodhouse Provided School.*—Builder, joiner, slater, plasterer, iron-founder and smith, plumber, painter. A deposit of £1 is required. Cheques, &c., to be sent to the West Riding treasurer. Those desirous of tendering should send in their names to J. Vickers-Edwards, county architect, County Hall, Wakefield, by April 14.

April 14. Aberayron.—*Alterations and repairs to the school for the Cardigan County Education Committee.* Plan and specification can be seen at the school in charge of the Headmaster. Tenders sealed and endorsed "Aberayron School Repairs" are to be delivered at the office of B. C. Jones, clerk to the District Education Committee, Aberayron, not later than midday on April 14.

April 14. Wakefield.—*New school at Sandal, near Wakefield.* Stainforth (Thorne Union) Provided School: new cloak-room, &c., &c.; Castleford Wheldon Lane Provided School: alterations, repairs, &c. A deposit of £1 is required for each of the above schools, which will be returned on receipt of a bona-fide tender. Cheques, &c., to be sent to the West Riding Treasurer. Builders desirous of tendering must send in their names to J. Vickers-Edwards, county architect, County Hall, Wakefield, by April 14.

April 14. Aberarth.—*Alterations and repairs to the school for the Cardigan County Education Committee.* Plan and specification can be seen at the school in charge of the Head Master. Tenders sealed and endorsed "Aberarth School Repairs" are to be delivered at the office of B. C. Jones, clerk to the District Education Committee, Aberayron, not later than mid-day on April 14.

April 16. Hastings.—*Construction and erection of four covered seats upon the Esplanade at Breeds Place, Eversfield Parade and Grand Parade.* Drawings and specification may be seen and form of tender obtained at the office of the borough engineer, P. H. Palmer, M.I.C.E., Town Hall, Hastings, between 10 and 5. Sealed tenders, endorsed "Tender for Covered Seats," must be delivered at the Town Clerk's Office, Town Hall, Hastings, not later than noon on April 16.

April 18. Sandy.—*New Council school, for the Bedfordshire County Council.* The drawings, specifica-

tions, and form of contract may be inspected at the offices of Gutch & Saunders, architects, Bank Chambers, Kettering, between 11 and 4, on any working day except Saturday. Builders desirous of tendering must send their names and addresses to the above-named architects on or before April 7, together with a deposit of £1 rs., when a copy of the bill of quantities and form of tender will be forwarded to them. Sealed tenders, endorsed "Tender for Sandy Council School," must be sent to W. W. Marks, clerk of the Council, Shire Hall, Bedford, before 5 p.m. on April 18.

April 18. Hunslet.—*Erection of an engineer's house, at the new workhouse, Rothwell Haigh, in accordance with the drawings and specifications prepared by the architect, J. H. Morton, F.R.I.B.A., 50, King Street, South Shields.* Applications for bills of quantities and forms of tender must be made to the architect on or before April 7, accompanied by a deposit of £1. Bill of quantities will be supplied to such applicants only. Drawings may be inspected at the offices of the clerk or the architect, and tenders on the forms provided must be delivered at the Union Offices, Hunslet, Leeds, by 10 a.m. on April 18.

April 18. Aberaman.—*New public hall, institute and free library at Aberaman, Aberdare.* Plans and specification can be seen at the architect's office, Clifton Street, Aberdare, where bills of quantities can be obtained. Sealed and endorsed tenders to be sent in to W. W. Price, Bryn Cottage, Hill Street, Aberaman, not later than April 18.

April 19. Blaydon.—*Enlargement of the Galvanized Iron Isolation Hospital at Normans Riding, comprising the erection of administrative, laundry and discharging blocks and two pavilions, for the Blaydon, Ryton and Whickham Joint Hospital Committee.* Plans and specifications may be seen and form of tender obtained on application to J. B. Renton, Council Offices, Whickham, R.S.O. (who will attend at the Council Offices, Whickham, by appointment, to supply all particulars) upon payment of £1. Sealed tenders, endorsed "Tender for Hospital," must be delivered to Henry Dalton, clerk, Blaydon-on-Tyne, by noon on April 19.

April 20. Wells-next-Sea.—*Enlargement of school for the Norfolk Education Committee.* Builders desirous of tendering can inspect plans and specification and obtain copies of quantities at the office of A. F. Scott, architect, Castle Meadow, Norwich, on and after April 5. A deposit of £1 rs. will be required. Tenders must be delivered by noon on April 20, addressed to "The Secretary, Norfolk Education Committee, 57, London Street, Norwich," and endorsed "Tender for Wells-next-Sea School."

April 20. Tonbridge.—*New Council school, to accommodate 420 children, at Tonbridge, Kent.* The drawings and specification may be inspected at the office of the architect, C. H. Strange, A.R.I.B.A., 20, Dudley Road, Tunbridge Wells. Any person desiring to tender must send in his name to the architect, accompanied with a deposit of £1, not later than noon on April 5. The tenders, on the form supplied, to be delivered to N. R. Stone, 23, Church Road, Tunbridge Wells, not later than noon on April 20.

April 20. Hawkinge.—*Enlargement to the Council school, at Hawkinge, near Folkestone, Kent.* Drawings and specification may be inspected at the office of the architect, Andrew Bromley, Radnor Chambers, Folkestone. Any person desiring to tender, must send in his name to the architect, accompanied by a deposit of £1, not later than noon on April 5. Tenders, on the form supplied, to be delivered to W. Thomas, 66, Broadmead Road, Folkestone, not later than noon on April 20.

April 21. Mold.—*Alterations and extensions to the County School, Mold, Flintshire, North Wales.* Plans and specifications may be seen at the offices of the architect, Samuel Evans, N. & S.W. Bank Buildings, High Street, Mold, from whom bills of quantities may be obtained on payment of a sum of £2 2s. Tenders to be made out on forms to be supplied, and sent in to W. R. Howard Evans, solicitor, Mold, clerk to the Governors, by April 21.

April 23. Coventry.—*Nurses' home, for the Coventry and Warwickshire Hospital Committee, in accordance with plans and specifications prepared by the architects, A. Hessel Tiltman, F.R.I.B.A., 1, Raymond Buildings, Gray's Inn, London, W.C., and Herbert W. Chattaway, Trinity Churchyard, Coventry.* Plans and specifications may be seen at the Architect's Office, Trinity Churchyard, Coventry, and bills of quantities and forms of tender can be obtained upon depositing the sum of £3 3s. Tenders, sealed and endorsed "Nurses' Home," to be sent to Ellis E. Crisp, secty., Coventry and Warwickshire Hospital, Stoney Stanton Road, Coventry, not later than 10 a.m. on April 23.

No date. Stapleford.—*Branch store and four houses, about to be erected in Brookhill Street, for the Stapleford and Sandiacre Co-operative Society, Ltd.* Builders desirous of tendering should apply to Walter H. Woods, M.S.I., architect and surveyor, High Street, Long Eaton, enclosing a deposit for £1 rs.

No date. Harlech.—*Alterations and additions to the Harlech Council School.* The plans, specifications and further particulars may be obtained on application to the county architect, A. M. Howard Jones, M.S.A., Plas Ynys, Borth, R.S.O.

No date. Blaenau Festiniog.—*Building new offices and rearranging the playgrounds at the Boys' Higher Grade School and Slate Quarries Schools, Blaenau Festiniog.* The plans, specifications and further particulars may be obtained on application to the county architect, A. M. Howard Jones, M.S.A., Plas Ynys, Borth, R.S.O.

No date. Stourbridge.—*Two houses at Wollaston, Stourbridge.* Builders willing to tender are requested to apply to Gething & Son, Queen Street, Stourbridge, and Oxford Street, Kidderminster.

No date. Stourbridge.—*Additions to house, Parkfield Road, Stourbridge.* Builders willing to tender are requested to apply to Gething & Son, Queen Street, Stourbridge, Oxford Street, Kidderminster.

No date. Shipley.—*Detached villa in Nab Lane.* Builders desirous of tendering are requested to send their names to Fairbank & Wall, architects, Craven Bank Chambers, Bradford. Quantities will be forwarded as soon as ready.

No date. Southend-on-Sea.—*Erection of a children's ward at the Victoria Hospital.* Tenders invited from builders trading within the Rochford Hundred. Bills of quantities may be obtained and plans inspected on payment of a deposit of £2 2s., to Greenhalgh & Brockbank, architects, Bank Chambers, Southend-on-Sea.

No date. Poole.—*Corn store at Poole, Dorset* (principally steel construction and galvanized iron). The drawings, specification, and conditions of contract may be seen and bills of quantities obtained upon payment of £1 rs., to Fred Bath, F.R.I.B.A., F.S.I., architect and surveyor, Crown Chambers, Salisbury.

ENGINEERING.

April 16. Leicester.—*Erection of a brick and concrete bridge, 30ft. span, over the River Soar, near Narborough, and a similar bridge, 20ft. span, over a stream at Little Bowden, near Market Harborough.* The drawings may be inspected at the offices of the county engineer, S. Perkins Pick, 6, Millstone Lane, Leicester, from whom bills of quantities and forms of tender may be obtained on payment of the sum of £1 rs. for the quantities of each bridge. Sealed tenders, upon the forms supplied, endorsed (a) "Tender for Enderby Mill Bridge," (b) "Tender for Little Bowden Bridge," to be sent to George Rowlett, clerk to the Highway Committee, 10, New Street, Leicester, by 10 a.m., on April 16.

April 17. Stratgarve.—*Constructing about 100 yds., partly embankment—of an approach to bridge at Stratgarve.* Specification is in the hands of D. Macraw, manager, Stratgarve, Garve, who will give all information and receive offers up to April 7.

April 17. Warrington.—*Work at the Winwick Pumping Station.* Conditions of contract and schedule of work required may be had from the Water Engineer on payment of a deposit of 10s. Tenders to be delivered to the Municipal Offices, Warrington, not later than noon on April 7.

April 18. Lockerbie.—*Supply and erection of a bench of retorts, comprising three ovens and fourteen retorts, with all ironwork complete to condensers. Chimney stack for same. Bench to be on shallow regenerative system. Corporation will supply all foundations. Also the following new or second-hand plant:—Condensers, having 8in. connections, complete with bypass, capable of dealing with a maximum of 80,000 cub. ft. per day; two purifiers, 8ft. square, with grids and valves complete; one steam tar and liquor pump, with 2in. or 2½in. suction and delivery; one cast-iron tank, capacity of about 1,000 gallons; one vertical steam boiler, about 4ft. diameter and 8ft. high. Further information may be had from R. W. Cowie, gas manager, Lockerbie. Offers to be sent to D. M'Jarrow, town clerk, Lockerbie, not later than April 8.*

April 9. Corris.—*Three coffer-dams for bridge construction in the River Dovey, near Machynlleth.* Specification and full particulars from J. R. Dix, Corris Railway, Corris, to whom tenders are to be sent, marked "Coffer-dam," not later than April 9.

April 11. Bootle.—*Superheaters and alterations to steel and cast-iron pipes, for the Corporation.* Copies of the specification, forms of tender, general conditions, &c., can be obtained from the Borough Electrical Engineer on depositing the sum of £1 rs. Tenders, endorsed "Superheaters and General," to be addressed to the Chairman of the Electric Power and Lighting Committee, Town Hall, Bootle, and delivered at the Town Clerk's Office by 10 a.m. on April 11.

April 11. Exeter.—*Electric tramways.* Contract No. 6A: For the construction of two additional bays at the Car Depot, Heavitree Road. Contract No. 7: For the construction of permanent-way and paving (including bonding) of about 3½ of a mile of route length line (single line), with passing places. Specifications and forms of tender can be obtained and plans inspected at the office of Thomas Moulding, city engineer and surveyor, Municipal Offices, Southernhay West, Exeter, on or after Mar. 29, on payment of a deposit of £1 rs. for each set. Fair wages clause. Sealed tenders, endorsed "Tramways—Contract No. 7," must be received at the Town Clerk's Office, No. 8, Southernhay, Exeter, on or before April 11.

April 12. Aberdeen.—*Steel girder bridge over the River Don, in the parish of Monymusk, including Masonry Pier, abutments and wing walls, and the construction of approach roads and appurtenant works.* The drawings and general conditions may be seen, and copies of the specification and schedule of quantities may be obtained at the office of Walker & Duncan, engineers, Aberdeen, on payment of £2 2s. Sealed tenders endorsed "Tender for Monymusk Bridge and Road" to be lodged with W. Murison, county clerk, County Buildings, Aberdeen, before noon on April 12.

April 13. Norre Sundby.—*Harbour works.* Drawing and conditions may be obtained from the Chamberlain's Office (Kaemnerkontor), Norre Sundby, or from Ingeniør J. Andersen, Frederiksborg Alle, 3 die Sal, Copenhagen, on payment of 20 kroner (£1 2s.). Tenders must be sent in to the Chamberlain's Office (Kaemnerkontor), Norre Sundby, by April 13.

April 16. Glasgow.—*Construction of a culvert 19½ ft. by 10 ft. by about 215 yds. in length for a diversion of the Yoker Burn between the Lanarkshire and Dumbartonshire Railway and the River Clyde, and also for excavating and embanking about 33,000 cub. yds., to form sidings ground between Yoker Burn and the Green Road, for the Trustees of the Clyde Navigation.* Drawings may be seen and specifications, schedule of quantities, and form of tender obtained, on application to W. M. Alston, the trustees' engineer. Sealed tenders, marked "Tender for Yoker Burn Culvert, &c.," to be lodged with T. R. Mackenzie, general manager and secretary, 16, Robertson Street, Glasgow, not later than 10 a.m. on April 16.

(Continued on p. xiv.)



WESLEYAN HALL AT WHITLEY, READING. W. ROLAND HOWELL, A.R.I.B.A., ARCHITECT.

This new building of the Wesleyan Methodists was opened about a fortnight ago. It comprises a hall 51ft. by 68ft., with gallery, behind which is a schoolroom 33ft. 6ins. by 53ft., with various classrooms, kitchens, &c. The large hall has an open pitch-pine roof, and accommodates 900 persons. Mr. W. Roland Howell, A.R.I.B.A., of Reading, was the architect of the building, the total cost of which (exclusive of site, but inclusive of heating and lighting) has been about £4,300. For the above illustration we are indebted to the "Reading Standard."

IN PARLIAMENT.

(By our Press Gallery Representative.)

The Alterations to the new Government Offices.

IN the House of Commons on Tuesday, March 27th, Sir William Bull asked the First Commissioner of Works whether it had been decided to cease completing the towers on the new Government Offices in Whitehall, and if so, whether in view of the number of masons who would be thrown out of employment, and the amount of stone that had been dressed and carved, he would consider the advisability of completing the original design.

Mr. Lewis Harcourt, in reply, said after consultation with the architects and the Advisory Committee he had decided not to carry the towers on the Charles Street side of the new public offices to the full height as originally designed. This decision was arrived at on two grounds: (1) that owing to the narrowness of Charles Street there was hardly any point of view from which they would have been visible; and (2) if carried out as designed they would have obstructed so much of the light available for the India and Local Government Board offices on the opposite side of the street as to render some of their already limited accommodation practically useless. With regard to the tower on the Great George Street side no decision had been taken as to its ultimate completion, but it would not be carried up to its full height at present, as it must be some years before the remainder of the building towards St. James's Park could be completed or even commenced, and until this was done the erection of only one of a pair of high towers would be architecturally and structurally undesirable. Considerations of economy had not entered into the question.

Another question on this subject was asked by Colonel Legge, who wished to know how many workmen were at present employed on

the new Government offices, and when the buildings would be completed.

Mr. Harcourt replied that the number of men employed on the building was 255; at the masons' yard 96, and 42 joiners at the builders' workshops. There were also a number of carvers. It was anticipated that the buildings would be completed towards the end of 1907.

Dublin College of Science and Art.

Mr. Field asked the Chief Secretary of Ireland whether he could explain the delay in commencing the building of the College of Science and Art in Dublin, and whether he could state when the work would be commenced, in view of the want of employment in Dublin.

Mr. McKenna replied that the work was commenced, a year ago and was still in progress.

No extensions of the National Gallery.

The Chancellor of the Exchequer informed Mr. Napier that the Government regretted that there was no prospect of the extension of the National Gallery, asked for by the trustees, being carried out in the approaching financial year, as it had not been possible to make provision for it in the Estimates. The question would be further considered in the course of the ensuing financial year.

An old Irish Castle as a Bacon Factory.

Replying to Mr. T. L. Corbett, Mr. Bryce, the Chief Secretary of Ireland, stated that he was informed that there were two ancient castles at Roscrea, King's County, one founded in 1213 by King John and the other in 1281 by Edmund Butler, afterwards Earl of Carrick. The latter castle was now the property of the War Department and was in good preservation. Certain persons interested in the establishment of a bacon factory at Roscrea had approached the War Office with a view to the purchase of a portion of the premises, and it had been decided to put the premises up for sale, exclusive of the castle,

by public auction subject to conditions as regards access to and preservation of the castle. There was no danger, therefore, that the castle itself would be used as a bacon factory, and every care would be taken that the castle should not suffer.

British Granite Once More.

Mr. Lambert, replying to Mr. Hay Morgan, stated that the contract for Keyham Dockyard extension did not stipulate that British granite was to be used, and the contractor was entitled to use foreign granite, provided its quality was satisfactory. Answering another question, he said so far as he had been able to ascertain it had not been the custom of the Government in the past to use only British granite in the construction of naval works.

Mr. W. Rutherford, in a question to the President of the Board of Trade, suggested that in view of the importance and magnitude of the manufacture and trade in granite sets on the coasts of Carnarvonshire and the neighbourhood of Newry, in Ireland, and the depression in that trade, foreign-made sets should pay an import duty.

Mr. Lloyd George, in reply, contented himself with a simple negative.

Condition of Winchester Cathedral.—A consultation has been held at Winchester Cathedral between Mr. T. G. Jackson, R.A. (the architect in charge), Mr. Francis Fox (the consulting engineer), Mr. J. B. Colson (the Cathedral architect and surveyor) and Mr. Walter Hill (managing director of the contractors, Messrs. Thompson & Co., of Peterborough) in reference to the pumping that is being carried on. A thorough investigation showed that this is having no effect upon the building or upon the water on the top of the peat, which is that immediately beneath the structure. The work of underpinning is proceeding very satisfactorily. It is estimated to occupy at least three years

Tenders.

Addressed postcards on which lists of tenders may be stated will be sent post free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Fetter Lane, E.C. Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Aberdare.—Accepted for the erection of forty dwelling-houses, together with street sewers and surface-water drains, on part of Pforchaman Farm, Cwmaman, Aberdare, for the Cwmaman Coal Co. Messrs. Morgan & Elford, architects, Mountain Ash and Aberdare:—
Waring, Cole & Waring, Charles Street, Neath.

Bristol.—For various reparations and renovations at Cotham Grove Baptist Chapel. Mr. B. Wakefield, architect, 45, Nicholas Street, Bristol:—

R. F. Ridd	£445 16 0
W. Cowlin & Son	442 4 0
E. Clark & Son*	412 19 0

* Accepted provisionally. [All of Bristol.]

Croydon.—For the erection of the Middle Whitgift School additions. Messrs. Berney & Sons, architects, Croydon:—

Hudson & Co.	£5,456 3 8
Gathercole Brothers	5,190 0 0
Waller	5,131 0 0
Cropley Brothers	4,993 0 0
W. Smith & Sons	4,985 0 0
Bulld & Co.	4,985 0 0
J. Smith & Sons	4,980 0 0
Akers & Co.	4,949 0 0
Barker	4,831 0 0
Marriott & Salter	4,800 0 0
Harbrow	4,798 0 0
Everitt	4,760 0 0
Saunders	4,749 0 0
Bacon & Son	4,695 0 0

Dartford.—For the erection of York Road Girls' Council Schools, for Kent Education Committee:—

W. Pollock	£8,778	£170
F. Johnson	7,654	139
R. Avar	7,595	150
W. J. Adcock	7,506	147
Thomas & Edge	7,420	160
Mattock & Parsons	7,399	147
W. H. Archer & Son	7,389	144
J. M. Patrick	7,390	130
W. Smith & Son	7,257	138
F. & G. Foster	7,226	134
F. Gough & Co.	7,184	140
Friday & Ling	7,150	145
W. F. Blay	7,050	132
J. Guttridge	6,985	172
J. Ellingham & Sons	7,000	130
Gann & Co.	6,967	140
J. Lonsdale	6,948	138
Wallis & Son	6,838	131
J. E. Johnson & Son*	6,769	135

A.—New girls' school. B.—Boys' playsheds.

* Accepted.

Eaton Socon.—For the erection of a house in Great North Road, for J. D. Higgin, St. Neots. Mr. Thomas Cockrill, A.M.I.C.E., architect, Biggleswade:—

S. Redhouse, sen., Stotfold	£2,068 0 0
C. Wright, Langford	1,958 0 0
W. Osborne, St. Neots	1,811 0 3
F. Wellham, Eaton Socon	1,784 1 6
C. Wrycroft & Son, St. Neots	1,659 0 0
W. Wade,* St. Neots	1,557 0 0

* Accepted.

Eccles.—Accepted for the erection of a public elementary school in Lewis Street, Patricroft, for the Corporation. Mr. J. H. Woodhouse, 100, King Street, Manchester:—

R. Carlyle, Seymour Grove, Old Trafford, Manchester	£7,308 0 0
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Provisional extras: cinderling, &c., playgrounds, £91 5s.; asphaltling, &c., playgrounds, £378 10s.

Guildford.—For the erection of eighteen semi-detached cottages on the Woodbridge Estate, for the Woodbridge Cottage Club. Messrs. Houston & Houston, architects, 148, High Street, Guildford. Quantities by Messrs. McEwan & Waghorn:—

Chinchen & Son	£6,950 0 0
J. Lawrence	6,799 0 0
T. G. Hawkins	6,790 0 0
R. Smith	6,700 0 0
W. Smith & Sons	6,697 0 0
Swayne & Son	6,350 0 0
Higlett & Hammond	6,297 0 0
R. Wood & Son	6,150 0 0
J. Smith & Sons	6,087 0 0
C. Ansell	6,060 0 0
Heffer & Co.	6,050 0 0
Tompsett & Co.	6,000 0 0
Drowley & Co.	5,999 0 0
E. C. Hughes	5,990 0 0
A. & F. Gammon	5,990 0 0
Mitchell Brothers	5,964 0 0
W. Lawrence & Sons	5,875 0 0
G. Kemp	5,716 0 0
Martin, Wells & Co	5,670 0 0
G. Willis	5,286 0 0
A. Franks	5,262 16 6
Tribe & Robinson	5,250 0 0
W. Mercer,* Guildford	4,950 0 0

* Accepted on reduction estimate, £4,418.

Hucknall Torkard.—For the erection of a new grocery department, for the Hucknall Torkard Industrial Provident Society. Mr. Harry Spencer, architect, Hucknall Torkard. Quantities by the architect:—

Birken & Rowlands, Kimberley	£1,279 15 0
J. Dove, Hucknall	1,200 0 0
Rowland Brothers, Kimberley	1,177 0 0
D. S. Webster, Hucknall	1,169 0 0
Co-operative Builders, Kettering	1,150 0 0
Fish & Sons, Nottingham	1,100 0 0
J. A. Munks,* Hucknall Torkard	1,060 0 0

* Accepted.

Leeds.—For the erection of a new branch post-office and sorting office, Hyde Park Corner, Leeds, for H.M. Office of Works, &c.:—

W. Wade & Co.	£3,962 9 9
W. Irwin & Co.	3,650 0 0
R. Costain & Sons	3,196 0 0
W. Nicholson & Son	3,591 17 5
H. Atkinson & Sons	3,579 0 0
W. H. Dewes & Co.	3,569 0 0
Armitage & Hodgson	3,490 0 0
T. Hannam & Sons	3,369 0 0
W. Wilson & Sons	3,337 0 0
T. Blakey	3,285 0 0
J. Wood & Son	3,279 0 0
C. Myers & Sons	3,255 0 0
J. F. Wright	3,240 12 6
J. Pullan*	3,000 0 0

* Accepted.

London, N.—For the erection of Belmont Road School, Tottenham, for the Education Committee. Mr. G. E. T. Lawrence, architect, 22, Buckingham Street, Adelphi, W.C.:—

Jackson & Co., Finsbury Park	£32,485	£1,416
Hooper, Nessy & Co., Green-		
wich	29,201	1,997
Clark & Sons, Cambridge	29,189	3,075
Pethick Brothers, Westminster	28,883	3,700
Oak Building Co., Cambridge	28,768	3,099
Leslie & Co., Kensington	27,526	2,308
C. Roper, Ipswich	26,900	3,122
A. J. Bateman, Ramsey	26,717	2,905
McCormick & Sons, Essex		
Road	26,430	1,428
Goddard & Son, Dorking	26,199	2,560
A. E. Symes, Stratford	26,119	2,054
B. E. Nightingale, Albert		
Embankment	25,896	1,536
Treasure & Son, Holloway	25,702	2,167
Chessum & Sons, Bow	25,597	2,240
W. E. Westgate, Romford	25,444	1,714
Pollard & Brand, Tottenham	25,229	2,064
H. J. Carter, Grays	25,149	2,007
Kerridge & Shaw, Cambridge	24,640	1,847
J. & W. Maddison, Canning		
Town	24,516	2,231
A. Porter, Tottenham	24,500	1,030
Shepherd & Co., Westminster	24,455	2,273
Yong & Son, Norwich	24,433	1,850
Lawrence & Son, Tottenham	24,384	1,785
Davey Ltd., Southend	24,367	2,465
Wallis & Sons, Maidstone	24,266	2,000
Moss & Sons, Loughborough	24,042	1,817
F. J. Coxhead, Leytonstone	23,692	1,045
Fairhead & Son, Enfield	23,590	1,979
J. Guttridge, Peterborough	22,966	1,766
Rowley Brothers,* Tottenham	22,856	2,027
Wall Ltd., London, E.C.	22,778	1,673
F. & A. Willmot, Ilford	22,676	2,340

* Accepted subject to approval of Board of Education, and to their signing contract.

A.—Deduct if plaster in lieu of glazed bricks above dados.

London, S.E.—For the erection of shops and flats at the corner of Weston Street and Snowsfields, Bermondsey. Messrs. Rings & Myers, architects, 21, Railway Approach, London Bridge. Quantities by Messrs. Campbell & Sons, 4, Finsbury Circus:—

Holland & Hannen	£19,818
Spencer, Santo & Co.	19,300
W. Downs	19,140
Colls & Sons	18,765
Higgs & Hill	18,484
Holloway Brothers	18,450
Smith & Sons	18,214
Carmichael	18,142
Patman & Fotheringham	17,973
G. Darlington*	17,800
F. & H. F. Higgs	17,250
Greenwood Ltd.	17,181

* Arrived late.

London, N.—For the erection of car-shed at Stamford Hill, to accommodate 126 cars, required in connection with the electrical working of the first section of the London County Council's northern tramways:—

Kirk & Randall	£34,493 0 0
F. & G. Foster	34,152 0 0
G. Munday & Sons	33,598 0 0
F. & T. Thorne	33,390 0 0
F. & H. F. Higgs	31,980 0 0
C. Wall, Ltd.	31,919 17 0
H. Lovatt, Ltd.	30,939 0 0
Hudson & Co.	30,554 0 0
Holloway Brothers, Ltd.*	30,120 0 0
Holliday & Greenwood, Ltd.*	27,999 0 0

* Recommended for acceptance. [All of London.]

London.—For the construction of the Bermondsey and Southwark storm relief sewer, for the London County Council:—

J. Best, Edinburgh	£209,343 4 5
R. H. B. Neal, Ltd., Plymouth	145,548 6 9
Price & Reeves, Waterloo Place, S.W.	144,461 6 0
Muirhead, Greig & Matthews, Queen Victoria Street, E.C.	135,833 3 7
D. R. Paterson, Camden Town	134,997 5 5
J. Strochan, Cardiff	134,900 0 0
Walter, Scott & Middleton, Ltd., Westminster	131,241 6 9
Pedrette & Co., Finsbury Park	129,244 13 11
J. Cochran & Sons, Westminster	128,482 1 2
J. Mowlem & Co., Ltd., Westminster	126,216 0 0
W. Kennedy, Ltd., Westminster	126,047 19 5
R. McAlpine & Son, Glasgow	107,024 7 8
J. Moran & Son, Ltd., Westminster	106,665 15 11
Smith & Co., Westminster	102,094 1 9
Tilbury Contracting and Dredging Co., Ltd.,* Great Tower Street, E.C.	100,493 5 4

* Recommended for acceptance.

Nottingham.—For the construction and erection of a bridge over the Nottingham Canal, Trent Street, for the Improvement Committee: (Contract No. 1) erection of abutments, &c., for the new bridge, and the taking down of the present structure, &c.; (2) about 95 tons of steel-work in plate and lattice-girders, trough flooring, buckled plates, &c. Mr. Arthur Brown, M.I.C.E., city engineer:—

Contract No. 1.

Leggott & Speight, Hull	£1,895 16 4
J. Hodson & Son	1,680 1 6
Bentley & Loch, Leicester	1,659 14 9
Lock, Andrews & Price	1,544 5 10
Johnson & Langley, Leicester	1,487 4 6
J. Byrom Ltd., Bury, Lancashire	1,399 0 0
T. H. Harper, Carlton, Notts	1,280 0 0
H. Ashley, Mansfield	1,268 4 5
J. G. Thomas	1,227 0 0
Dennett & Ingle,* Station Street	1,220 0 0
J. Bentley,* Bradford	1,120 0 0

Contract No. 2.

Ashmore, Benson, Pease & Co., Stockton-on-Tees	£1,970 2 0
T. Pigott & Co., Birmingham	1,705 0 0
Brathwaite & Kirk, West Bromwich	1,690 6 3
Westwood & Wrights, Brierley Hill	1,680 17 0
Redpath, Brown & Co., Manchester	1,661 4 3
Eastwood Swinger & Co., Derby	1,642 3 0
A. Handsley & Co., Derby	1,603 5 11
Motherwell Bridge Co., Motherwell	1,600 0 0
S. Butler & Co., Leeds	1,590 2 0
Horsley & Co., Tipton	1,582 7 2
Skipwith, Jones & Lomax, Manchester	1,517 0 0
A. Findlay & Co., Motherwell	1,490 3 8
Somervail & Co., Glasgow	1,474 6 0
Cleveland Bridge Co., Darlington	1,458 1 2
Butterley Co.,* Butterley, near Alfreton	1,356 7 7

* Accepted. † Withdrawn.

[Rest of Nottingham.]

Nottingham.—For the erection of a sanatorium for females at the Nottingham Workhouse. Mr. Arthur Marshall, A.R.I.B.A., architect, High Street, Nottingham:—

F. Meeson	£1,310 0 0
J. J. Adams	1,300 0 0
W. Crane & Co.	1,298 0 0
W. Maule & Co.	1,292 0 0
T. Fish & Son	1,281 0 0
J. Hutchinson & Son	1,280 0 0
F. Evans	1,270 0 0
J. Lewin	1,255 0 0
T. Barlow & Co.	1,245 10 0
H. Vickery & Son	1,240 0 0
T. Cuthbert	1,210 0 0
J. G. Short,* Newark Street	1,192 10 0

* Accepted. [All of Nottingham.]

Okehampton.—For the erection of semi-detached residences in Station Road, for Mr. E. Murrin. Mr. Francis J. Worden, architect, Okehampton:—

J. M. Harris	£1,730 0 0
J. Petherick	1,650 0 0
H. Harris & Co.	1,470 0 0
W. Harris & Son	1,456 0 0
Sleeman & Sons	1,445 0 0
Kerslake & Son	1,420 0 0
Blatchford & Avery	1,420 0 0
Geen & Avery	1,297 0 0
S. T. Geen Son & Co.*	1,290 0 0

* Recommended for acceptance.

Okehampton.—For two residences, for Mr. I. T. Miller. Mr. Francis Worden, architect, Okehampton:—

J. M. Harris	£1,721 0 0
S. Geen & Harris	1,319 0 0
W. Harris	1,316 0 0
Kerslake & Son	1,300 0 0
G. K. Blatchford	1,215 0 0
Avery & Blatchford	1,230 0 0
J. Sleeman & Sons	1,195 0 0
S. T. Geen Son & Co.	1,070 0 0
W. Chapman*	1,000 0 0

* Recommended for acceptance.

Shenfield.—For the erection of a country house, for the Highland Avenue Building Syndicate. Mr. Hugo R. Bird, architect and surveyor, Brentwood:—

F. W. Burtwell	£750 0 0
F. W. Jarvis	725 0 0
E. Dix*	680 0 0

* Accepted.

Southsea.—For the erection of girls' secondary school. Mr. C. W. Bevis, architect, Elm Grove Chambers, Southsea. Quantities by Mr. C. W. Ball, Whittington Chambers, Southsea:—

J. J. Jerome	£24,044 13 8
W. T. Dugan	23,769 0 0
Armitage & Hodgson	22,765 0 0
J. Croad	21,875 0 0
F. Corke	21,750 0 0
S. Salter	21,735 0 0
F. Privett	21,730 0 0
W. R. Light & Son	21,668 0 0
J. Munday	21,397 13 9
J. Crockerell	21,349 0 0
W. W. Learmouth	21,100 0 0
M. Coltherop	20,700 0 0

[Architect's estimate, £21,500.]

Worcester.—For the enlargement of Worcester Post Office, for H.M. Office of Works, &c.:—

G. Wells	£5,994 0 0	£81 5 0
Watts & Co.	3,885 6 6	85 11 0
J. & A. Brazier	3,716 0 0	25 0 0
D. Roberts	2,987 0 0	—
Treasure & Son	2,805 0 0	50 0 0
W. Hopkins	2,700 0 0	15 0 0
A. J. Colborne	2,588 0 0	49 0 0
J. Wood & Sons	2,597 0 0	60 0 0
W. Bowers & Co.	2,595 10 0	36 0 0
Barnsley & Sons	2,446 0 0	80 0 0
Bromage & Evans*	1,912 0 0	27 3 0

* Accepted.

AWARDED TWO GOLD MEDALS INTERNATIONAL FIRE EXHIBITION, 1903.



NEW PREMISES, OXFORD STREET, W., FOR MESSRS. WARING & GILLOW, LTD.

R. FRANK ATKINSON, F.R.I.B.A., *Architect.*

Area of Concrete Floors and Roofs, about Eight Acres.

The whole of the Concrete Fireproof Floors and Roofs of this building constructed on the Columbian System of Ribbed Steel Bars and Concrete, also the Vaults under the pavement around the entire building

BY THE

Columbian Fireproofing Co., Ltd.

87, KING WILLIAM ST., E.C.

J. D. O'BRIEN, Managing Director.

Telephone—5060 BANK.

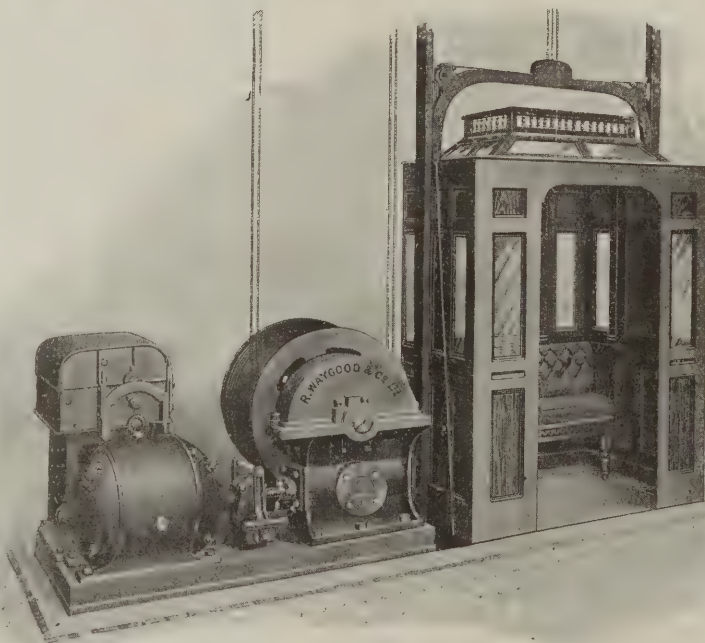
WAYGOOD LIFTS

of

ALL KINDS,

and for

ALL PURPOSES.



CATALOGUES
and
ESTIMATES FREE.

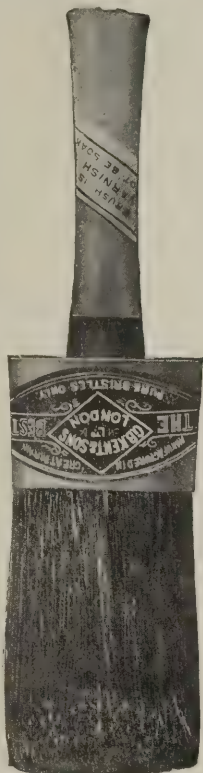


Head Office and Works : FALMOUTH ROAD, LONDON, S.E.

Trade and Craft.

Brushes.

We have received a copy of the new catalogue and price list of painting brushes that Messrs. G. B. Kent & Sons, Ltd., have recently brought out. This is altogether the best example of a catalogue dealing with this class of goods we have yet seen. The illustrations of brushes are mostly reproduced from photographs, which show the goods most clearly. The hair, shape and make of the brushes can be properly distinguished, and no imagination has to be used, such as the drawings and wood cuts we have too long been accustomed to require. We reprint one of the illustrations in this catalogue. All who have to deal with painters' tools will not only find this list most useful for reference, but we venture to think instructive, because all kinds of brushes are here illustrated for a variety of circumstances that frequently arise in practice, but in which painters generally make shift with unsuitable tools, so resulting in bad workmanship and wasted time and labour. Messrs. Kent are distinguished among paint brush manufacturers for the high quality of their goods. There are many cheap and nasty brushes on the market. The best brushes may be more expensive at first cost, but they are the cheapest in the long run. A brush should be made of pure hog's bristles, and owing to the disturbed state of Russia the prices of the hair remain very high.



VARNISH BRUSH.

Novelties in Tiles.

The difficulty of securely fixing wall-tiles must be known to our readers. The problem has recently been solved by Messrs. G. Woolliscroft & Son, Ltd., by moulding the back of the tile with grooves undercut in opposite directions, as shown in our illustration. This patent "Grip-Back" tile gives a most effective and unique holding surface,

by which means the tile is held absolutely rigid in its place. These tiles are produced in practically any colour, and the cost is

PATENT



"GRIP" BACK

about the same as glazed bricks. This well-known firm are also the manufacturers of the patent "Grip" roof tile and lath, the use of which precludes the necessity of nailing, and the employment of this system of roofing combines inexpensiveness with durability. Messrs. Woolliscroft have also carried out some very important and extensive work in red and buff terra-cotta, while their operations extend to mosaic work. The mosaics executed by them on the walls of Armagh Cathedral have been very greatly admired.

An Excellent Innovation in Blinds.

The houses of Japan are constructed in a very different fashion to our own. The walls are not solid brick or stone, but consist of wood and plaster and white, thin, tough rice paper stretched over the light latticework that forms the windows and on the outer ranges of sliding screens (*shoji*), or covering the thicker screens (*jusuma*) that form the dividing partitions of the rooms. These paper walls are sanitary, easily and cheaply renewable, and lend themselves to decorative effect. When there are such possibilities in paper, in connection with buildings, it is surprising that we have not put the material to greater use in this country. Tardy recognition has come, however, in one direction where the advantages of paper are so emphatic that they cannot be disputed. We refer to the recent invention of paper window blinds supplied by Messrs. Japa Blinds, Ltd., of 55, Barbican, London, E.C. The Japa Blinds do away with all the old troubles of cloth blinds, those insanitary dust and germ traps, that needed frequent washing, which they did not often get because of the trouble. These paper blinds can be renewed for less money than the washing of old style blinds cost. They are made of a very durable waterproof paper specially prepared for the purpose, and are to be obtained in many pleasing designs. The lower edges are decorated by means of lace made in many patterns.

Saxilby Church Tower has fallen into a very dilapidated condition, and an appeal is being made for £1,200 to restore it.

New Companies.

BRITANNIA BRICK CO., Crewe. Capital: £1,000.

KNIGHTS, SONS & CO., to acquire the business carried on at Pimlico as Knights, Sons & Co., to adopt an agreement with J. J. Knights and others, and to carry on the business of timber merchants and importers, &c. Capital: £24,500.

H. BRAGG & SONS, to acquire the business carried on at Brixton as H. Bragg & Sons, to adopt an agreement with W. L. Bragg, and to carry on the business of builders, contractors, &c. Capital: £5,000.

J. M. BOEKBINDER, to take over the business of a decorator, builder, contractor, &c., carried on by J. M. Boekbinder, with the tenancy of No. 11, Pratt Street, Camden Town, N.W. Capital: £1,000.

PATENT INDENTED STEEL BAR CO., to acquire any invention relating to the reinforcement of concrete in structures or to other methods of constructing buildings with a view to the improvements in their strength or fire-resisting qualities or otherwise, to adopt an agreement with A. L. Johnson, D. E. Garrison, and Sir William Mather, and to carry on the business of manufacturers of steel bars and rails, &c., Westminster, S.W. Capital: £10,000.

Coming Events.

Wednesday, April 4.

INSTITUTE OF SANITARY ENGINEERS.—Mr. H. K. G. Bamber on "The Manufacture of Portland Cement," at 8 p.m.

INSTITUTION OF CIVIL ENGINEERS.—Students' Visit to Rotherhithe Tunnel Works at 2.30 p.m. Mr. B. F. Beverley on "Variations in Direction of the Wind, and an Instrument for Determining them Graphically," at 8 p.m.

Thursday, April 5.

INSTITUTION OF CIVIL ENGINEERS.—Students' Annual Dinner, Trocadero, at 7.30.

CHEMICAL SOCIETY.—Ordinary Meeting at 8.30 p.m.

Friday, April 6.

ARCHITECTURAL ASSOCIATION.—Mr. E. Greenop on "Valuations, Compensations, and Light and Air," at 7.30 p.m.

Saturday, April 7.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Associates' visit to Cousland Cement Works.

ARCHITECTURAL ASSOCIATION.—Sixth Spring visit to New Scotland Yard Extensions. Members to meet at the building at 2 p.m.

NORTH OF ENGLAND INSTITUTE OF MINING AND MECHANICAL ENGINEERS.—Meeting at Memorial Hall, Newcastle, at 2 p.m.

NORTHERN ARCHITECTURAL ASSOCIATION.—Visit to reinforced concrete goods warehouse in New Bridge Street, Newcastle, and to "Rowton House," in Dog Bank.

Wednesday, April 11.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Associates' Annual Business Meeting.

Wednesday, April 18.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Annual Business Meeting and President's Address.

Saturday, April 21.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Visits to Pinkie House, Musselburgh, and Church and Presbytery of our Lady of Loretto, Musselburgh.

Monday, April 23.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.—Messrs. G. P. Bankart and Lawrence A. W. Turner on "Plasterwork," at 8 p.m.

SURVEYORS' INSTITUTION.—Ordinary General Meeting at 4 p.m.

Thursday, April 26.

INSTITUTION OF MECHANICAL ENGINEERS.—Anniversary Dinner.

Friday, April 27.

ARCHITECTURAL ASSOCIATION.—Mr. Walter Cave on "Fenestration," at 7.30 p.m.

PERFECTION

IN

Spring Hinges

The "VICTOR" Double Action Spring Hinges open wider than any other—viz., 135° each way, i.e., 45° beyond right angles—and close with a perfect check action.

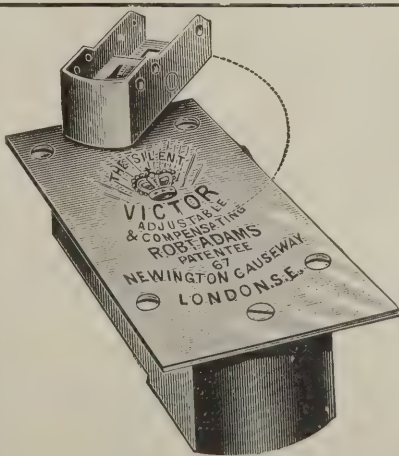
ROBERT ADAMS,

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3 & 5, Emerald Street,

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The "Crown Victor" showing opening capacity.

Guaranteed THE BEST

Spring Hinges

In the world.

The "VICTOR" Single Action Spring Hinges open wider than any other—opening to and closing from the angle of 180°, i.e., the half circle, with a perfect check action.

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3 & 5, Emerald Street,

Theobald's Road, W.C.

Telephone: 829 Central.

(Continued from p. 185.)

April 18. Withington.—*Electric lighting of workhouse and hospitals*, for the Guardians of the Charlton Union. Specifications may be obtained from and plans seen at the office of G. R. Peers, A.M.I.E.E., 16, John Dalton Street, Manchester, upon payment of a deposit of £3 3s. Tenders, endorsed "Electric Lighting," to be delivered to David S. Bloomfield, clerk to the Guardians, Union Offices, All Saints, Manchester, not later than 9 a.m. on April 18.

April 18. Brussels.—*Railway plant.* For the construction of the Vollezele to Ninove section of the local railway from Hal to Ninove. The estimated cost of the work is 90,000 francs (£3,600), and a deposit of 9,000 francs (£360) is required to qualify any tender. A copy of the specifications may be obtained on payment of 1 franc from M. Darteville, rue de Turquie, No. 18, Saint Gilles, Brussels. Tenders, in sealed envelopes, should be addressed to the General Manager of the Company, at 14, Rue de la Science, Brussels (where specifications, plans, &c., may be inspected), and sent in by April 18.

April 18. Bristol.—*Electric lighting of the tobacco warehouse, Cumberland Basin, and the maintenance of the work for 12 months after completion.* Drawings can be examined on application to W. W. Squire, Engineer's Office, Cumberland Road, from whom copies of the specification, form of tender, and form of contract can be obtained on production of a receipt from the Secretary of the Docks Committee showing that £3 has been paid as deposit. The tenders must be enclosed in a sealed envelope, endorsed "Tender for Electric Lighting Tobacco Warehouse," and addressed to the Secretary of the Docks Committee, 19, Queen Square, Bristol, and must be delivered to him, accompanied by the necessary documents, before 10 a.m., on April 18.

April 18. Bristol.—*Delivery, erecting in place and maintenance*, for twelve months after erection, of two electrically-driven transporters at the Tobacco Warehouse, Cumberland Basin. The two transporters are of the type which have travelling wheels arranged to run on the lower flange of rolled steel joists, and they are to carry the operator with them. Tenderers will be required to state what work they have done before on a similar nature. Specification, form of tender, form of contract and copy of contract drawing can be obtained from W. W. Squire, engineer's office, Cumberland Basin, Bristol, on production of a receipt from the Secretary of the Docks Committee showing that £3 has been paid as deposit. Tenders must be enclosed in a sealed envelope, endorsed "Tender for Electric Transporters, Tobacco Warehouse," and addressed to the Secretary of the Docks Committee, 19, Queen Square, Bristol, and must be delivered to him accompanied by the prescribed documents before 10 a.m. on April 18.

April 19. Ystradfydwg.—*Driving a tunnel* (mining only) 2,100 yds. or thereabouts in length through the Blaenrhondda Mountain, sinking shafts and constructing works in connection therewith in the parish of Ystradfydwg, in the county of Glamorgan, for the U.D.C. Drawings may be inspected and copies of the specification, schedule of prices and forms of tender obtained upon application to J. E. Hughes, M.I.C.E., engineer, Tynewydd, Treherbert, Glamorgan, upon depositing the sum of £5. Fair wages clause. An assistant engineer will accompany intending contractors along the site of the works on Wednesdays, April 4 and 11, starting from the Engineer's Office at Tynewydd at 11 a.m. Sealed tenders, enclosed in the printed envelopes provided, and addressed to the Chairman of the Gas and Water Committee, endorsed "Tender for Tunnel," must be delivered at the Council Offices, Pentre, Glam., not later than 10 a.m. on April 19.

April 20. Halifax.—*Construction and completion of a single line of railway*, about 4½ miles in length, from Holmfild Station to Southwortham, in the borough of Halifax, in the West Riding of the county of York, together with certain station works connected therewith, according to plans, specifications and conditions prepared by Myers-Beswick & Partners, of Leeds, engineers. Specification and bill of quantities can be obtained on application to Land & Foster, solicitors, 13, Ward's End, Halifax, to whom tenders must be delivered not later than April 20.

April 23. Littlehampton.—*Steel bridge over the River Arun at Littlehampton*, to consist of a swing span and a fixed span, for the U.D.C. Tenders are also invited for the construction of the approaches and abutments in connection with the bridge. Tenders must be sealed and endorsed either "Tender for Bridge" or "Tender for Approaches," and must be delivered to A. Shelley, clerk, not later than 9 a.m. on April 23. For the bridge only those tenders from firms who have erected similar bridges will be considered, and the tenderers must give the names of the swingbridges they have erected. On a deposit of £5 5s. drawings may be seen and copies of the specification, general conditions, bill of quantities and forms of tender obtained on application to the engineer, Major Hector Tulloch, C.B., R.E. (retired), 28, Victoria Street, Westminster, London, S.W., or to Arthur Shelley, clerk, Town Offices, Littlehampton.

May 5. Guernsey.—*Quay wall*, with low-level landing, on the southern side of St. Julian's Emplacement, Harbour of St. Peter-Port, Guernsey. Drawings of the proposed works may be inspected, and the general conditions, specifications and forms of tender and other particulars obtained, upon application at the States Offices, Guernsey, on payment of £5. Tenders, enclosed in sealed envelopes, endorsed "Tender for Quay, St. Julian's," and addressed to John N. Brouard, supervisor of the harbour, &c., must be delivered so as to reach the States Office, Guernsey, on or before 3 p.m. on May 5.

May 12. Brussels.—*Railway plant.* For the construction of the section from S. Cécile to the French frontier, of the railway from Bétrix to the frontier via Muno. Estimated cost, 3,500,000 francs (£140,000); deposit, 190,000 francs (£7,600). Specifications ("cahier des charges," special No. 27) may be obtained at the Bourse, Brussels (price 4 francs 70 cents), where tenders will be received up to May 12.

No date. Alexandria.—*Refuse destructor.* The Municipality propose to establish either one destructor, capable of burning 200 tons of refuse per day, or two destructors with a capacity of from 80 to 120 tons each. No public call for tenders will be made; persons interested should therefore communicate with the Municipality of Alexandria, enclosing tenders and plans.

IRON AND STEEL.

April 6. Aberdare.—*Supply and delivery of 24-in. cast-iron pipes.* Specification and particulars can be obtained from the Surveyor, Town Hall, Aberdare. Tenders, endorsed "Tender for Pipes," must be delivered to Thomas Phillips, clerk, Town Hall, Aberdare, on or before April 6.

April 6 and 7. Brescia.—*Supply of iron and steel for the Italian (Royal) Arms Factory as follows:*—(1) Iron in rods, &c., to the estimated value of 13,008 lire (about £520); (2) steel for bayonets and parts of swords, to the estimated value of 3,710 lire (about £148); and (3) brass in wire and sheets, to the estimated value of 2,475 lire (about £99). Tenders for (1) and (2) will be received up to April 7, and for (3) on April 6. They should be addressed to "Direzione d'Artiglieria della Fabbrica d'Armi in Brescia, Italy."

April 10. Isleworth.—*Supply and erection of an iron escape staircase* to be fixed at Percy House, Mill Plat, Isleworth, according to plan and specification prepared by W. H. Ward, architect, Birmingham. Plan and specification may be seen upon personal application at the Union Offices, Isleworth, W. Tenders, endorsed "Tender for Escape Staircase," must be delivered to William Stephens, clerk to the Guardians, Union Offices, Isleworth, W., by 4 p.m. on April 10.

April 11. Stockport.—*Supply of 3-in. and 4-in. cast-iron mains, and for irregulars from 3-in. to 8-in.* Specifications and particulars can be obtained from the engineer, S. Meunier. Fair wages clause. Tenders, endorsed "Mains," must be addressed to the chairman of the Gas Committee and be delivered at the Town Clerk's office on or before April 11.

April 17. Stockholm.—*Rolled steel joists for the Swedish State Railways* ("Flussisen" quality) of two kinds, I and L, for bridge-building and for wagons. Further particulars (in Swedish), together with notices regarding the manufacture, testing and delivery of the joists, may be seen at the offices of the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall Street, London, E.C. Sealed tenders, marked respectively "Anbud a balkar for bbygggnader" and "Anbud a balkar for vagnstilverkning," should be addressed to "Kungl. Jernvägsstyrelsens Registrator, Stockholm," where they will be received up to noon on April 17.

PAINTING AND PLUMBING.

April 5. Cairo.—*Paint brushes, &c.* Tenders, accompanied by stamped paper of 30 millimètres, must be sent by registered post to the Directeur Général, Chemins de fer de l'Etat, Cairo, before April 5. Specification, &c., and form of tender may be obtained on application to Col. J. H. Western, R.E., Queen Anne's Chambers, Westminster, S.W., on payment of 2s. per copy. A copy of the specification may be seen at 73, Basinghall Street, E.C.

April 6. Crediton.—*Extensive repairs and external painting to the Union Workhouse.* Specifications and conditions can be seen and full particulars obtained of the Master at the Union Workhouse. Sealed and endorsed tenders for the whole of the work to be sent to William Pope, clerk, 31, High Street, Crediton, by April 6.

April 9. Halifax.—*Outside painting of Council schools.* Specifications and forms of tender may be obtained on application to James Lord, C.E., borough engineer, Town Hall, Halifax. Tenders, endorsed "Painting Council Schools," must be sent to W. H. Ostler, education secy., Halifax, on or before noon on April 9. Fair wages clause.

April 9. Manchester.—*Painting various bridges over the Rochdale and Ashton Canals.* Specification and form of tender may be obtained on application at the City Surveyor's Offices, Town Hall, Manchester, on payment of £1 1s. Tenders, enclosed in the official envelope and addressed to the Chairman of the Paving, &c., Committee, to be delivered at the City Surveyor's Office not later than 10 a.m. on April 9.

April 10. Cleckheaton.—*Painting the exterior of the hospital buildings and premises, situate in Oakenshaw Road, also for a considerable amount of painting work, &c., inside, for the North Brierley Joint Hospital Board.* Fair wages clause. Specifications can be obtained on application to W. H. Clough, clerk, Town Hall, Cleckheaton, to whom tenders, endorsed "Tenders for Painting," are to be sent not later than April 10.

April 11. Norwich.—*Painting (externally) various provided schools, the whole of the work to be carried out forthwith.* Specification and quantities may be obtained from C. J. Brown, architect, The Close, Norwich, on and after April 4, from 10 a.m. to 4 p.m., upon payment of a fee of 5s. per school. Tenders, endorsed "Tender for Painting," to be sent to the above address by April 11.

April 11. Toxteth Park.—*Painting, &c., at the Workhouse, Smithdown Road, according to specification to be seen there upon application to the master.* Tenders, marked externally "Painting, &c.," to be sent to R. Albert James, clerk to the Guardians, 15, High Park Street, Liverpool, by April 11.

April 11. Toxteth Park.—*Painting, &c., at the Children's Home, Church Road, Watertree, according to specification to be seen at the Home upon application to the Superintendent.* Tenders, marked externally "Painting, &c.," to be sent to R. Albert James, clerk to the Guardians, 15, High Park Street, Liverpool, by April 11.

April 11. London, S.W.—*Supply of oilman's goods during the period ending Mar. 31, 1907, for the Chelsea Borough Council.* Forms of tender, and information

respecting the contracts, may be obtained at the Town Hall, where samples may be inspected. Tenders must be placed in the box provided for that purpose in the Town Clerk's Office not later than 5.15 p.m. on April 11.

April 12. Belper.—*Painting at the Isolation Hospital.* Specification can be seen on applying to the Matron at the Hospital. Tenders to be sent to Joseph Pym, clerk, Belper, not later than April 12.

April 12. London, S.E.—*Cleaning and painting work at Newington Workhouse, Westmoreland Road, Walworth, S.E., for the Southwark Guardians.* The specification can be seen and all information obtained at the offices of the Master of the Workhouse as above, between the hours of 10 and 4. Tenders, endorsed "Cleaning and Painting Work" should be addressed to the Guardians and delivered at the Union Offices, John Street West, Blackfriars Road, S.E., by 4 p.m. on April 12. Fair wages clause.

April 12. Warrington.—*Painting part of the outside wood and ironwork at the Lancashire County Asylum.* Persons desirous of tendering must measure up the work themselves, between 9 and 12 a.m. and 2 to 5 p.m. on any of the following days—the 28th, 29th and 30th inst. Tenders must be made upon forms, which can be obtained from H. Ellis, clerk, and must be delivered at the Asylum not later than 8 a.m. on April 12, addressed to "The Chairman," and endorsed "Tender for Painting."

April 12. Winchfield.—*Supply of 5 tons of sheet lead* (5 lbs. to the foot), carriage paid, to the Workhouse. Tenders, marked "Tenders for Lead," must reach W. H. Wright, clerk to the Guardians, Odiham, Hants, not later than 9 o'clock on April 12.

ROADS AND CARTAGE.

April 5. Aberdeen.—*Macadamising, &c., at Forest Avenue.* Plans may be seen, and specification, schedule of quantities and form of tender obtained on application to W. Dyack, borough surveyor, Burgh Surveyor's Office, 41½, Union Street, Aberdeen, with whom sealed tenders, properly endorsed, must be lodged before noon on April 5.

April 6. Penzance.—*Raising stone at Polmennor Quarry.* Specification to be seen at the office of the Borough Surveyor. Tenders to be sent in to the Public Buildings, Penzance, by April 6.

April 6. Tain.—*Maintaining the 17th section of district roads* (North Division, Rosskeen Parish), for three years, from May 15, 1906. Copies of the specification to be had from the District Road Surveyor, or at the District Clerk's Office in Tain. Offers to be lodged with W. J. Munro, district clerk, Tain, by April 6.

April 7. Cardiff.—*Repairs to the roads' and paths at the Headquarters Homes, Ely, for the Guardians, according to specification, a copy of which, together with forms of tenders, may be obtained from the clerk.* Forms of tender, with specification attached, endorsed "Tender for Repairs to Roads, Ely," must be forwarded to Arthur J. Harris, clerk, Union Offices, Queen Chambers, Cardiff, not later than 10 a.m. on April 7.

April 7. Blything.—*Supply of 2,900 tons of granite, consisting of 800 tons of 2½-in. granite, 1,900 tons of 1½-in. granite, and 200 tons of granite chips for the R.D.C., to be delivered on or before the 31st day of July next, at the following places, in such quantities as may be required by the Surveyor, viz., Saxmudham, Darsham, Halesworth, Beccles, Leiston, Brampton, Wenham, Blythburgh, Walberswick, Southwold and Laxfield Stations, Beccles Quay and Lowestoft South Quay.* Tenders to be sent to Harold A. Mullens, clerk, Union Offices, Bulcamp, Halesworth, not later than April 7. No printed form of tender is issued.

April 7. Frodingham.—*Supply of about 400 tons of whinstone, delivered free at Frodingham and Gunness Stations, Great Central Railway.* Specification and forms of tender may be had on application to J. Green, surveyor, Council Office, New Frodingham, Doncaster, to whom tenders must be sent not later than April 7.

April 9. Woodham Ferris.—*Repair of the highways in this parish for the year ending March 1907, for the Chelmsford R.D.C.* Forms of tender and full particulars can be obtained from F. E. H. Powell, surveyor of highways. Tenders to be endorsed "Tender for Repair of Highways," and delivered to W. W. Duffield, clerk to the Chelmsford R.D.C., High Street, Chelmsford, by noon on April 9.

April 9. Aylesbury.—*1,707 tons of granite and 400 tons of slag for the repair of the roads for the R.D.C.* Full particulars of the granite and slag, and the stations and places at which it is to be delivered, will be found in the form of tender, to be obtained by forwarding a stamped addressed foolscap envelope. Tenders must be delivered to F. B. Parrott, clerk to the R.D.C., Bourton Street, Aylesbury, by noon on April 9, and a sample must be forwarded, free of expense, with the tender.

April 9. Leeds.—*Supply of Yorkshire flags, kerbs, pavors, and setts during the year ending Mar. 31, 1907, for the Corporation.* Tender forms, specifications, and further particulars may be obtained at the Highways Office, 155, Kirkstall Road. Samples of the several kinds of material are deposited at the City Highways Department, 155, Kirkstall Road, and must be inspected before tenders are sent in. Sealed tenders, endorsed "Tenders for Yorkshire Stone," and addressed to the Highways Committee, must be sent in to the Town Clerk's Office, not later than noon on April 9.

April 10. Aberdeen.—*Quarrying and breaking stones in the Braemar, Tarland, Aboyne, Kincardine O'Neil, and Cluny and Midmar sub-divisions of the Deeside district.* Schedules of quantities may be had on application to John Milne, district road surveyor, Aboyne, and sealed orders will be received by John Murray, district clerk, 22, Bridge Street, Aberdeen, up to April 10.

April 10. Tynemouth.—*Excavating, laying concrete foundation, and paving with whinstone setts and granite setts in Tynemouth Road, North Shields.* Plans and specification may be seen at the office of John F. Smillie, borough surveyor, to whom tenders must be sent by 10 a.m. on April 10.

April 11. Romford.—*Enlargement of Mawneys Road Schools, to accommodate an additional 400 children.* Contractors desirous of tendering should send in their names to the architects, Harrington & Ley, 65, Bishopsgate Street Without, E.C., accompanied by a deposit of £2 2s., on or before April 11.

April 11. Wimbledon.—*Supply of two water-vans, in accordance with specification to be obtained on application.* Sealed tenders, endorsed "Tender for Water-Vans," addressed to the Chairman, Highways Committee, to be delivered not later than noon on April 11.

April 12. Cowpen.—*Providing and laying about 1,700 lineal yds. of Whinstone or granite kerb in Morpeth Road, from Kitty Brewster to Cowpen Row, for the U.D.C.* Plan, section, and specification may be seen, and form of tender obtained, at the offices of Robert Grieves, surveyor, Seaford Street, Waterloo, Blyth. Tenders, endorsed "Tender for Kerbing," must be delivered not later than 4 p.m. on April 12, to the surveyor.

April 12. Sudbury.—*Supply of granite for the West Suffolk County Council.* Particulars and form of tender may be obtained on application to A. Ainsworth Hunt, county surveyor, Sudbury, Suffolk, to whom tenders are to be delivered by April 12.

April 12. Castleford.—*Works of improvement in Smawthorne Lane (back), Ambler Street, Richmond Street (back and front), in accordance with the plans and specifications prepared by the surveyor, William Green, to the Council, at whose office the same can be seen during office hours.* Sealed tenders, endorsed "Street Improvements," to be sent to H. H. Broadbent, clerk to the Council, Council Offices, Castleford, by noon on April 10.

April 12. Liversedge.—*Kerbing, flagging and paving, on concrete bed (5,700 sq. yds.), required to be done on the Leeds and Whitehall Road, and the Birstall and Huddersfield Road, for the U.D.C.* Plans and specifications may be seen and quantities obtained from F. Langley, engineer and surveyor, Liversedge, up to April 12, and on the latter date sealed tenders, endorsed "Tender for Main Road Paving," are to be delivered to T. Mitcheson, solicitor and clerk to the Council, Council Offices, Liversedge, not later than 4 p.m. All applications for quantities must be accompanied by a deposit of £2 2s.

April 14. Ruskington.—*Supply of granite, slag and ironstone, to Ruskington Station (carriage free) during the season, for the U.D.C.* Prompt deliveries in accordance with contracts will be insisted upon, failing which the penalty clauses will be enforced. Forms of tender may be had on application to the Clerk. Tenders, with samples, stating price per ton, to be sent to J. B. Trafford, surveyor, Ruskington, on or before April 14.

April 14. Ruskington.—*Carting granite and ironstone from Ruskington Station to the Lincoln Road, Tattershall Road and Westcliffe Road, and also the Fen Road and Washdyke Road during the season, for the U.D.C.* Tenders are also required for carting by the day. Tenders to be sent to J. B. Trafford, surveyor, Ruskington, on or before April 14.

April 18. Bournemouth.—*Making-up the following roads:—Firs Glen Road, Winton, A.A. (about 460ft. long); Firs Glen Road, Winton, B.A. (about 370ft. long); road rear of Parade, Boscombe (about 260ft. long).* Full particulars, form of tender, specification and schedule can be obtained of the borough engineer, F. W. Lacey, at whose office drawings can be seen provided that the sum of £1 rs. has been previously deposited. Tenders to be sent in, in envelopes furnished for the purpose, to the Town Clerk before 11 a.m. on April 18.

April 18. Bradford.—*20,000 tons of road metal required for the macadamised roads within the city, for the Corporation.* Form of tender may be obtained on application at the office of J. H. Cox, city surveyor, at the Town Hall. Fair wages clause. Sealed tenders, endorsed "Tender for Road Metal," to be sent to Frederick Stevens, town clerk, Town Hall, Bradford, on April 18.

April 18. Crediton.—*Widening a portion of the main road from Crediton to Cadbury, in the parish of Stockleigh Pomeroy, according to conditions and specifications which can be seen on application to the surveyor of the R.D.C., S. Pridham, Cheriton Fitzpaine, from whom all particulars can be obtained.* All tenders to be sent to the Clerk, at No. 31, High Street, Crediton, on or before April 18.

April 18. Shildon.—*Excavating, levelling, paving, metalling, channelling, &c., of All Saints Road, Bouch Street and Back Redworth Street (from Scott Street to Charles Street).* Plans and specifications may be seen and quantities obtained on application to the surveyor, M. Turnbull, Shildon. Separate tenders, properly endorsed, to be sent to J. T. Proud, clerk to the Council, Council Offices, Shildon, by April 18.

April 19. Oakham.—*Supply of about 700 tons (more or less) of broken granite, granite chippings and screenings, to be delivered free at various railway stations, from May to November, for the County Council.* The Council also invite tenders for team-labour for the delivery of the granite from the various railway stations to the main roads within the above-mentioned district. Forms of tender and full particulars of the estimated quantities and materials required for delivery and to be carted from the different railway stations to the main roads may be obtained from the clerk. Sealed tenders, endorsed "Tender for Road Materials," or "Tender for Team Labour," must be delivered to B. A. Adam, clerk of the Council, Oakham, by April 19.

April 21. Conway.—*Making-up of Marine Crescent, Deganwy.* The drawings and specifications may be seen, and form of tender, with schedule of approximate quantities and other particulars, at the office of F. A. Delamotte, borough engineer and surveyor, Town Hall, Conway, upon payment of a deposit of £1. Sealed tenders, in the envelopes provided, endorsed "Tender for Marine Crescent," must be delivered to T. E. Parry, town clerk, Castle Street, Conway, by April 21.

No date. Sidmouth.—*Steam rolling, for the U.D.C., for the year ending Mar. 31, 1907.* For further particulars apply to the Surveyor.

SANITARY.

April 7. Congleton.—*For the following works:—Main sewer, gin. diam., 390 yds. in length; labour, &c., in laying 2,400 yds. of water-main.* Specification, bills of quantities, forms of tender obtained, and the drawings examined on application to the Surveyor. Tenders to be delivered at the office of the Town Clerk, endorsed "Tender for Sewer or Water-main," addressed to A. Plant, town clerk, on or before April 7.

April 9. Leeds.—*Range of urinals in Burmantofts Street; additional entrance to urinal at Victoria Cattle Market.* Particulars may be obtained at the City Engineer's Office, Municipal Buildings, Leeds. Tenders, properly endorsed, should be received at the Town Clerk's Office not later than 10 a.m. on April 9.

April 10. Walton-on-Thames.—*Sewerage works.* Construction of 270 yds. of 8in. cast-iron pipe sewer, together with manholes and house connections, in Russell Road. The drawings and specification may be seen and bill of quantities obtained on application at the Council Offices, Walton-on-Thames, on payment of £1 rs. Sealed tenders, endorsed "Russell Road Sewerage," are to be delivered to R. Wilds, engineer and surveyor, Council Offices, Walton-on-Thames, not later than 4 p.m. on April 10.

April 10. Paisley.—*Sanitary fittings proposed to be executed in erecting a public convenience at the West End Cross.* Plans may be seen and schedule of quantities obtained at the Master of Works Office, 13, Gilmour Street. Sealed offers, marked "Tender for Sanitary Fittings at West End Cross," to be lodged with Far. Martin, town clerk, Municipal Buildings, Paisley, by 10 a.m. on April 10.

April 11. St. Austell.—*Supply of socket drain pipes in such quantities and at such times as may be required by the surveyors of the R.D.C. up to Mar. 31, 1907.* Each tender must state the net price for first and second qualities of 6in., 8in., 10in., and 12in. pipes, of 2ft. lengths respectively delivered carriage paid at Par or St. Austell Railway Stations. The Council do not require less than a 4 ton truck load to be delivered at any one time. Further particulars can be obtained of A. J. Blight, highway surveyor, Telowith, St. Austell, and sealed tenders, marked "Tenders for Pipes," must be sent to John Stephens, clerk to the Council, St. Austell, not later than April 11.

April 14. Portsmouth.—*Construction of sewers, manholes, &c., and all accessories in Tangier Road and through Baffin's Estate into Milton Road and thence to Bransbury Road, at Eastney, in the said borough.* On payment of the sum of £5 a lithographed copy of the specification, general conditions and bill of quantities, with form of tender, can be obtained on application to the Town Clerk, and any further particulars can be obtained at the Borough Engineer's Offices at the Town Hall, Portsmouth. Tenders, marked "Tender for Tangier Road Sewer," must be filled up, signed and returned, with the bill of quantities duly filled in, to A. Hellard, town clerk, not later than 10 a.m. on April 14.

April 18. St. Breward.—*Trenching and laying of gin. diameter cast-iron and stoneware pipes from Stannon to near Wenford Bridge, in the parish of St. Breward, a distance of over 5 miles, and other works, for the North Cornwall China Clay Co., Ltd.* Plans and specification may be seen at the office of T. H. Andrew, engineer, Market Hill, St. Austell, until April 11, and tenders will be received by him not later than April 18.

April 19. St. Austell.—*Sewerage and sewage-disposal of the districts of Charlestown, Tregonissey and Slades, for the R.D.C.—2,317 yds. run of 6in. stoneware pipe sewers, 4,522 yds. run of gin. stoneware pipe sewers, 120 yds. run of 12in. stoneware pipe sewers, 150 yds. run of gin. cast-iron pipe sewers, together with manholes and other works, the construction of storage culvert, with cast-iron pipe outlet to low water.* The whole to be let in one contract. Drawings and specification may be seen at the offices of the engineers, Beesley, Son & Nichols, M.M.I.C.E., of 11, Victoria Street, Westminster, S.W., where also specification, bills of quantities and form of tender can be obtained on deposit of £5. Sealed tenders, endorsed "Sewerage and Sewage Disposal," are to be delivered to John Stephens, clerk to the R.D.C., St. Austell, before 10 a.m. on April 19.

April 30. Middleton.—*Construction of three circular tanks, catchpits, conduits, &c., at the Sewage Outfall Works at Rhodes.* Plans may be seen and specifications, quantities and form of tender (which includes a fair wages clause) obtained on and after April 5 by applying to W. Welburn, borough surveyor, Town Hall, between 9.30 and 10.30 a.m., on depositing £1 rs. Tenders, endorsed "Tender for Tanks," are to be addressed to the Chairman of the Surveyor's Committee, and delivered at the Town Clerk's Office on or before April 30.

May 5. Mumby-cum-Chapel.—*Construction of two new cloughs or inlandgouts, one in the Orby Drain, the other in the Willoughby Drain, for H.M. Commissioners of Sewers.* Plans and specifications of the proposed works may be seen at the office of Charles T. Dennis, surveyor of sewers, Mablethorpe, to whom tenders, endorsed "Tender for Cloughs," are to be sent not later than May 5.

No date. High Wycombe.—*Additions to the boys' lavatories at the Central Schools for the Borough Education Committee.* For particulars apply to Thomas Thurlow, architect.

TIMBER.

April 9. Brighton.—*30,000 jarrah wood paving blocks 3in. by gin. by 4 1/2 in. (actual finished size), delivered at the Hollingdean Road Siding.* Sealed tenders, endorsed "Tender for Jarrah Wood Paving Blocks," must be addressed to Hugh Talbot, town clerk, and left at his office, Town Hall, Brighton, before 10 a.m. on April 9.

April 9. London, N.—*Supply and delivery of jarrah, black butt and other hardwood paving blocks, and of creosoted yellow deal paving blocks, for the Islington Borough Council.* Specification and particulars can be obtained upon application to the borough engineer, J. Patten Barber, Town Hall, Upper Street, Islington, N. Sealed tenders, endorsed "Tender for Wood Blocks," must be received by W. F. Dewey, town clerk, Town Hall, Upper Street, Islington, N., by April 9.

April 9. Stone.—*Erection of wood or canvas and wood fencing (as may be determined); also shedding, with loose-boxes or partitions for stock and implements; also a grand stand, &c., in the showyard at Stone, on July 18 and 19, for the Staffordshire Agricultural Society.* Contractors may tender for the whole of the work or part. Forms of tender and full particulars may be obtained from J. P. Jones, secty., Newcastle, Staffordshire, to whom tenders must be sent by April 9.

MISCELLANEOUS.

April 5. London, E.C.—*Supply of the following stores for the Great Indian Peninsula Railway Co.:—Expanded brass, mild steel firehole shield plates, lamps and lamp fittings, reversible cast-steel crossings, water cranes, bolts, nuts, rivets, coach screws, &c., lamp glasses, &c., Portland cement fencing materials.* Specifications and forms of tender may be obtained at the offices, on payment of the fee for the specification, which payment will not be returned. Tenders must be delivered in sealed envelopes, marked "Tender for Expanded Brass," or as the case may be, and sent to J. I. Berry, secty., 48, Cophall Avenue, E.C., London, not later than 11 a.m. on April 5.

April 6. Smethwick.—*Supply of the following materials for one year, for the Corporation:—Broken Clew Hill granite; broken and unbroken Rowley ragstone, kerbs, circles, elbows and setts; steel shovels and steeled picks, scrapers, mud-scoops, digging forks, and galvanized sanitary ash-bins, all Smethwick pattern; bricks (Staffordshire brindle and common); scavenging and dandy brushes and pick-helves; gully grates, frames and weirs; manhole and lamp-hole covers and cast-iron trunks, all Smethwick pattern; glazed earthenware pipes; cement (best heavy Portland); lime; carbolic disinfectant powder.* All the above to be delivered at the contractor's cost to the Highway Stores, Stony Lane, except the following:—Ragstone: Separate prices to be given for delivering to Spon Lane Wharf and Rolfe Street Depot Wharf. Forms of tender may be obtained from the Borough Surveyor. Tenders, addressed to the Chairman of the Public Works Committee, to be sent under seal not later than 10 a.m. on April 6.

April 7. Bedford.—*Two tip wagons for the removal of house refuse, two street watering vans and three general purpose carts, for the Corporation.* Full particulars can be obtained upon application to the Borough Surveyor, Town Hall, Bedford. Sealed tenders, endorsed "Tender for New Vans, &c.," addressed to the Chairman of the Streets and Buildings Committee, to be delivered at the Borough Surveyor's Office by noon on April 7.

April 7. London, S.E.—*Supply of the following stores for the South-Eastern and Chatham Railway Co.'s Managing Committee:—Iron bars, plates and sheets; (Section No. 1) general ironmongery; (Section No. 2) bolts, nuts, rivets, nails, &c.; steel bars and plates; finished brass and copperwork; lead, tinplates, tin and zinc goods; glass and lamp materials; paints, &c.; brushes; woodwork; gas and water fittings.* Specification and forms of tender may be had on application in writing to the Superintendent of Stores, 84, Tooley Street, London, S.E. Forms of tender for each contract are printed separately, and parties applying should state the particular contract for which they propose to tender. Patterns may be inspected up to 6th April at the Stores Depot, Bricklayers' Arms Station, between 10 and 4; and any further information required may be obtained at the Superintendent's Office, 84, Tooley Street, S.E. Tenders to be endorsed "Tender for Stores," and addressed to Charles Sheath, secty., London Bridge Station, on or before April 7.

April 9. Upholland.—*Supply of the following materials, for the U.D.C.:—Setts, flags, kerbs, channel stones, broken stone, slag, oil, gulleys, grids, spades, shovels, scoops, lamp glasses, disinfectants, drain pipes, manhole covers, step irons, bricks and cement.* Further particulars may be obtained on application to the Clerk or the Surveyor. Sealed and endorsed tenders to be sent in to the Council Offices, Upholland, not later than April 9.

April 10. Wimbledon.—*Supply and delivery of fire hydrants for a period of two years, the minimum quantity required being fifty, for the Corporation.* Conditions and specification may be obtained on application to the Borough Engineer and Surveyor. Sealed tenders, endorsed "Tender for Fire Hydrants," addressed to the Chairman of the Watch Committee, to be delivered not later than noon on April 10.

April 16. Dundee.—*Supply of the following stores for the Corporation:—Steel tyres and steel wheels; iron &c.; ironmongery, including bolts, nuts, &c.; chilled iron car wheels and brake blocks; oil, &c.; paints, varnishes, &c.; sand; electrical, accessories, including armature coils; pinions and gears.* Samples can be seen, and specification, with forms of tender, can be obtained on application to P. Fisher, general manager, Tramway Offices, Dundee. Sealed offers, suitably marked outside, must be lodged with W. H. Blyth Martin, town clerk, Dundee, not later than April 16.

April 18. Glasgow.—*Jobbing work and supply of the following articles and materials during the year from June 1 to May 31, 1907:—(1) Painterwork; (2) mason work; (3) plumber and gasfitter work; (4) ironmongery; (5) timber; (6) glass; (7) lime and cement, and (8) paints and oils, &c.* Schedules and forms of offer may be obtained on application at the office of W. C. Menzies, the manager, 22, King Street, City. Tenders, marked "City Improvements Department: Offer for Jobbing Work, &c.," must be lodged with A. W. Myles, town clerk, City Chambers, Glasgow, on or before April 18.

Current Market Prices

FORAGE.

		£ s. d.	£ s. d.
Beans	per qr.	1 13 0	1 14 0
Clover, best	per load	3 15 0	4 2 6
Hay, good	do.	3 5 0	3 12 6
Sainfoin mixture	do.	3 5 0	3 15 0
Straw	do.	1 8 0	1 14 0

MISCELLANEOUS.

Bricks Stocks, d/d to job	per 1,000	1 14 0	—
Do. Flettons on rail	do.	1 4 0	—
Do. Pressed Wire Cuts, d/d to job	do.	1 16 0	—
Do. Blue brindled wire cuts	do.	1 1 0	—
Do. do. wire cuts	do.	1 5 0	—
Do. do. pressed facings	do.	1 17 6	—
Coke Breeze, into carts	per load	0 2 0	—
Do. at gasworks	do.	0 4 0	—
Do. d/d to job	do.	0 7 6	—
Sand	per yard	0 6 6	—
Ballast	do.	0 10 6	—
Granite Chippings	do.	0 11 6	—
Do. do.	do.	0 11 6	—
Cement	per ton	1 10 6	—
Lime	do.	1 4 0	—
Castor Oil, French	per cwt.	1 1 10	1 2 0
Colza Oil, English	do.	1 4 9	—
Copperas	per ton	2 0 0	—
Lard Oil	per cwt.	2 15 0	2 17 0
Lead, white, ground, carbonate	per ton	16 0 0	—
Do. red	do.	15 0 0	0 19 0
Linseed Oil, barrels	per cwt.	1 1 0	—
Petroleum, American	per gal.	0 0 6	0 0 6
Do. Russian	do.	0 0 5	0 0 5
Pitch	per barrel	0 8 0	—
Shellac, orange	per cwt.	9 8 0	9 9 0
Soda, crystals	per ton	3 2 6	3 5 0
Tallow, Town	per cwt.	1 7 0	1 7 6
Tar, Stockholm	per barrel	1 5 0	—
Turpentine	per cwt.	2 7 3	—

METALS.

Standard Copper	per ton	82 10 0	83 0 0
Do. Strong sheets	do.	93 10 0	94 0 0
Lead, Soft Foreign	do.	15 15 0	16 0 0
Do. English	do.	16 5 0	16 10 0
Do. pipes	do.	19 2 6	19 5 0
Do. sheets	do.	18 12 6	18 15 0
Galvanised Corrugated sheets	do.	12 7 6	12 10 0
Spelter G.M.	do.	24 15 0	25 0 0
Angles, Scotland	do.	6 12 6	6 15 0
Bars	do.	7 12 6	7 15 0
Marked bars, Staffs	do.	9 0 0	—
Common bars	do.	7 5 0	7 10 0
Angles, M'boro.	do.	6 10 0	6 12 6
Joists	do.	6 7 6	6 10 0
Angles, Midlands	do.	6 15 0	7 0 0
Joists	do.	7 0 0	7 5 0
Girder plates, Midlands	do.	7 17 6	8 0 0
Angles, Foreign, c.i.f. Thames	do.	5 18 0	6 0 0
Tees	do.	6 2 6	6 5 0
Joists	do.	5 12 6	5 15 0
Channels	do.	5 16 0	—
Nails, Wire	do.	0 0 0	—
Tin, Foreign	do.	166 10 0	167 0 0
Do. English ingots	do.	167 0 0	168 0 0
Zinc, sheets, Silesian	do.	27 0 0	—
Do. do. Vielle Montaigne	do.	27 5 0	—

TIMBER.

Soft Woods.

Fir, Dantzic and Memel	per load	2 15 0	5 0 0
Pine, Quebec, Yellow	do.	4 2 6	7 10 0
Do. Pitch, American	do.	2 19 0	5 0 0
Laths, log, Dantzic	per cu. fath.	4 0 0	6 0 0
Deals, Karlskrona, Yellow, 1st & 2nd, 3 x 11	per std.	8 5 0	—
Do. Archangel, Yellow, 2nd, 3 x 11	do.	14 5 0	—
Do. do. do. 3rd, 3 x 11	do.	11 0 0	—
Do. do. do. 3rd, 3 x 9	do.	11 10 0	—
Do. do. do. 4th, 3 x 11	do.	9 0 0	—
Do. do. do. 5th, 3 x 9	do.	8 10 0	—
Do. Kovda, Yellow, 3rd, 3 x 9	do.	11 10 0	—
Do. Mariehill, Yellow, 4th, 3 x 7	do.	9 10 0	9 15 0
Do. do. do. 4th, 2 1/2 x 7	do.	9 15 0	—
Do. Nederkalix, Yellow, 1st, 3 x 9	do.	12 5 0	—
Do. do. do. 2nd, 3 x 7	do.	9 0 0	—
Do. do. do. 2nd, 2 1/2 x 8	do.	9 0 0	—
Do. St. Petersburg, Yellow, 1st, 3 x 9	do.	14 0 0	—
Do. do. do. 2nd, 3 x 9	do.	10 5 0	—
Do. do. do. 3rd, 3 x 7	do.	9 5 0	—
Do. do. do. 3rd, 2 1/2 x 7	do.	9 10 0	—
Do. Montreal, Yellow, Pine, 1st, 3 x 11	do.	19 10 0	—
Do. do. do. do. 2nd, 3 x 11	do.	18 10 0	—
Do. Quebec, Spruce, 2nd, 3 x 9	do.	9 10 0	—
Battens, Karlskrona, Yellow, 1st & 2nd, 2 x 9	do.	8 15 0	—
Do. do. do. 1st & 2nd, 2 x 6	do.	8 0 0	—
Do. Mariehill, Yellow, 4th, 2 x 8	do.	10 0 0	—
Do. do. do. 4th, 2 x 8	do.	9 15 0	—
Do. Gefle, Yellow, 5th, 2 x 7	do.	9 5 0	—

		£ s. d.	£ s. d.
Battens, St. Petersburg, Yellow, 3rd, 2 1/2 x 6 1/2	do.	8 0 0	—
Do. do. do. 3rd, 2 1/2 x 6 1/2	do.	8 0 0	—
Do. do. do. 3rd, 2 x 6	do.	8 0 0	—
Do. do. do. 3rd, 2 x 6 1/2	do.	7 10 0	—
Do. do. do. 3rd, 2 x 5	do.	7 15 0	—
Do. do. Yellow, Unsorted, 2 x 8	do.	9 15 0	—
Do. do. White, 3rd, 2 x 4	do.	8 5 0	—
Do. do. do. 3rd, 2 x 3	do.	8 5 0	—
Do. Trangsund, Yellow, Unsorted, 2 x 4 1/2	do.	8 5 0	—
Do. do. do. 2 x 3 1/2	do.	8 5 0	—
Do. Nederkalix, Yellow, 2nd, 2 1/2 x 6 1/2	do.	8 10 0	—
Do. Norrkoping, Yellow, 1st & 2nd, 2 x 7	do.	8 5 0	—
Do. Ingramsport, Yellow, Unsorted, 2 x 8	do.	8 10 0	—
Do. do. do. 2 x 7	do.	8 0 0	—
Do. do. do. 2 x 6	do.	7 5 0	—

		£ s. d.	£ s. d.
Floorings, Porsgrund, Yellow, 1st, 1 x 7	per square	0 11 3	—
Do. Sandarne, Yellow, 2nd, 1 x 6 1/2	do.	0 10 9	—
Do. do. do. 3rd, 1 x 6 1/2	do.	0 10 0	—
Do. Skelleftea, Yellow, 2nd, 1 x 6	do.	0 10 6	—
Do. do. do. 2nd, 1 x 5	do.	0 9 3	—
Do. Kubikenborg, Yellow, 2nd, 1 x 6	do.	0 10 6	—
Do. do. do. 3rd, 1 x 5	do.	0 8 9	—
Do. do. do. 3rd, 1 x 6	do.	0 9 9	—
Do. Fredrikshald, Yellow, 3rd, 1 x 5 1/2	do.	0 9 0	—
Do. do. do. Unsorted, 1 x 5	do.	0 8 9	—
Do. Johannedal, White, 1st & 2nd, 1 x 6	do.	0 9 9	—

HARD WOODS.

Ash, Quebec	per load	4 0 0	7 15 0
Birch, New Brunswick	do.	2 7 6	4 10 0
Do. Quebec	do.	2 12 6	5 0 0
Box, Turkey	per ton	7 0 0	20 0 0
Cedar, Cuba	per ft. sup.	0 0 3	0 0 4

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Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

DURING THE WEEK ending March 30th thirty failures in the building and timber trades in England and Wales were gazetted.

W. WALKER, plumber and glazier, Ashton-under-Lyne. R.O. March 23rd.

R. E. BEESLEY, builder, Wood Green. Adj. March 23rd.

LANGTON & Co., builders' merchant, Brentford and Twickenham. R.O. March 23rd.

J. CHARLESWORTH, builder, Wolstanton. Adj. March 26th.

T. W. PLOWMAN, carpenter and builder, Ipswich. Adj. March 23rd.

G. H. MIGHALL, builder, West Hoathly. Adj. March 19th.

J. D. DENNY, architect and surveyor, Liangollen. R.O. March 21st.

S. BRANDFORD, painter and plumber, Claverley. Deficiency £218.

B. COOKE & Co., builders and contractors, London. Liabilities £91,371; assets £42,826.

T. SECKERSON, builder and contractor, Dudley. Liabilities £2,578; deficiency £1,755.

R. OLDROYD & SONS, contractors, Ossett. First meeting, O.R.'s, Dewsbury, April 4th, at 10.30. P.E., Dewsbury C.C., May 1st, at 2.

G. BAKER & SON, builders, Wimborne. Liabilities £674; assets, estimated to produce £193, have only realized £165.

T. BIDDULPH, builder, Hulme. First meeting, O.R.'s, Manchester, April 4th, at 3. P.E., Manchester C.C., April 9th, at 10.

E. DENNY, builder, Grange-over-Sands. First meeting, O.R.'s, Barrow-in-Furness, April 5th, at 11.15. P.E., Temperance Hall, Ulverston, April 5th, at 2.45.

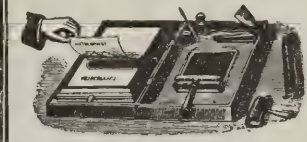
J. LUNT & Co., paint, oil and colour dealers, Liverpool. First meeting, O.R.'s, Liverpool, April 4th, at 2.30. P.E., Liverpool C.C., April 23rd, at 11.

E. SUTTON, builder, Hinckley. First meeting, O.R.'s, Leicester, April 5th, at 12. P.E., The Castle, Leicester, April 6th, at 10.

A. A. GALE, builder and contractor, Woking. First meeting, 132, York Road, Westminster Bridge, April 5th, at 12.30. P.E., Guildford Town Hall, April 10th, at 1.

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ADVERTISER (30) desires RE-ENGAGEMENT in architect or consulting engineer's office. Fifteen years' London experience in heavy construction work and preparation of specifications. Quick and accurate draughtsman. Highest references.—E. HOFF, 245, Barcombe Avenue, Streatham Hill. 1715

ARCHITECT'S ASSISTANT, good draughtsman, steady and reliable, satisfactory references; moderate salary.—"Nonconformist," Box 1712, BUILDERS' JOURNAL Office, 6, Great New Street, E.C.

ARCHITECTS.—A well-known London Quantity Surveyor is willing to take out quantities for works of any magnitude in own office, or otherwise by hour or percentage; excellent references given.—Box 1757, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

ARCHITECTURAL ASSISTANT (27) desires re-engagement. Nine years' varied London and Provincial experience. Design, details, working drawings, perspective, &c. Excellent testimonials. Moderate salary.—Address Box 1716, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

ARCHITECT'S ASSISTANT (22) requires RE-ENGAGEMENT; 5 years' London office experience; also acted as Clerk of Works; neat draughtsman, working drawings, &c.; good references.—Box 1741, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

ARCHITECT'S ASSISTANT (25), nine years' varied experience, desires re-engagement; designs, working and detail drawings, specifications, measuring and usual routine; mod. sal.—A. T., 86, Lyal Road, Bow, E. 1748

ARCHITECT & SURVEYOR'S thoroughly competent ASSISTANT desires RE-ENGAGEMENT. Eleven years' first-class provincial and London experience; good testimonials.—Box 1762, BUILDERS' JOURNAL Office, 6, Great New Street, E.C.

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BUILDER'S ASSISTANT (age 20); 5½ years' practical experience; first class certificate advanced construction; knowledge of quantities, sanitary science, working drawings and details, tracings.—Box 1749, BUILDERS' JOURNAL Office, 6, Great New Street, Fetter Lane, E.C.

BUILDER'S CLERK or ASSISTANT (40) DIS-ENGAGED, long experience; drawing, quantities, measuring-up, levelling, supervision of work, &c.; country preferred.—L. J. G., 88, Adelaide Road, Shepherd's Bush, London. 1721

BUILDERS.—ELECTRICAL WIRING WORK WANTED, carcass or otherwise, by competent workman. Hour, day, or job.—E. ARNOLD, 30, St. James Road, Bermondsey, London. 1732

CONTRACTOR'S ASSISTANT or AGENT seeks ENGAGEMENT; age 27; exp. Government, municipal, and speculative work, supervision, setting out, measuring, &c.; office or works.—SMITH, 2, Douglas Road, Lewisham. 1751

FOREMAN OF PAINTERS AND DECORATORS seeks engagement. Head or working. Good manager. Steady, practical, and reliable. Colourist. Age 36. Town or country.—T., Market House, Fleet, Hants. 1731

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GENERAL FOREMAN seeks re-engagement; carpenter and joiner; age 33; abstainer; 5 years' good refs.—A. C. SMITH, 10, Mearley Road, Leyton, N.E. 1746

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PLUMBER wants JOB, town or country; wages moderate for constancy; good references.—Apply W. M., 31, Stamford Road, Fulham. 1739

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TO ARCHITECTS.—Advertiser (20) just finished articles with City firm of quantity surveyors, who have been engaged on important works, desires to enter Architect's Office as improver; good references.—H. P. EAMES, 18, High Street, Barnet. 1745

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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

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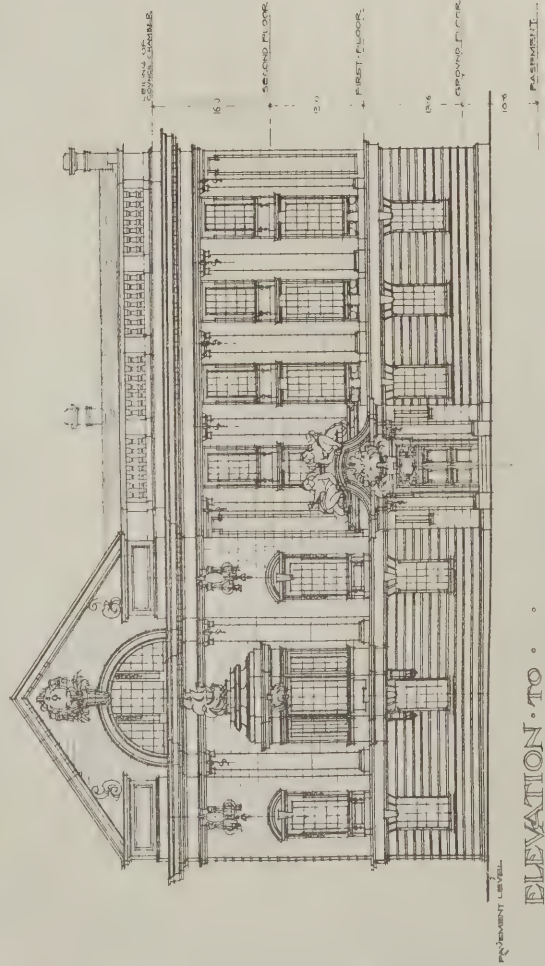
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Hooking the Client. THE ways in which architects set about the first essential of their practice are often rather peculiar. There are, of course, many ways of securing clients and conducting business negotiations, but we cannot attempt to enumerate them all. Certain instances, however, may be given for the benefit of the younger men, who sometimes regard the success of their older confrères with wonderment. Many, no doubt, look upon it as due to exceptional influence, and although they themselves may also possess influence of a kind, yet, somehow or other, they do not manage to secure work. The client rises to their bait, but, alas! they cannot hook him. Nevertheless, they very often stand just as good a chance of securing a commission as older architects, except that they lack experience, both in business aptitude and professional qualifications. A good deal of work comes to the older men from their having already executed buildings. These advertise the architect by

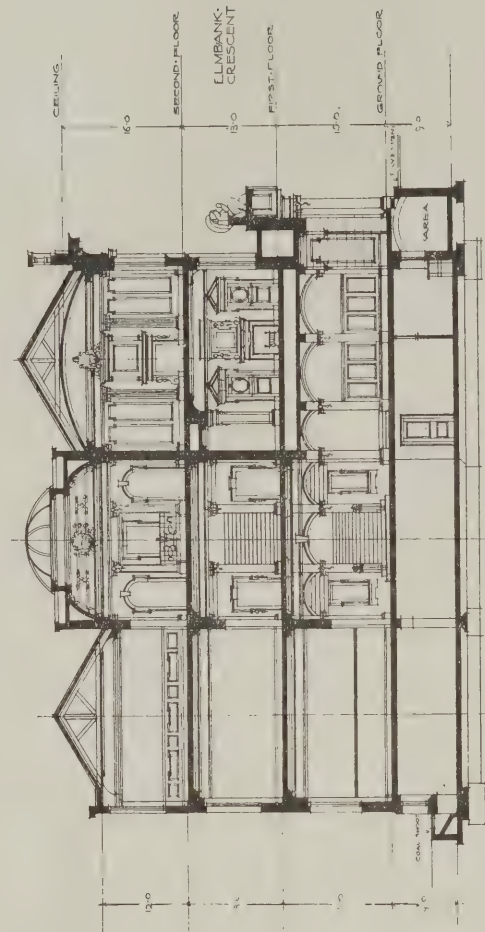
attracting the public, many of whom, if they see a building which they like, will enquire the name of the architect. The public generally judge from the appearance of the completed building, and do not possess the knowledge to enable them to judge of the ability of the man. The result is that there are many architects practising in a large way who have secured their position by natural progress from one large job to another, and are dealing with schemes quite beyond their abilities, the work devolving on highly skilled assistants. We all know instances of men who leave everything to their managers, and merely deal with the clients. As a rule, however, the first chance an architect gets comes in one of two ways—by the influence of family connections and friends, or the winning of competitions. In dealing with their clients some architects adopt the “hail fellow well met” style, others the impressive manner and far-away look, some the more practical manner of the linen-draper's assistant when displaying goods, and some the “arty” manner. All these separate manners no doubt have their effect upon certain temperaments, but they are certainly not suitable to go through life on. Some architects of perhaps less distinctive temperament pass easily from one manner to the other in the endeavour to suit different clients, and generally end in making buffoons of themselves. These are the snobs of the profession. They toady to the influential client, and act tyrannically to those under them. Others think it desirable to ignore all methods, or perhaps they do not think of the matter, though this practice is not particularly commendable. Architects, of course, have to deal with all classes of the community, and no doubt some of the above enumerated methods suit certain people, but, for our part, we think there is a middle course which will satisfy every circumstance, and one which it is not impossible to instil into the minds of students. We recognize that in commerce a man must be businesslike. The term is wide in its meaning, but its general significance is understood. The architect is expected to deal with business matters, and, consequently, he should be a business man. When clients come to him they expect that he shall, sensibly and reasonably, give them what they ask for. They do not come to him as a personal friend, but as a business man; and they expect him to talk business from the first. Perhaps, however, this is not quite a correct statement, because the majority of commercial men look upon the architectural profession as a body of unbusiness-like men with whom one must perforce deal, and they come more or less prepared for the worst: the low esteem in which the profession is held by the public is undoubtedly traceable to this. Architects have to deal with their clients' money, and yet in many cases they hardly understand the rudiments of commerce. A client starting to build

never knows what his house is going to cost, and it is an admitted axiom among the public that the cost will be exceeded by one-third to three times the figure estimated. Doubtless, every client makes alterations that increase the cost, and the architect probably has an idea that it is not to his advantage to warn his client. In the end, however, we consider this to be a disadvantage. Engineers are very differently esteemed, although paid on the very same commission basis as architects.

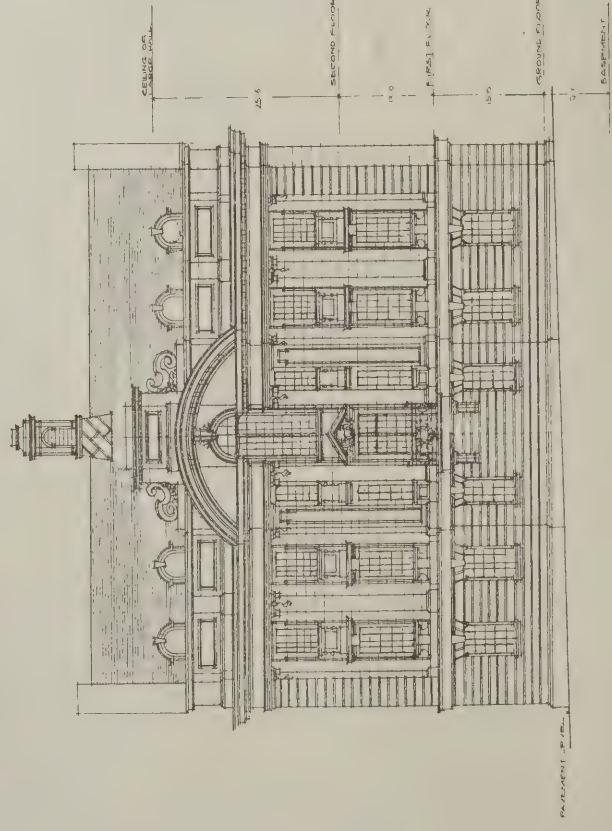
The Registration Meeting. THE meeting which was held last Tuesday week to consider the report, appendix and memorandum of the Institute Registration Committee passed off very harmoniously, and a definite step was taken towards the settlement of this vexed question. The meeting came to two unanimous resolutions: (1) “That the general principles of the report and recommendations of the Registration Committee, dated March 20th, 1906, be adopted and the details referred to the Council for further consideration and report to the general body”; and (2) “That the Council be requested to take the necessary steps, when the scheme in accordance with the first resolution is perfected and approved by the general body, to apply to His Majesty the King for a revised or supplemental charter, and to prepare and present a Bill to Parliament.” The general feeling of the meeting seemed to be that such an important matter could not be properly dealt with in any hurry. Several points of objection were raised, as was only natural, but the prevailing opinion was that these could be settled at a later stage, after the general principles had been agreed to. Some members expressed objection to altering the title of the Institute to “The Royal College of Architects,” while the suggestion hinted at in the report that the pupillage system should be done away with, and schools substituted, also did not meet with favour. Regarding the new class of licentiates which is proposed to be formed, Mr. G. A. T. Middleton said very much the same as we did last week, namely, that it would be necessary to consult those who wished to be admitted. At the present time it would be found that there were not very many who would care to join the Institute in a lower rank than that of the Associates, without power to vote; those who were of any standing at all—the very men one would like to draw into the Institute—would not thereby be drawn. Some other means might be found. We make the suggestion that the term “associate members” might be used instead, if three classes are to be adhered to, or we think it would perhaps be better to call the Associates Fellows at once, giving the new class the title of Associates, and honouring the members in the present fellowship class by giving them the title of Honorary Fellows.



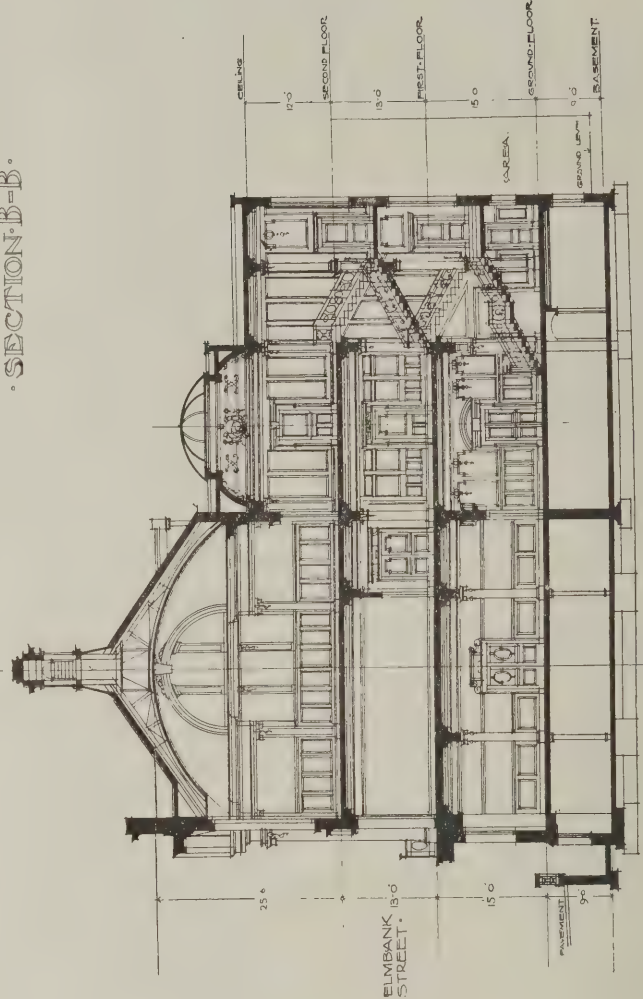
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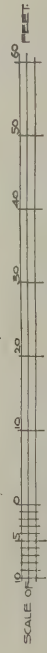
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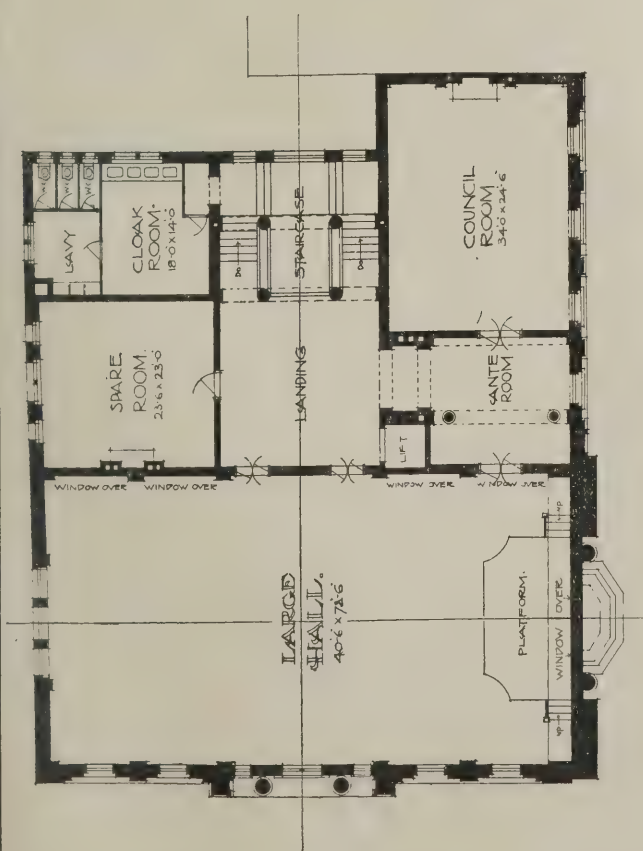
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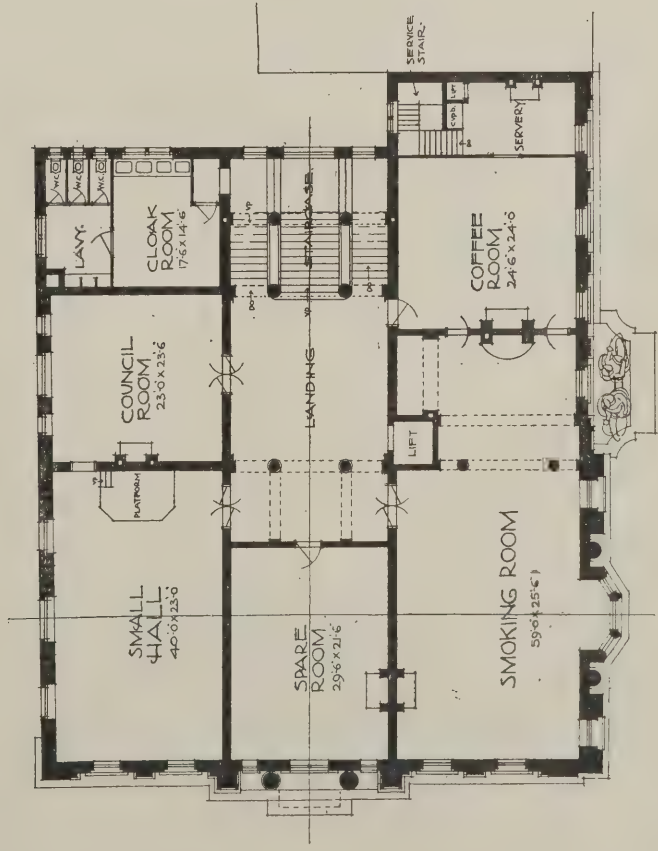
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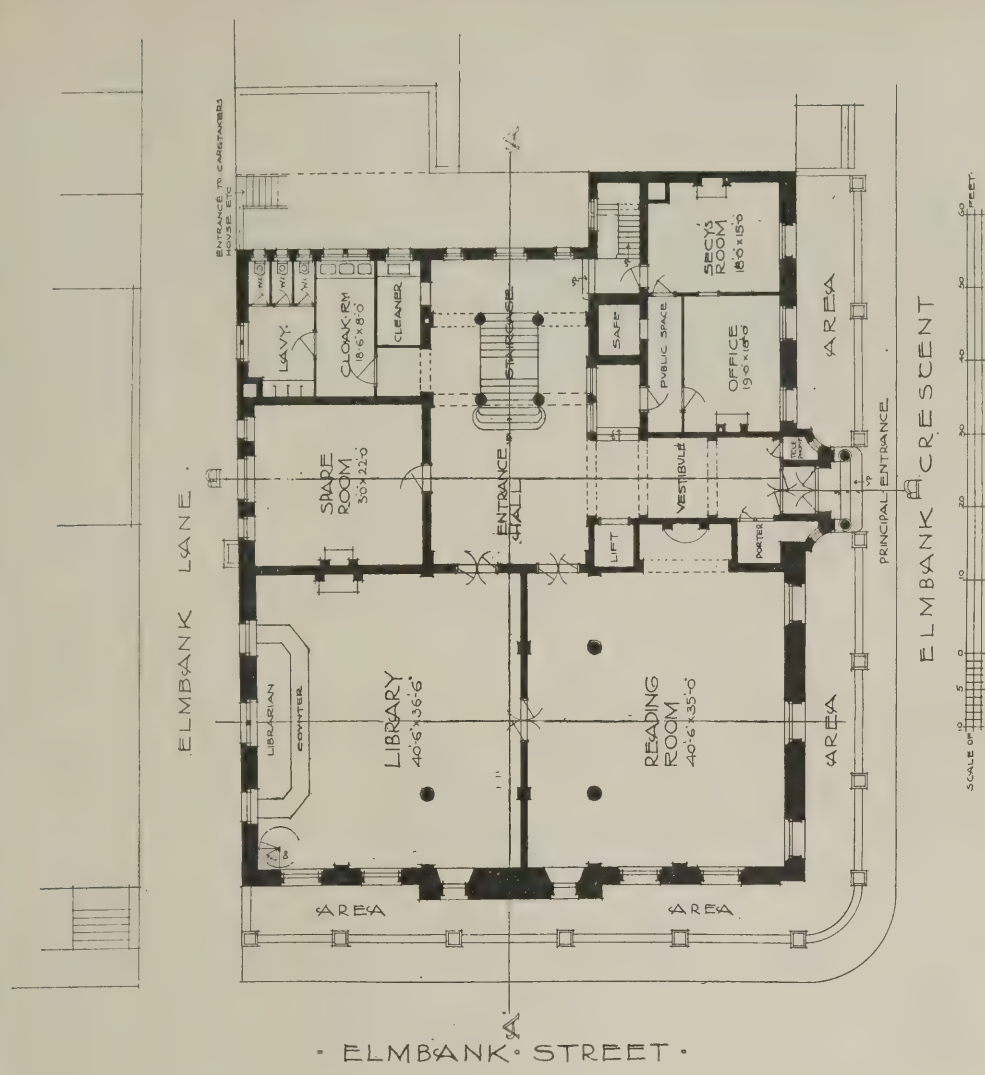
SELECTED DESIGN FOR NEW BUILDING OF THE INSTITUTION OF ENGINEERS AND SHIPBUILDERS IN SCOTLAND, CORNER OF ELMBANK CRESCENT AND ELMBANK STREET, GLASGOW.
JOHN B. WILSON, A.R.I.B.A., I.A., ARCHITECT.



Second-floor Plan.



First-floor Plan.



Ground-floor Plan.

In this competition, just decided, the design placed first by the assessor (Mr. G. Washington Browne) was that of Messrs. Mitchell & Whitehead, but the Institution Committee adopted Mr. Wilson's design, placed second, as being, in their opinion, more commodious and suitable to their purposes. The estimated cost of the building is £25,500. The external walls will be faced with white freestone, and the construction throughout will be fire-resisting. A liberal use of marble in flooring and decoration is intended.



NORTH ELEVATION.



SOUTH ELEVATION

WALLSEND MUNICIPAL BUILDINGS COMPETITION.

IN this competition, just decided in favour of Mr. J. H. Morton, F.R.I.B.A., of 50, King Street, South Shields (whose design was awarded the first premium), the scheme was to provide a building giving complete accommodation for the comparatively small sum of £11,500. The problem has been satisfactorily solved. In the plan here reproduced the municipal portion is placed on the High Street front, the court building being to the south, with entrances from Lawson Street (where also, at one corner of the site, is the fire-station), leaving ample room for a future town hall on the Coach Road front. The keynote of the planning is the position of the council-chamber, on the first floor, and the police-court, beneath it, the council-chamber being approached from the main entrance hall by a roomy staircase, through an ante-room. As in planning municipal buildings the offices most frequented by the public should be more easily accessible than the others, the offices of the borough surveyor, borough accountant, rates offices, registrar and relief offices are all on the ground floor. The grouping of them is best seen from the plan. The registrar's office and relief station both have direct external entrances, as it is found best for them to be given the least possible access to the more important corridors and entrances. The court building is approached through an entrance hall lighted by a cupola. A separate entrance is planned through the municipal buildings to the magistrates' room, and access to the entrance hall of the court is also provided from the corridor of the municipal buildings. Access to the public gallery is from the rear, and a separate entrance is arranged for prisoners from an enclosed yard to the detention rooms in the basement, with stairs leading to the dock in the police-court. The council-chamber above is barrel-vaulted, and is divided from the public gallery by an arcading of three bays: the gallery will seat more than 100 persons and is approached from Lawson Street. Special care has been taken in providing a commodious suite of committee-rooms.



WEST ELEVATION.

0 10 20 30 40 50 60
SCALE OF FEET.



SECTION



SECTION

0 10 20 30 40 50 60
SCALE OF FEET.

FIRST-PREMIATED DESIGN FOR WALLSEND MUNICIPAL BUILDINGS.
J. H. MORTON, F.R.I.B.A., ARCHITECT.

Correspondence.

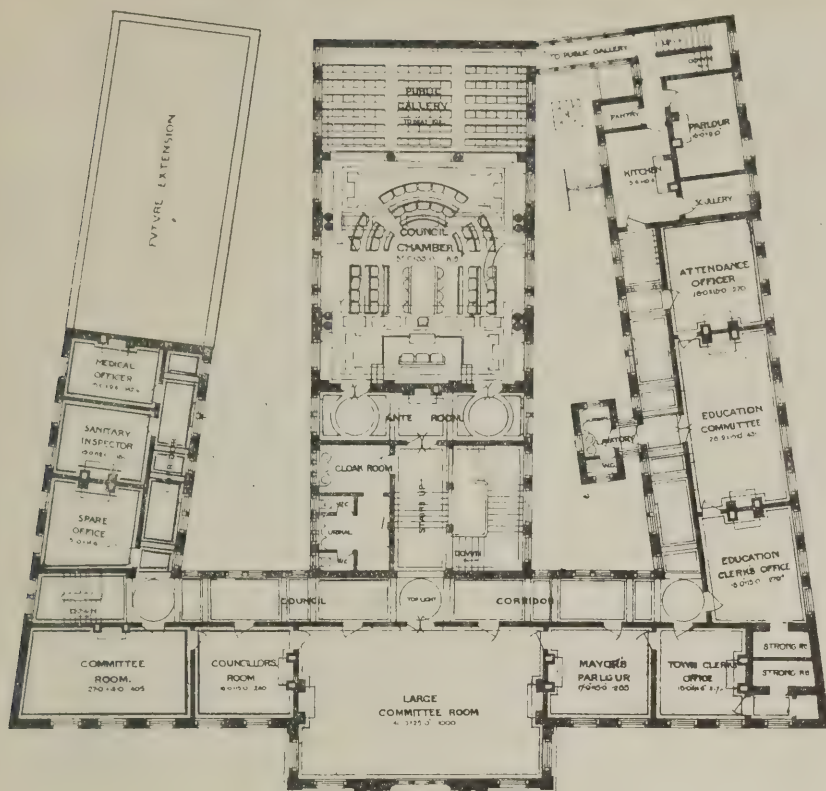
Action of Plaster-of-Paris on Iron.

To the Editor of THE BUILDERS' JOURNAL.

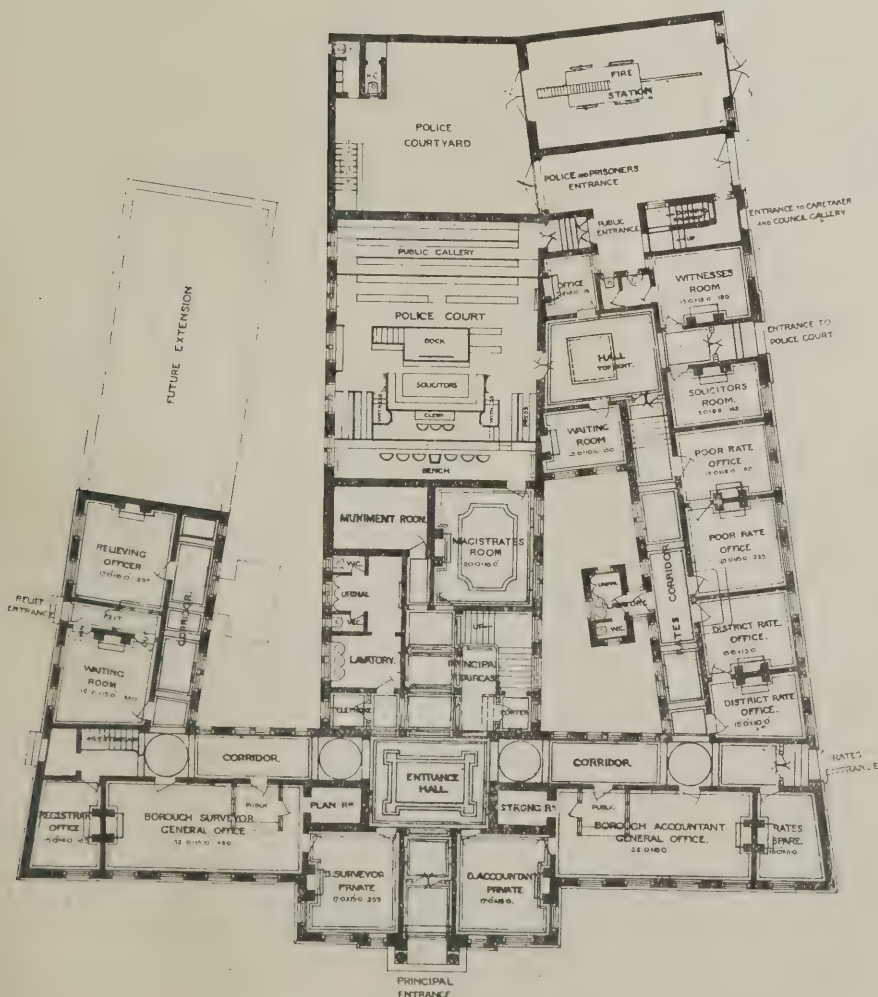
SIR,—May I venture to make one further contribution to the correspondence on this interesting subject, under a promise that it shall be my last. Dealing with your able exposition of Calvert's theory as to the rusting of iron in your issue of March 21st, I think few will be found to uphold longer the contention that the presence of carbon dioxide is essential for the rusting of iron in moist air since the publication of the careful work of Professor Dunstan and others (see Proc. R.A. Inst., Woolwich, 1899; Proc. C.S., 1903; and Trans. J.C.S., 1905), in which the authors have definitely shown rusting to take place in the absence of carbon dioxide. At the same time the presence of this gas certainly aids oxidation. Further, the contact of alkalis with iron, as you point out, has certainly a preserving effect, but this appears to be due not to the absorption of carbon dioxide, but to the inhibiting effect of alkalis on the formation of hydroxyl groups which act upon the iron, the rust formed not possessing the simple formula Fe_2O_3 as you suggest, but being certainly a hydroxide of iron, probably with some such formula as $Fe_2O_3(OH)_2$. Again, the impurities in commercial iron must play a large part in the rusting process in the presence of moisture, when electrolytic action will be set up.—Yours truly,

ALAN E. MUNBY.

[We did state that rust was hydrated oxide of iron, but went on to say that the ferrous carbonate which was first formed decomposed to ferric oxide. We might have added that in the presence of water this becomes hydroxide of iron. Mr. Munby refers to the researches of Professor Dunstan, Dr. Jowett and Dr. Goulding, and quotes their suggested formula for iron rust, $Fe_2O_3(OH)_2$. This supposes that the iron is in a ferrous condition, but they themselves show that the rust which forms under practical conditions is in the ferric condition. Other authorities, too, support this; several writers giving it the formula $Fe_2O_3 \cdot Fe_2(OH)_6$. Prof. Wilhelm Ostwald regards it simply as hydroxide of iron with the formula $Fe(OH)_3$. This can be stated as hydrated ferric oxide, thus $Fe_2O_3 + 2H_2O = 2Fe(OH)_3$, the reversal of which equation, indeed, takes place on heating, the hydroxide being decomposed into ferric oxide. Mr. Munby's formula may also be stated as $Fe_2O_3 \cdot H_2O$. The researches of Professor Dunstan and his co-operators which led to the promulgation of the theory that rusting was due to the formation of peroxide of hydrogen or hydroxyl groups were laboratory experiments that had no similarity to actual practical conditions. Their analysis of the rust thus produced showed the iron to be mostly ferrous, but their analysis of the rust produced under practical conditions showed the iron to be mostly ferric. This they trace to the further oxidation of ferrous oxide in air. At the same time their laboratory experiments showed that the rust produced by carbon dioxide was of such similar composition to the rust produced naturally that we do not think they were at all justified in stating that the product was very different and in concluding that carbonic acid plays an unimportant part in atmospheric rusting. We contend that their theory was very far from proved and that Calvert and Crum Brown's theory still holds good. The inhibiting effect of alkalis on the formation of rust we maintain is due to the neutralization of carbonic acid. Those who care to pursue the subject further should refer to the criticisms of Dr. G. T. Moody published in the proceedings of the Chemical Society for 1903, which, in our opinion, undermine Prof. Dunstan's theory, although



First-floor Plan.



Ground-floor Plan.

FIRST-PREMIATED DESIGN FOR WALLSEND MUNICIPAL BUILDINGS.
J. H. MORTON, F.R.I.B.A., ARCHITECT.

he has sought to meet these criticisms when repeating his theory in the Journal of the Chemical Society for October 1905; the history of his efforts in this direction is only another instance of the fact that chemists seem unable to appreciate the practical problems of construction and to design their experiments in conformity therewith. The reason is that they have little or no knowledge of the phenomena familiar to practical men; though the latter are not generally able to interpret them because they lack the scientific training.

— Ed. B.J.]

DRAWINGS OF BAMBERG.

THE three drawings of Bamberg reproduced in this issue are good examples of Mr. H. Wilson's draughtsmanship. The originals were drawn, we believe, on brown paper, the high lights being skilfully put in with white chalk. Of the three, perhaps that reproduced on this page is the best. Bamberg, it may be mentioned, is a town in Bavaria, not far from Nuremberg. It has a very fine Byzantine cathedral, originally built early in the eleventh century and rebuilt, after a

fire, about a hundred years later. This building contains the tombs of the founder and his empress Cunigunde, Conrad III. and Pope Clement II., and is embellished with numerous paintings by eminent masters. Other prominent buildings in the town are St. Martin's Church, the palace, the townhouse and the theatre.

At Letchworth (Garden City) the "Mrs. Howard Memorial Hall" has been built at a cost of £1,100 from designs by Mr. Raymond Unwin, the estate architect.



BAMBERG: VIEW FROM BRIDGE. DRAWN BY H. WILSON.

BUILDING LEGISLATION.

A Comparison of English and American Laws.

By Horace Cubitt, A.R.I.B.A., P.A.S.I.

(Concluded from p. 153, No. 580.)

IN Boston walls reinforced by an iron or steel framework are allowed, in the case of external walls, to be of less thickness than that specified for ordinary brick walls, provided that such walls meet the requirements of the Act as to strength. Party-walls in first- and second-class buildings must be of brick, and must be carried up to the height of joins. above the roof, but in the case of buildings not over 45ft. high 12ins. above the roof is considered sufficient. Where openings or recesses occur in an external wall their extent is limited only by the provision that the piers must be of sufficient strength to comply with the section fixing the maximum load allowable on various materials; the panel walls, however, may not be less than 12ins. thick in buildings under 70ft. high, or less than 16ins. thick in buildings 70ft. and more in height. The question of recesses and openings in external walls seems to be very well dealt with in this manner.

Some requirements, such as those concerning recesses and openings in party-walls and the construction of fireplaces and chimneys, are not dissimilar to those of the Model By-laws; but the external brickwork of chimneys must be 8ins. thick unless the flues are finished with terra-cotta linings, and in the case of party chimney stacks the provision of these linings is compulsory. The junction of walls at any angle in the first- and second-class buildings is required to be assisted by wrought-iron ties at roft. vertical intervals. Presumably the brickwork is also bonded, and although the iron ties must provide additional strength I am not aware that this method is customary in any class of buildings in this country.

Construction of Floors.

The construction of floors, both "new and renewed," must be carried out in accordance with very detailed provisions—a contrast to the regulations of the original Model By-laws, where the question of strength is not even mentioned. In Boston the floors of every building are required to be so constructed that they will carry safely the weight to which the proposed use of the buildings will subject them. The least capacity per square foot, exclusive of materials, is given as—floors of dwelling-houses 50 lbs., office buildings 100 lbs., public buildings 150 lbs., warehouses 250 lbs. As will be seen, these data are considerably less than those in use for the construction of ordinary buildings in this country, and thus the regulation as to strength just referred to can hardly effect the erection of buildings of sound construction, while still keeping the jerry-building fraternity within reasonable bounds. It is also stated that every building built or altered after the commencement of the Act must have posted in every room used for mechanical or mercantile purposes the building commissioner's certificate of the weight-bearing capacity of the floor, which capacity must not be exceeded.

Roofs and Elevator Shafts.

The strength of "new and renewed" roofs has also to be in accordance with the specified municipal requirements, and the construction of elevator shafts is not allowable unless "some substantial material not inflammable" is used, and existing shafts (except those 28ins. square, or less, and those in ordinary dwelling-houses) must be rendered non-inflammable on the inside.

Means of Escape from Fire.

The question of means of escape in case of fire, both from new and existing buildings, is

dealt with in a much more drastic fashion than in the Massachusetts building laws, previously referred to. "Every building hereafter built" and every building occupied by two or more families, or as a tenement, boarding or lodging-house, or as a factory or workshop, is required to have with reference to its height, construction, surroundings, character of occupation, and number of occupants, sufficient means of egress in case of fire "satisfactory to the building commissioner." In all new buildings two storeys or more in height, and in all existing buildings, other than ordinary dwelling-houses and small mercantile premises, there must be provided "two independent and sufficient ways of egress." Any person responsible for the condition of a building is entitled to a certificate to the effect that the building is provided with safe means of egress.

The regulations dealing with the construction and means of escape from theatres are, both in Boston and New York, of a very detailed character; but as, again, this branch of my subject is quite sufficient for a separate article, and as it is hardly of general interest, there will be no attempt to go further than to state the existence of not very dissimilar regulations to those in force in London. With regard to New York, however, I may mention the interesting requirement that a diagram plan of each tier, gallery or floor, showing the exits, must be printed on the programme of the performance.

Alterations to Existing Buildings.

It will have been noticed that in several instances in Boston existing buildings are dealt with. These, as in England, are of course often under leases, and a clause has been inserted in the Boston building laws to enable a lessor who may have had to spend a considerable sum on his premises to collect an extra rent from the lessee. It is stated that "in the case of any alteration not in the nature of ordinary repairs being required under the terms of this Act upon a building wholly or partly under a lease containing no provision for such a case, the owner shall pay the expense and may collect of the lessee an additional rent for the portion so leased equal to 8 per cent. per annum on that proportion of the sum paid which the leased portion bears to the whole building."

From this summary of the Boston building laws it will be seen that the requirements are in great contrast to those of an English provincial town based upon the Model By-laws. The contrast is in this case much more marked than when, as will now be attempted, a comparison is made between the New York Building Code and the London Building Acts.

New York Building Code.

As in several respects the New York Building Code is very similar to the Boston building laws, it will not be necessary to mention in detail requirements which can be much more easily dealt with by reference to the Boston code. We again meet with defined limits, styled fire limits, within which only small specified frame buildings are allowed to be erected. The building code is administered by three commissioners of buildings, there being one commissioner for the boroughs of Manhattan and the Bronx, one for the borough of Brooklyn, and one for the boroughs of Queens and Richmond.

There is the right of appeal from a commissioner's decision in any case where the amount involved in such decision exceeds 1,000 dollars. In the boroughs of Manhattan and the Bronx such appeals must be taken to a Board of Examiners consisting of nine members representing the official, industrial and building interests. In the boroughs of Brooklyn, Queens and Richmond appeals must be taken to the Board of Buildings, of which body the three commissioners of buildings are the only members. In both cases

the decision is stated to be final. It is to be feared that the Board of Buildings, consisting as it does entirely of officials, can hardly be expected to take an entirely impartial attitude; the constitution of the Board of Examiners, however, does not meet with this objection and is not very dissimilar to that of the tribunal of appeal brought into existence by the London Building Act, 1894.

In contrast to London, where in ordinary cases plans need not be submitted, although they are required in all our provincial towns, plans in New York have to be deposited in all cases of the erection of new buildings or the structural alteration of existing ones. Some structural details are also required, and no work is allowed to be commenced until the plans are approved.

As in Boston, buildings of a certain size and class are required to be erected of fire-resisting materials. All new buildings over 75ft. high and those over 35ft. high which are to be used as hotels, lodging-houses, schools, theatres or similar buildings are to be thus constructed. It is to be noticed that wood floors if pugged are considered to be of fireproof construction.

Non-fireproof buildings five storeys in height, erected or altered for use as tenement or apartment houses to be occupied by one or more families on any floor above the first, must have the first floor above the lowest storey constructed fireproof. When any such building exceeding five storeys in height has a store on the first storey, the entire second-storey floor shall also be constructed fireproof, and if the building exceed six storeys, or 75ft. in height, both the first- and second-storey floors must be constructed fireproof. A non-fireproof building of this class may in no case exceed seven storeys, or 85ft., but if constructed of fireproof materials it may be 150ft., or not more than twelve storeys, in a street exceeding 79ft. wide, but not more than 125ft., or ten storeys, in a street less than that width. No building exceeding 100ft. in height may be less than 40ft. in width.

Height of Buildings.

The height of buildings erected under the New York Building Code is measured from the curb level to the top of the roof beams in the case of flat roofs, and to the average of the height of the gable in the case of high-pitched roofs, whereas under the London Building Act, 1894, it is measured to the top of the parapet or to the base of the gable. The height of buildings in New York is almost proverbial, but few people can be found to state that an increase in the present limit of height for London buildings would in any way be for the good of the community.

Cubic Contents.

The regulations limiting the cubic contents of buildings will, I think, appear to us not to err on the side of safety. Warehouse buildings in London are not allowed to exceed 250,000 cub. ft., except by the consent of the Council in certain cases, where an extent of 450,000 cub. ft. may be allowed. In New York non-fireproof buildings, in accordance with their situation on the frontage or at the corner of a street, may extend to from 8,000 to 12,500 super. ft. When it is realized that the buildings may in ordinary cases considerably exceed rooft. in height it is seen that, to our mind, an enormous cubic capacity is allowable. These figures only refer to non-fireproof buildings, there being no limit in New York as to the area of fireproof buildings. The allowable area of buildings in Boston has been previously referred to, and while this subject is under consideration it may be of interest to note that there is no provision whatever in the Model By-laws to regulate the cubic capacity of buildings. It does not appear unreasonable to suppose that an outbreak of fire has

much less chance of becoming dangerous if the extent of the building in which it occurs is limited.

It may be remembered that the Baltimore fire of less than two years ago originated in a building of a cubic capacity of about 1,000,000 cub. ft.—four times that allowed by the London Building Act, 1894. The fire thus obtained such an extensive hold that it was impossible to prevent the adjoining buildings becoming involved, with the well-known disastrous results. In this matter of the limitation of excessive cubical extent I think it will be agreed that our methods in London are much preferable to those current in the United States.

Window and Door Openings.

When we consider the laxity prevalent in the limitation of cubical extent, the strict regulations in New York for the prevention of the spread of fire through windows and door-openings are in striking contrast. An attempt to obtain powers of a similar nature in London was made recently in that part of the amendment to the Building Act which was not proceeded with. A justification for such an attempt may be considered to be found in the fact that several comparatively recent fires on a considerable scale, notably the one of a few years ago in Cripplegate, would have been confined to a much smaller area if similar regulations to those in New York had been in force. In that city every building more than two storeys above the curb-level, except dwelling-houses, schools and churches, must have iron blinds or shutters to every exterior window or opening above the first storey if there is another building within 30ft. of such openings, and the shutters or blinds must be closed at night. The shutters may be constructed of pine if made of two thicknesses and covered with tin, or other suitable protection of openings may be provided if sanctioned by the authorities; and fireproof buildings are allowed to have inside shutters.

The stated distance of 30ft. does not seem to be too much, for in the Barbican fire of a few years ago the flames leapt the street, which was more than 40ft. wide, and attacked the houses on the opposite side.

General Construction.

It is when the subject of general construction in detail is touched upon that we find the most considerable difference between the New York Building Code and the London Building Acts. In London the regulations dealing with the construction of ordinary buildings, other than those fixing the minimum thickness of walls, are very largely confined to the prevention of the spread of fire—the construction of hearths and flues, the heights to which party and external walls must be carried above the roof, and other such like requirements. In New York, however, not only are these matters dealt with in a very similar manner, but also the details of the construction of foundations, walls, floors and roofs have to be carried out to comply with the tabulated safe capacities of the particular materials used. The bearing powers of soils are given, and also the proportion of the live load, varying in accordance with the class of building, which has to be added to the dead load to enable the total weight resting on the foundations to be obtained.

The code also contains several pages of specification and formulæ for constructional iron and steel work, and as a whole it may be stated that on the subject of regulations dealing with construction it is hardly possible to compare the building legislation of London with that of New York. Our methods probably do not tend to such scientific construction, but individuality is given more scope; and although it may be desirable for there to be more control exercised over the operations of jerry-builders, yet the

authorities in New York appear to have gone to the other extreme.

Walls.

Some of the few requirements which are able to be contrasted with those in London are possibly of interest. It is stated that walls may be of less thickness than specified if the same amount of material is used in piers and buttresses; that hollow walls may be constructed of the same quantity of material as if they are built solid, both of these being of course different to the requirements of the London Building Act. In one case the rather curious term of "fore and aft" wall is used; if this had occurred in our London Building Act it would rather naturally have been put to the credit of the predominant naval element existing in the fire brigade.

The question of the construction of elevator shafts, iron and steel skeleton buildings, and the erection of frame buildings outside the building limits, has been dealt with in connection with the Boston building laws, and as these matters are treated in a very similar manner in the New York code it will not be necessary to again refer to them except in connection with a final review.

Conclusions.

Without, I trust, going into unnecessary detail an attempt has thus been made to give a fair general outline of typical regulations concerning buildings in the United States, with a brief comparison with those in this country, and in conclusion the main points of interest may be summarized.

In one noticeable instance it is seen that the American regulations are less stringent than our own, buildings being allowed to be erected outside the building limits of a class that would not be sanctioned even in the outskirts of an English provincial town. We can hardly venture to state in the face of present-day criticism that in this respect our requirements are as reasonable as those current in American towns.

In many other instances, such as the compulsory fireproofing of certain buildings, the provisions of means of escape, and the detailed regulations for safe construction, the American requirements are of a much more far-reaching character than our own. It must be admitted, however, that in some cases, as for instance those regarding the erection of steel skeleton buildings and those regulating the proportion of piers and recesses in brick walls, the requirements appear to be founded more in accordance with scientific construction, and are consequently of a less hard-and-fast character. If there is one point in particular more noticeable than another in the contrast between the building legislation of the two countries, it is the great prominence given in the American regulations to the provision of theoretically safe construction.

It is of interest to note that in the case of the American building legislation quoted in this paper there is not the long list of buildings and companies exempted, which, especially in the London Building Acts, is such a common feature of similar legislation in this country. The only buildings specially stated to be exempted are those which are the property of the United States.

Architects and surveyors in the course of their career may have to adapt themselves to very different circumstances. To some extent in our large towns and cities the conditions of life are tending towards those prevalent in the United States, and it can hardly be doubted that if this continues, in twenty or thirty years' time our building legislation will have altered in the same direction. It is certain that we cannot lose by knowing a little about the building conditions of those whom in these days of quick locomotion may almost be styled our neighbours, and it is more than probable that we ourselves may have to face not very dissimilar problems.

KING EDWARD VII. SCHOOL, LYTHAM.

IN illustrating this school in our issue for last week the name of Mr. Arnold Thornley, A.R.I.B.A., should have been included with Messrs. Briggs & Wolstenholme, F.F.R.I.B.A., as the architects.

The following particulars reached us too late for inclusion in our last issue:—

The buildings are placed on the north-east portion of the site, with the playing fields to the south and west. By this arrangement an opportunity is given to interpose belts of trees between the buildings and the south-westerly gates. The site is proposed to be laid out with cricket field and Association football grounds to the south, and Rugby and hockey grounds to the west. The plan is practically a balanced one, with the various buildings grouped round a closed quadrangle 312ft. long by 132ft. deep. The entrance to the quadrangle is centrally placed under the clock tower on the north elevation and the various departments grouped as follows:—To the south the educational portion of the school proper with central assembly hall and classrooms; to the west lavatories, changing rooms, latrines, play- and reading-rooms, woodworking shop and gymnasium; to the north the remainder of the workshops, bicycle-room adjoining main entrance, museum and governor's room, and library with the necessary cloakroom, &c.; to the east, centrally placed in the quadrangle, the dining-room with kitchen adjoining, and the boarding house for thirty-two boys at the south-east corner, with masters' private house on the north-east. The science rooms are placed on the first floor over the main entrance and cloakrooms, &c., adjoining the upper portions of the assembly hall, and the music rooms are arranged to the south of the assembly hall and are completely isolated from the school. The north-lighted art room is placed over the large classroom at the extreme end of the southern wing, and has its own separate staircase. The boarding house is planned with the dormitories and sick rooms on the first and second floors. The headmaster's house is arranged with the private bedrooms on the first floor and the servants' bedrooms on the second floor, approached by a second staircase. The easterly side of the quadrangle is formed by grouping the three departments—masters' house, kitchen department and boarding house, and, whilst each is distinct in itself, intercommunication is readily secured by a connecting corridor. The kitchen is practically isolated and is planned with its own yard, masked from St. Paul's Avenue by a protecting boundary wall with private entrance for tradespeople and carts. The latrines are placed at the west extremity of the classroom corridor outside the quadrangle, as also the exit to the playing fields beyond; here also are grouped the five-courts. With the exception of two, all the classrooms face south and are on the ground floor. The changing rooms are arranged to allow 150 boys to change at the same time. The accommodation is as follows:—Large hall to seat 700 or 800 people; seventeen classrooms, varying from twenty to fifty boys, and giving room for 510 boys altogether; chemical laboratory and physics laboratory to accommodate thirty boys each; and lecture room for fifty boys.

The style adopted is a simple treatment of late Renaissance as being eminently suited to a building of this description, allowing, as it does, of the maximum window space. The buildings are to be faced with red bricks and the dressings of stone, the roofs to be covered with Coniston green slates. The interior woodwork will be of American whitewood, stained green and varnished. The estimated cost of the complete scheme is put at about £50,000.

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TOWER OF FRAUENKIRCHE, BAMBERG. DRAWN BY H. WILSON.



VIEW IN JUDENSTRASSE, BAMBERG. DRAWN BY H. WILSON.

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THE ARCHITECTURAL ASSOCIATION.

A MEETING of the Architectural Association was held on Friday evening at 18, Tufton Street, Westminster, the chair being occupied by the president, Mr. E. Guy Dawber, F.R.I.B.A.

Messrs. P. J. D. Webster, A. V. Sutherland Graeme and W. W. Diggle were elected members of the Association, and the re-instatement of Mr. R. P. Bruce was announced. It was stated that the following further donations to the Building Fund had been received:—

	£	s.	d.
James Boyd & Sons	-	-	25 0 0
Hippolyte J. Blanc	-	-	3 3 0
A. Ebbs	-	-	1 1 0
W. Petch	-	-	1 1 0
E. E. Cronk (double subscription)	-	0	10 6
R. Hunter	-	0	10 6
C. W. Piper	-	0	10 6
H. D. Searles-Wood	-	0	10 6
G. Sherrin	-	0	10 6
A. Whitelaw	-	0	10 6

The president read a letter from R.I.B.A. stating that the council would grant exemption from the Intermediate Examination of the Institute to those students of the A.A. who had passed through the four years' course of the A.A. schools in a manner satisfactory to the Board.

A paper on "Valuations, Compensations, and Light and Air" was then read by Mr. E. Greenop, A.R.I.B.A.

Valuations.

When valuing existing buildings, he said, it was necessary of course to possess the knowledge to enable one to estimate with accuracy the probable cost of repairs, the deductions for rates, and a deduction for possible loss of rent, and similar contingencies. It was not unusual to see 10 per cent. upon the gross rental value deducted for repairs, but the experienced valuer preferred to take each case on its merits. A stuccoed house, for instance, requiring painting externally every three or four years would obviously necessitate a much larger annual average outlay than a red brick-faced house of the same size; again, the age of the property, the class of tenant, and other such considerations might vary the conditions materially.

After determining the nett income, the most important matter had to be decided upon—namely, the number of years' purchase to be applied as a multiplier; in other words, the percentage an investor would require during the term in question, in addition of course to getting back his capital. Here the tables were of service, so far as mathematics were concerned, but as regards the proper percentage to adopt, that would have to be settled for every particular case. On a house, say, in Belgrave Square an investor would be content—indeed, would have to be content—if he could see, say, 4 per cent. for his money, whereas with an inferior East End weekly property the expectation of 8 per cent. or even 10 per cent. could be justified, the one being well assured and the other more or less precarious.

Valuations of property perhaps more often arose out of mortgage proposals than for other objects. Here care had to be exercised, as also when the money to be lent was derived from trust funds. Trustees are precluded by Act of Parliament from lending upon leasehold property having less than sixty years unexpired.

Compensations.

Turning to compensations, Mr. Greenop said these usually arose out of the formation of and additions to railways, the widening of roadways, the acquisition of land for schools, drainage, &c. The proceedings were governed mainly by the Land Clauses Acts, which were generally incorporated with the special Acts obtained by the various bodies acting as promoters. The claimant could

elect to go to arbitration or before a jury of laymen; he generally chose the latter.

The ordinary principles of valuation applied to compensation cases. It was usual to add 10 per cent. to the actual value as the recognized solatium for having to part with property against one's will.

Light and Air.

Dealing lastly with light and air cases, Mr. Greenop said these were the most unsatisfactory with which surveyors had to deal. The proceedings were usually long-drawn-out, and it was difficult to get the case properly appreciated without models and visits to the premises, which were costly matters. In the end the parties were probably far worse off than if they had settled their differences out of court.

Mr. Greenop said he always endeavoured to get these cases referred to a surveyor as sole arbitrator. It was a comparatively inexpensive method of dealing with the dispute, and it was generally speedily settled.

The earlier decisions laid it down that in order to obtain redress for interference with light one had to show the interference to be of sufficient importance to amount to a nuisance, but the important case of *Home and Colonial Stores v. Cols* had altered the matter. In this case, too, one of the lords justices in his judgment spoke approvingly of the value of the angle of 45 degs. as a test, and thereby gave a new lease of life to it. It might not be very accurate or scientific, but it was very convenient and time-honoured. It was also readily understood by laymen.

In conclusion Mr. Greenop referred to the Bill promoted several years ago, with the combined aid of the Royal Institute of British Architects, the Surveyors' Institution and certain eminent lawyers, for the purpose of dealing with light and air matters on the lines of Part VIII. of the London Building Act, which dealt with party structures. A private Bill of this nature, however, was not hurried in Parliament, and a long time was likely to elapse before it passed into law.

Mr. W. Woodward proposed a vote of thanks to the lecturer, which was seconded by Mr. Max Clarke and supported by Messrs. Louis Jacob, Leslie W. Green, Matthew Garbutt and R. S. Prideaux.

The president announced that the next meeting of the Association would be held on April 27th, when a paper on "Fenestration" would be read by Mr. Walter Cave.

THE INTERCEPTING TRAP.

A Condemnation.

IN the twenty fourth annual report of the Bradford Sanitary Association the engineer, Mr. Malcolm Paterson, M.I.C.E., F.G.S., refers to Dr. Butler's paper on the intercepting trap, read recently before the Royal Sanitary Institute. The doctor's conclusion was that the intercepting trap was a failure, and Mr. Paterson agrees with him. He says: "The device was the product of theory into which practical considerations did not enter, and, in short, was adopted by the Local Government Board with unusual celerity, and put into those Model By-laws which are more honoured in the breach than in the observance. It violated every canon of drainage practice. It interfered with the swift passage of solids to the outfall; it interfered with the current of ventilation; it put a resting place for the solids in each house system, making so many small sewer-gas producers; it created vents on ground level at the thresholds of the houses and the gardens, whence at each closet flush foul air was driven out; it choked entirely a large percentage of drains; and finally it intensified both the poisonous quality of the sewer air and its pressure upon the ordinary house sink gulleys, when, in spite of the

locking off, it did reach them, as it often did. Yet, despite these violations of common sense and natural laws, it was upheld by the Local Government Board and by a large superfluity—it cannot be called weight—of official authority. Brought in hastily as a royal road to security, it has taken long years of leisure for repentance, and the first officials to realize the mistake have been the surveyors of those districts which had adopted it, who, as the practice increased, discovered the extraordinary difficulties it placed in the way of the adequate and secure ventilation of the sewers; at the same time that it induced a more dangerous and offensive state of the disconnected drains."

Notes and News.

The Surveyors' Institution will hold a provincial meeting at Birmingham on May 24th and 25th.

Sutton-in-Ashfield Congregational Church has just been completed at a cost of £3,982. Messrs. G. Baines & Son, of 5, Clement's Inn, Strand, W.C., were the architects and Mr. J. Greenwood, of Mansfield, was the contractor.

The Society of Ordained Surveyors held its eighth annual general meeting on Friday last at Edinburgh. The report of the General Examining Board stated that in the preliminary examinations held during the last year twelve candidates presented themselves, six of whom passed in all subjects; while in the final examinations three candidates came forward, one passing.

The York Minster Buttresses.—The work of fixing the flying buttresses and pinnacles to the north and south sides of the nave of York Minster is progressing satisfactorily. Two of the buttresses, with their pinnacles, have been completed on the north side, and the stonework for two more of the six to be placed on this side is now ready for fixing. On the south side, the first has been finished, and the stonework for the second prepared. Mr. Bodley is the architect in charge.

Paul's Cross Memorial.—It was the desire of the late Mr. H. C. Richards, K.C., that Paul's Cross—in the garden of St. Paul's Cathedral—which was demolished in 1643, should be rebuilt, and for this purpose he bequeathed a sum of £5,000. Apparently Mr. Richards anticipated that there might be some difficulty experienced in carrying out his project, and this may have led to his providing the alternative of erecting on the site of the cross a memorial which might be entirely a new design. This latter course is likely to be followed, Mr. Reginald Blomfield, A.R.A., being the architect. The re-erection of the cross, which was a pulpit of wood mounted upon steps of stone and covered with lead, is almost impossible owing to the different line which the present cathedral takes from the old one, and its much greater breadth.

Aberdeen Architectural Association.—This Association—which is distinct from the Aberdeen Society of Architects, affiliated with the R.I.B.A.—held a general meeting last week, when Mr. W. Kelly was elected hon. president, Mr. G. G. Irvine, president, and Mr. J. B. Davidson vice-president. The first annual "At Home" was afterwards held, a number of drawings by well-known architects being exhibited. The president said their main objects were not only to further the progress of architecture, but also to encourage good fellowship with those engaged in the other arts and crafts in the city. He spoke of the rapid progress as a body which the Association had made, and said he thought that, considering their first meeting was only held last November, it was very satisfactory indeed that they should now have a membership of over fifty.

Mr. Edmund Kirby, F.R.I.B.A., is nominated as the new president of the Liverpool Architectural Society.

Change of Address.—Mr. John C. McKellar, I.A., architect and property valuator, has moved from 224, St. Vincent Street to Gresham Chambers, 45, West Nile Street, Glasgow.

Big Claim against a Town Council.—Mr. Mackison, burgh engineer of Dundee for the past thirty-three years, at a salary of £500 a year, claims £36,000 for extra work. By 13 votes to 10 the Town Council have decided to repudiate the claim.

At the new Ivanhoe Hotel, just completed at the corner of Bloomsbury Street and Great Russell Street, London, W.C., the whole of the partitions, amounting to about 8,000 sq. yds., have been constructed by the Arc Fireproof Partitions Co., Ltd., of 26, Olmar Street, S.E.

The new Asylum for the City of York, at Naburn, about three miles from the city, was formally opened on Wednesday last by the Lord Mayor (Alderman Wragge). The total cost of site and buildings has been about £130,000. The asylum has been built from designs by the city engineer, Mr. A. Creer, and provides accommodation for 151 males and 211 females. The contractors were Messrs. George Longden & Sons, Ltd., of Sheffield.

The Directors of Messrs. Marmor, Ltd., importers of Greek marble, entertained a party of architects and friends on Saturday to view the boat-race from their wharf at Crabtree, Fulham. After the race, luncheon was served in a marquee erected on the wharf, and several speeches were delivered. Mr. William David, the managing director, humorously observed that his friends had been brought together under false pretences, as the invitations were issued to view the boat-race, whereas, in reality, he and the directors wanted their friends to see the examples of marbles displayed in different parts of the wharf. After lunch many of the visitors took the opportunity of inspecting these beautiful examples of marble.

The Val de Travers Asphalt Paving Co., Ltd., held its thirty-sixth ordinary general meeting on Wednesday last at River Plate House, Finsbury Circus, E.C. The chairman, Mr. H. C. Scott, said the profits during the past year (£26,798 nett) had been practically the same as for 1904, which was satisfactory. Competition had become very keen, and prices had in consequence been greatly reduced; nevertheless the company was able to maintain its profits by reason of the turnover, which had been more than during any preceding year of the company's business—75 per cent. more than for 1902. A dividend was declared equal to 7½ per cent. per annum. Dealing with the company's Venezuelan property, which had been acquired from the Compagnie Générale Asphalte de France, the chairman said that though work had been suspended by the revolution in the country, efficient machinery had now been erected, and it was anticipated that a shipment of 2,000 barrels per month would be available.

Obituary.

Mr. J. T. Franklin, of Messrs. Franklin & Newman, architects, Rugby, died recently, aged 52.

Mr. William Boulton, for twenty years burgh surveyor of Aberdeen, died last week in his eighty-sixth year.

Mr. Joseph Williams, a well-known West of England builder, was found hanging dead at his residence at Swindon on Friday last.

IN PARLIAMENT.

(By our Press Gallery Representative.)

The Government Buildings Again.

IN the House of Commons last week Sir W. Bull addressed a number of questions to the First Commissioner of Works with regard to Government buildings in Whitehall. He asked if there were any such for which towers were originally designed but which had been abandoned by his predecessors.

Mr. Harcourt replied that towers formed part of the design for the buildings now occupied by the Home Office and the Local Government Board, but they had never been completed.

Sir W. Bull asked if special foundations had been laid in the new Government offices with a view to erecting the towers as designed by the late Mr. Brydon, and what would have been the saving if the special foundations in question had not been completed.

Mr. Harcourt said the reply to the first paragraph of the question was in the negative.

Sir W. Bull followed this by another question as to the estimated cost of the towers and the sums already expended on the materials, and the necessary preparation of stone and scaffolding.

Mr. Harcourt said the cost of building the towers was not separately stated in the estimate, and could not therefore be given without considerable calculation. With regard to the second part of the question, the measuring surveyors had the matter in hand, but some time must elapse before any figures were available.

In reply to a further question, Mr. Harcourt said until the variations had been properly dealt with by the surveyors, and agreement arrived at on the many points requiring adjustment, no reliable estimate of the saving by the decision to abandon the towers could be given.

Sir W. Bull then asked whether it was a fact that 3,000ft. of carved stone would not be required and that 110 masons would be discharged.

Mr. Harcourt: No, sir, I think the hon. member is mistaken in both those figures.

Freights on Cement.

The President of the Board of Trade, Mr. Lloyd-George, has agreed to a suggestion made by Mr. Ernest Lamb that he should make enquiries of the Conference Shipping Lines in this country with regard to the rates quoted by the Continental shipping lines which are in the Conference as to the freights charged on cement to ports in Cape Colony. Mr. Lamb pointed out that on August 1st, 1905, the Conference raised the rates on this side by 2s. 6d. per ton, or about 5½d. per cask, although the Continental shipping lines refused to raise their rates.

Suggested Duty on Imported Slates.

Mr. David MacIver asked the President of the Board of Trade whether, having regard to the magnitude of the slate trade, especially in Carnarvonshire, and to the depression in that trade owing to the importation of slates from abroad free from any contribution to the Imperial revenue or local rates and taxes, he would be prepared to favourably consider a proposal that all such foreign slates should pay an import duty equivalent to the Imperial and local burdens which were incident to those produced in this country.

Mr. Lloyd-George: The slackness in the slate trade appears to be rather attributable to the general depression in the building trade of the United Kingdom than to the imports of slates into this country, which I find were less last year than in any of the past five years. The figures are as follows (in thousands of pounds):—1901, £273; 1902, £286; 1903, £467; 1904, £340; 1905, £262. I am not prepared to recommend the imposition of an import duty on slates.

Irish Building Materials.

Mr. John Roche asked the Chief Secretary for Ireland whether he would give instructions to those responsible for making out the specification for the College of Science to be built in Dublin that the superior quality of the Ballinasloe limestone should be taken into account.

Mr. McKenna, Secretary to the Treasury, who replied, stated that the architects of the Royal College of Science had lately been making a study of Irish building materials, and had come to the conclusion that, subject to prices being satisfactory, large quantities of them could be used in the buildings. It would not, however, be possible at this stage to state what particular stone would be employed.

New Road across the Green Park.

Mr. Harcourt, in answer to Mr. Eugene Wason, stated that the new road across the Green Park into Piccadilly was not constructed to carry wheeled traffic, and there was no intention of opening it for that purpose either now or in the future.

NOTES ON COMPETITIONS.

Proposed new Almshouses at Wareham, Dorset.

This competition is not likely to appeal to anybody practising at any distance from Wareham, for, in addition to there being no architect assessor, the plan of the site is only to be seen at that place. As the value of the proposed buildings is £2,400, a long journey is hardly commensurate with a venture which offers at the best nothing but a very sporting chance. There is one unusual feature in this competition, however, which is good: only sketch plans are required. The trustees propose to select one set of plans from those submitted and to entrust the author of them with the preparation of complete designs and the carrying out of the work at the usual remuneration. A system which requires only sketch plans is one which might frequently be adopted, and one which would work satisfactorily in the hands of a professional assessor. In this instance, unfortunately, the assessors are laymen, so that the advantage is reduced to a doubtful quantity, as it needs a well-trained expert eye to detect the merits of a sketch. Pretty drawing can cover a multitude of faults.

Carnegie Library at Royston, near Oldham.

A limited competition for this library has just been decided in favour of Messrs. Butterworth & Duncan, of Rochdale.

Council School at Farnworth.

Messrs. Ormrod & Pomeroy, of Bolton, are the successful architects in the competition for a council school to be erected in Plodder Lane, Farnworth, at a cost of about £5,500, providing accommodation for 500 scholars.

Competitions Open.

The following is a list of competitions open:—

DATE OF DELIVERY.	COMPETITION.
April 14	SCHOOL AT OSSETT.—Premium of £50 (to merge). Particulars from the Secretary at the Education Office, Ossett.
„ 15	PEACE PALACE AT THE HAGUE.—Particulars from the office of the Carnegie Foundation, Noordeinde 33, The Hague.
May 31	NATIONAL CONGRESS HALL FOR BRAZIL.—Premiums of 15,000, 10,000 and 5,000 milreis (equivalent to about £1,685, £1,125 and £562 respectively). 5,000 milreis also for designs not premiated but desirable to be acquired. The conditions of the competition can be seen at the offices of the Commercial Intelligence Branch of the Board of Trade at 73, Basinghall Street, E.C.
No date	DETACHED AND SEMI-DETACHED HOUSES AT CLIFTONVILLE, BELFAST.—Premium £700. Particulars from R. J. McCounell & Co., 51, Royal Avenue, Belfast.

Enquiries Answered.

The querist's name and address must always be given, not necessarily for publication.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Correspondents are particularly requested to be as brief as possible.

Circular Concrete Reservoir.

RESERVOIR WRITES: "I am designing a circular concrete service reservoir and should be glad of your opinion as to the necessary thickness for the retaining wall against fairly loose soil. The depth of water is to be 8ft and the height of wall from floor to parapet 12ft. For about one-half of the circumference the wall will be surcharged about 6ft., sloping to nothing at the other side. The reservoir is to be open, and the concrete is to be composed of 1 cement, 4 broken stones, 2 sand and gravel; internal diameter 100ft., measured half-way up the water depth if the wall is built on the inside."

As the reservoir has a diameter of 100ft. it is hardly safe to make any allowance for extra strength due to the curvature, and the wall should be calculated as if it were in one straight line. The site of the reservoir has a slope of about 1 in 17, so that at the lower end, as in Fig. 1, the top of the wall will be flush with the surface of the ground, while at the upper end, Fig. 2, the wall will have a surcharge about 6ft. high. Dealing first with Fig. 1, assuming a natural slope of 35 degs. and working in the usual manner for an ordinary retaining wall, the resultant will be found to cut the base at a distance of 0.63ft.

from the edge x. Then by the formula $\frac{2}{3} \frac{W}{d}$ the maximum pressure at x will be $\frac{2 \times 4680}{3 \times 0.63}$

= 4,952 lbs. = say 2.2 tons per sq. ft., which will be within the safe strength of the concrete. Keeping the same thickness of 2ft. at the top of the wall, in Fig. 2, the thickness at the bottom will have to be increased owing to the surcharge. Making use of Rankine's method for surcharged retaining walls, the method of working will be as follows:—Draw the outline of the proposed wall, natural slope of earth, and slope of surcharge in the usual way. From point B set up B P, making an angle with the back of the

wall equal to the natural slope of the earth to be retained, and produce the line of surcharge to fix the position of the point P. Then by Rankine's formula for pressure in lbs. on the back of the wall $\frac{1}{2} W (B P)^2 = \frac{1}{2} \times 112 \times 9.81 = \text{say } 5,380 \text{ lbs.}$ acting horizontally at one-third the height of the wall. Set this out to scale, as C D, and parallel with slope of surcharge draw C E, the length of which is regulated by a vertical line from D; then C E, amounting to 6,550 lbs., will be the actual thrust on the back of the wall. Next find the centre of gravity of the wall, and drop a perpendicular; produce C E to cut this line in F, and from F set out F G equal to the thrust and F H equal to the weight of 1ft. run of wall. Complete the parallelogram, giving F J as the resultant, cutting the base at 1.1ft. from A and having a vertical component W of 8,830 lbs. Then for the pressure on the base $\frac{2}{3} \frac{W}{d} = \frac{2 \times 8,830}{3 \times 1.1} = 5,333 \text{ lbs.} = \text{say } 2.4 \text{ tons per sq. ft.}$ If the slope of the surcharge had been at a smaller angle than the natural slope, a slight alteration in the method of working would be necessary.

HENRY ADAMS.

A Street Alteration.

LLANDUDNO.—ENQUIRER writes: "I have been called upon under the Private Street Works Acts to allow our Council to make an old street in such manner that it can be taken over by them. Objections were raised on the grounds that the work was not needed, and that the scheme was too expensive. Nevertheless the council applied to the district magistrates to have their scheme confirmed, no one appeared to oppose it, and I have now received a bill of costs amounting to £10 12s. 8d., the whole scheme being about £400. I may mention that the magistrates' clerk is an alderman of the Council."

The Council appears to have acted strictly according to the law. You do not state whether formal notice was sent to the Council withdrawing opposition on the part of all the various objectors. In the absence of this the Council was justified in carrying the matter to court. But even if this notice was sent, the Council may have incurred expense in preparing to meet the objections before the notice of withdrawal was received. The question of costs is in the discretion of the court, which has power to direct payment of the whole or part by either party, or payment in such proportions as it thinks fit. It is not well of course that the magistrates' clerk should be a member of one of the contending parties; but the decision is given by the magistrates and not by him.

A HOUSE-BUILDING COMPETITION.

BY way of encouraging the erection on their property at Cliftonville, Belfast, of well-arranged houses, economically yet artistically furnished, the Belfast Garden Estates Co. (Messrs. R. J. McConnell & Co.) have decided to offer prizes to the value of £700, open to all. The competition is divided into three classes, the cost of the residences being limited to £240, £275 and £350 respectively. The competition is not for plans or designs on paper, but for completed houses erected on the estates, and finished throughout and ready for occupation. For the purposes of the competition thirty-three special sites have been laid out on the estate, these sites having frontages towards avenues 40ft. wide. These thoroughfares will be completed by the company, at their expense, in accordance with the requirements of the city surveyor for Belfast. Water, gas and sewers are already laid ready for connection with the new houses, while several acres of land have been enclosed and laid out as a private recreation-ground for the use of the residents.

The Three Classes

into which the competition is divided are as follows:—

Class I.—Detached houses to cost not more than £350 complete and ready for occupation. Each must contain at least two sitting-rooms, four bedrooms, bathroom, two w.c.s, kitchen, scullery, pantry and coal-place. First prize £100, second £50, third £25. In addition, £50 will be awarded to the designer of the house which gains the first prize.

Class II.—Detached houses to cost not more than £275 complete and ready for occupation. Each must contain at least two sitting-rooms, three bedrooms, bathroom, w.c., kitchen, scullery, pantry and coal-place (or open gin. brick-built coal-bunker). It is suggested that in these smaller houses, and also in the semi-detached houses, Class III., the living-room should be decidedly larger than the best room or parlour. The prizes offered are similar to those in Class I.

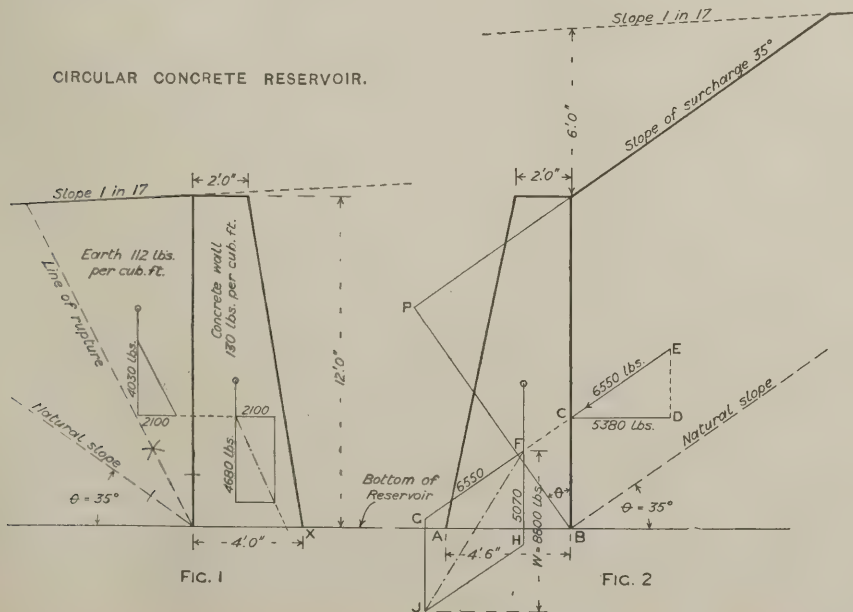
Class III.—Pair of semi-detached houses erected complete and ready for occupation at a cost of not more than £480 the pair. Each house must contain at least two sitting-rooms, three bedrooms, bathroom and w.c., kitchen, scullery, pantry and coal-place (or open gin. brick-built coal-bunker). The prizes are similar to those in the other classes.

Full particulars of the conditions of the competition can be obtained from the estate office, Cliftonville Circus, Belfast. All applications on official forms (which will be supplied for the purpose) must be sent to Messrs. Carson & McDowell, solicitors, 51, Royal Avenue, Belfast, on or before May 15th, together with £5 5s., which will entitle the owner, his nominee or purchaser (who may not necessarily take out a lease for eighteen months from date of application) to a lease in perpetuity of the lot allocated, at the yearly rent stated on the schedule attached to the conditions. All houses must be completed on or before November 1st next. Mr. Maurice B. Adams, F.R.I.B.A., of London, has been appointed by the company to act as professional assessor and to award the several prizes.

Prizes for Furnishing.

To encourage the economic furnishing of the houses, the company offer to the occupier or the furnisher a silver cup (or other article to be chosen by the winner), value £10 10s., for the house in Class I. furnished best at a cost not exceeding £175, and a cup or prize value £5 5s. as second prize; similar prizes being offered for the best furnished house in Class II., the cost not to exceed £125. The entrance fee for these furnishing competitions is £1 1s., which must be paid on or before July 1st next.

CIRCULAR CONCRETE RESERVOIR.



Complete List of Contracts Open.

WITH a few exceptions, news of Contracts Open are not repeated after they have been published once in these columns, so that readers will find particulars in our previous issue of other contracts that still remain open.

Unless expressly stated to the contrary all deposits required for bills of quantities, &c., are returned on receipt of *bona-fide* tenders.

The words "Fair Wages Clause" inserted in certain paragraphs signify that persons tendering must conform to a fair-wages clause in the contract, which requires them to pay the rates of wages current in the district.

BUILDING.

April 12. Penrith.—*Additions to two houses in Wordsworth Street, for Stephen Slinger.* Plans, specifications, &c., may be seen on application to G. Watson & Son, architects, St. Andrew's Chambers, Penrith, to whom tenders are to be sent not later than April 12.

April 12. Killarney.—*Building and completing a rectory for the parish of Killarney, in accordance with plans and specifications, which may be seen at the offices of the Architects or at the residence of Rev. J. D. Madden, Woodlawn, Killarney.* Sealed tenders, marked "Tender for Rectory," to be lodged with W. H. Hill & Son, architects, 28, South Mall, Cork, on or before April 12.

April 12. Bradford.—*Various works (ironfounders and engineers excepted) required in the extension of a warehouse.* Plans and specifications and conditions of contract may be seen, and bills of quantities obtained at the offices of Milnes & France, architects, 99, Swan Arcade, Bradford, to whom tenders must be sent not later than 9 a.m. on April 12.

April 12. Lichfield.—*Pulling down of old cottages and erecting two dwelling-houses and domestic offices in Stowe Street, for the Trustees of Milley's Hospital.* Plans, &c., may be seen at the office of W. Perry, 39-41, Bore Street, Lichfield. Tenders, endorsed "Stowe Street," must be sent to H. H. Brown, steward, Bird Street, Lichfield, not later than noon on April 12.

April 12. Spreyton.—*Pair of cottages for George Lambert.* Plans and specifications may be seen at the office of Harbottle Reed, architect, 12, Castle Street, Exeter, to whom tenders must be sent by April 12.

April 12. Newquay.—*Alterations and improvements at the council schools for the Cornwall Education Committee, according to the specification which may be seen at the schools, or at the office of the architect, B. C. Andrew, Biddick's Court, St. Austell.* Forms, upon which all tenders must be made, may be had from the architect or the secretary. Sealed endorsed tenders to be sent to F. R. Pascoe, secretary, Education Office, Truro, by April 12.

April 12. Hazlemere.—*New Free Methodist Chapel.* Plans and specifications can be seen at H. Tilling's, Wycombe Marsh, to whom all tenders must be sent, marked "Tender," not later than April 12.

April 12. Kendal.—*Proposed alterations and additions to Broom Close, Kendal.* Plans may be seen and quantities and specifications obtained at the office of John F. Curwen, F.S.A., F.R.I.B.A., architect and sanitary engineer, 26, Highgate, Kendal, to whom tenders must be sent not later than noon on April 12.

April 12. Antrim.—*Labourers' cottages in the rural district, for the Rural D. Council, in accordance with plans and specifications which can be seen at the office of the clerk of the Council, or at the office of the architect, W. T. R. Taggart, Scottish Provident Buildings, Belfast, as follows:*—Two cottages at Townparks, Antrim, on the lands of Dr. Gawn; two cottages at Townparks, Antrim, on the lands of Mrs. Young; one cottage at Islandbawn, Muckamore, cr. the lands of John Clark; one cottage at Ballyear, Carrmoney, on the lands of William Houston; one cottage at Ballyrobin, Muckamore, on the lands of Scott Gilliland; one cottage at Killyfad, Randalstown, on the lands of John Fulton; one cottage at Annaghmore, Toomebridge, on the lands of B. O'Boyle; one cottage at Portlee, Toomebridge, on the lands of Mrs. McCann; two cottages at Ballynamullen, Toomebridge, on the lands of Felix Lavery; one cottage at Tannaderry, Randalstown, on the lands of James Gilbert; four cottages at Cranfield, Randalstown, on the lands of James Charleton; two cottages at Cranfield, Randalstown, on the lands of Bernard O'Kane; one cottage at Cranfield, Randalstown, on the lands of Mrs. Hume; two cottages at Ballydonagh, Crumlin, on the lands of John McCurg; two cottages at Ballyshanagill, Crumlin, on the lands of John Nelson; two cottages at Feehogue, Randalstown, on the lands of Lord O'Neill; four cottages at Lurgan West, Randalstown, on the lands of Lord O'Neill; one cottage at Ballygrooby, Randalstown, on the lands of G. L. Young; two cottages at Craigmore, Randalstown, on the lands of J. H. Mulligan; two cottages at Ballymacilhoyle, Crumlin, on the lands of W. S. Thompson. Persons tendering may do so for any or all of the different blocks, but they must name the particular site or sites on their tender. Tenders are to be lodged with J. Clark, clerk of Council, Union Office, Antrim, by 10 a.m. April 12.

April 12. Farnborough.—*Alterations and additions to the "Swan Inn," for Crowley & Co., Ltd.* Plans and specification may be seen and further particulars obtained upon application to Friend & Lloyd, architects, Aldershot, to whom the tenders are to be sent not later than 11 a.m. on April 12, endorsed "Tender for Alterations, 'Swan Inn.'"

April 12. Grange-over-Sands.—*New stores, for the Carnforth Co-operative Society, Ltd.* Contractors must make application for quantities to H. E. Illingworth, architect, 8, East Parade, Leeds, before April 12.

April 13. Kirkby-in-Furness.—*New bank premises, for the Lancaster Banking Co. Plan, &c., may be seen on application to J. Waye, care of Settle & Brundrit, Ulverston.* Sealed tenders, endorsed "Bank," to be sent to J. Waye, by noon on April 13.

April 14. Bramley.—*Slaters', plumbers', plasterers' and painters' work in the erection of eight houses at Bramley.* Plans and specifications may be seen at the

offices of Beckwith & Webster, architects, 2, Basinghall Square, Leeds, to whom sealed tenders are to be sent in by April 14.

April 14. Leith.—*Repair and maintenance, for five years from Whitsun, of the whole of the roofs and roof-lights of the sheds, warehouses, offices and other buildings at the harbour and docks, for the Harbour Commissioners.* Particulars may be obtained on application at the office of the superintendent, Peter Whyte, M.I.C.E., Tower Place, Leith. Tenders to be lodged with Victor A. Noel Paton, W.S., clerk to the Commission, 31, Melville Street, Edinburgh, on or before April 14.

April 14. Newhaven.—*Erection of small sheds for stores at Newhaven Harbour for Leith Harbour and Dock Commissioners.* Drawings may be seen and schedules of measurements may be obtained on application at the office of the superintendent, Peter Whyte, M.I.C.E., Tower Place, Leith. Tenders to be lodged with Victor A. Noel Paton, W.S., clerk to the Commission, 31, Melville Street, Edinburgh, on or before April 14.

April 14. Queenstown.—*Erection of six houses, for the Queenstown Naval Dwellings Co., in accordance with plans and specification prepared by W. H. Hill & Son, architects, 28, South Mall, Cork, with whom tenders are to be lodged on or before April 14.* Detailed quantities may be obtained from the Architects on payment of £1 rs.

April 14. Pontypridd.—*Erection of two cottages at Coodpenmaen, Pontypridd, for the Wesleyan Trallwn Mission.* Plans and specification can be seen at the offices of A. O. Evans, Williams & Evans, architects, Pontypridd, to whom sealed and endorsed tenders must be sent by April 14.

April 14. Wakefield.—*New school at Normanton Woodhouse and alterations to Normanton Woodhouse Provided School:—Builder, joiner, slater, plasterer, ironfounder and smith, plumber, painter.* A deposit of £1 is required. Cheques, &c., to be sent to the West Riding treasurer. Those desirous of tendering should send in their names to J. Vickers-Edwards, county architect, County Hall, Wakefield, by April 14.

April 14. Aberayron.—*Alterations and repairs to the school for the Cardigan County Education Committee.* Plan and specification can be seen at the school in charge of the Headmaster. Tenders sealed and endorsed "Aberayron School Repairs" are to be delivered at the office of B. C. Jones, clerk to the District Education Committee, Aberayron, not later than midday on April 14.

April 14. Wakefield.—*New school at Sandal, near Wakefield, Stainforth (Thorne Union) Provided School: new cloak-room, &c., &c.; Castleford Wheldon Lane Provided School: alterations, repairs, &c.* A deposit of £1 is required for each of the above schools, which will be returned on receipt of a *bona-fide* tender. Cheques, &c., to be sent to the West Riding Treasurer. Builders desirous of tendering must send in their names to J. Vickers-Edwards, county architect, County Hall, Wakefield, by April 14.

April 14. Aberarth.—*Alterations and repairs to the school for the Cardigan County Education Committee.* Plan and specification can be seen at the school in charge of the Head Master. Tenders sealed and endorsed "Aberarth School Repairs" are to be delivered at the office of B. C. Jones, clerk to the District Education Committee, Aberayron, not later than mid-day on April 14.

April 16. Glasgow.—*Excavation, embanking and construction of drains, roads, &c., required in the formation of timber storage ground behind Merklands Quay, Partick, for the Trustees of the Clyde Navigation.* Drawings may be seen, and specification, schedule of quantities, and form of tender can be obtained on application to the trustees' engineer, W. M. Alston. Sealed tenders, marked "Tender for Timber Depot at Merklands," to be lodged with T. R. Mackenzie, general manager and secy., 16, Robertson Street, Glasgow, not later than 10 a.m. on April 16.

April 16. Hastings.—*Construction and erection of four covered seats upon the Esplanade at Breeds Place, Eversfield Parade and Grand Parade.* Drawings and specification may be seen and form of tender obtained at the office of the borough engineer, P. H. Palmer, M.I.C.E., Town Hall, Hastings, between 10 and 5. Sealed tenders, endorsed "Tender for Covered Seats," must be delivered at the Town Clerk's Office, Town Hall, Hastings, not later than noon on April 16.

April 17. Cockton Hill.—*New council school, for the Durham County Education Authority.* Plans, specifications, and general conditions of contract can be seen, and bills of quantities obtained at the office of the architect, G. G. Hoskins, Darlington. Sealed tenders, endorsed "Cockton Hill Council School Tender," are to be sent addressed to the Secretary, Elementary Education Department, Shire Hall, Durham, by April 17.

April 17. Ulverston.—*Erection of five houses in Clarence Street, for the Swarthmoor and Ulverston Co-operative Society, Ltd.* Persons desiring to submit tenders may inspect drawings and specifications and obtain bills of quantities and other particulars at the office of the architects, Settle & Brundrit, A.A.R.I.B.A. Each tender must be enclosed in a sealed envelope, endorsed "Tenders for Five Houses, Clarence Street, Ulverston," and delivered to the Architects' Office not later than noon on April 17. Fair wages clause.

April 17. Herne Bay.—*Enlargement of the County Police Station at Herne Bay, ordered by the Standing Joint Committee.* Plans and specification can be seen and

bill of quantities and tender form obtained on deposit of £2 at the office of the County Architect, 35, Week Street, Maidstone, between 10 a.m. and 5 p.m. Sealed tenders, endorsed "Herne Bay Police Station," are to be delivered to Charles Turner, clerk, at the Sessions House, Maidstone, not later than 5 p.m. on April 17.

April 17. Mousehole.—*Erection of a villa for R. I. Harvey, Liverpool.* Plans and specifications may be seen at the office of the architect, Henry Madlern, F.I.A.S., 13, Clarence Street, Penzance, to whom sealed tenders are to be sent by April 17.

April 17. Tredegar.—*Erection of twenty-two houses at Charles Street.* Applications to see plans and specification must be made, with deposit of £1 rs., to Thomas Danks, Oakfield Road, Tredegar, architect and surveyor, between the hours of 12 and 2; also 5 and 7. Sealed tenders, endorsed "Tender for Houses, Charles Street," must be received by J. Porteous Bell, secy., Hawthorn Villa, Tredegar, by April 17.

April 17. Neuaddwyd.—*Restoration of chapel in accordance with the plans and specification which are to be seen at Neuaddwyd Chapel House.* Tenders, endorsed "Chapel," are to be sent in on or before April 17, to the Rev. T. Gwilym Evans, Aberayron, Cardiganshire.

April 13. London, N.E.—*Repairing and rendering watertight, by an asphalt lining, the swimming bath at the schools at Brentwood, for the Guardians of the Hackney Union.* Specification, conditions of contract and tender form (prepared by W. A. Finch, architect, 76, Finsbury Pavement, E.C.) can be obtained of F. R. Coles, clerk, between 10 a.m. and 4 p.m. Sealed tenders, endorsed "Repairing Swimming Bath, Brentwood Schools," must be delivered to Frank R. Coles, clerk to the Guardians, Clerk's Office, Sidney Road, Homerton, N.E., by 2 p.m. on April 18.

April 18. Treorky.—*Extension of Horeb English Baptist Chapel, Treorky, Rhondda Valley, for the Trustees.* Plans and specification may be seen at the office of W. D. Morgan, architect, Victoria Chambers, Pentre. Sealed and endorsed tenders to be delivered to William Lawrence, The Institute, Treorky, on or before noon on April 18.

April 18. Newhaven.—*Erection of new Council offices and fire-station in Fort Road.* The specification, conditions of contract and drawings of the proposed buildings may be seen at the office of F. J. Rayner, architect, 34, Meeching Road, Newhaven, any day between the hours of 1 and 2 o'clock, from whom copies of the bill of quantities and forms of tender may be obtained on deposit of a postal order value £1 rs. Fair wages clause. Tenders under seal, and marked "Council Offices," to be delivered to Edward Knightley, clerk to the Council, Council's Offices, Newhaven, not later than 4 p.m. on April 18.

April 18. Sandy.—*New Council school, for the Bedfordshire County Council.* The drawings, specifications, and form of contract may be inspected at the offices of Gutch & Saunders, architects, Bank Chambers, Kettering, between 11 and 4, on any working day except Saturday. Builders desirous of tendering must send their names and addresses to the above-named architects on or before April 7, together with a deposit of £1 rs., when a copy of the bill of quantities and form of tender will be forwarded to them. Sealed tenders, endorsed "Tender for Sandy Council School," must be sent to W. W. Marks, clerk of the Council, Shire Hall, Bedford, before 5 p.m. on April 18.

April 18. Hunslet.—*Erection of an engineer's house, at the new workshop, Rothwell Haigh, in accordance with the drawings and specifications prepared by the architect, J. H. Morton, F.R.I.B.A., 50, King Street, South Shields.* Applications for bills of quantities and forms of tender must be made to the architect on or before April 7, accompanied by a deposit of £1. Bill of quantities will be supplied to such applicants only. Drawings may be inspected at the offices of the clerk or the architect, and tenders on the forms provided must be delivered at the Union Offices, Hunslet, Leeds, by 10 a.m. on April 18.

April 18. Aberaman.—*New public hall, institute and free library at Aberaman, Aberdare.* Plans and specification can be seen at the architect's office, Clifton Street, Aberdare, where bills of quantities can be obtained. Sealed and endorsed tenders to be sent in to W. W. Price, Bryn Cottage, Hill Street, Aberaman, not later than April 18.

April 19. Marlow.—*Alterations and additions to the music-room, for the Marlow Public Hall, Ltd.* Plans and specification may be seen at the office of R. Wellcome, 5, High Street, Marlow. Tenders (endorsed) to be delivered at the office of the Company, 5, High Street, Marlow, not later than 5 p.m. on April 19.

April 19. Blaydon.—*Enlargement of the Galvanized Iron Isolation Hospital at Normans Riding, comprising the erection of administrative, laundry and discharging blocks and two pavilions, for the Blaydon, Ryton and Whickham Joint Hospital Committee.* Plans and specifications may be seen and form of tender obtained on application to J. B. Renton, Council Offices, Whickham, R.S.O. (who will attend at the Council Offices, Whickham, by appointment, to supply all particulars) upon payment of £1. Sealed tenders, endorsed "Tender for Hospital," must be delivered to Henry Dalton, clerk, Blaydon-on-Tyne, by noon on April 19.

April 20. Cross Keys.—Twenty-five (more or less) houses near Nine Mile Point Collieries, Sirhowy Valley. Plans and specifications may be seen with T. Thomas, Nine Mile Point Collieries, near Cross Keys, Mon., or at the office of R. L. Roberts, M.S.A., Abercarn. Sealed tenders, endorsed "Tenders for Houses," by April 20.

April 20. Drogheda.—Erection of an hospital, for the Drogheda Cottage Hospital Committee. Drawings and specifications may be inspected with the Hon. Secretaries, Greenhills, Drogheda, and copies obtained from Frederick Shaw, M.R.I.A.I., architect, St. Laurence Street, Drogheda. Sealed tenders to be sent to Sidney Smith, Rosa Smith, hon. secs., Greenhills, Drogheda, not later than April 20.

April 20. Cothal.—Mason, carpenter, slater, and plasterer works of new dwelling-house and shop to be erected at Cothal; also for the mason and carpenter works of repairs and concrete floor at the old mill, Cothal. Plans and specifications may be seen in the hands of Alexander Stronach, junr., & Son, advocates, 29, Belmont Street, Aberdeen. Contractors will meet at Cothal on April 14 current, at 2 p.m., when the works will be pointed out by Mr. Stewart, architect, and offers must be lodged with A. Stronach, junr., & Son on or before April 20.

April 20. Wells-next-Sea.—Enlargement of school for the Norfolk Education Committee. Builders desirous of tendering can inspect plans and specification and obtain copies of quantities at the office of A. F. Scott, architect, Castle Meadow, Norwich, on and after April 5. A deposit of £1 rs. will be required. Tenders must be delivered by noon on April 20, addressed to "The Secretary, Norfolk Education Committee, 57, London Street, Norwich," and endorsed "Tender for Wells-next-Sea School."

April 20. Tonbridge.—New Council school, to accommodate 420 children, at Tonbridge, Kent. The drawings and specification may be inspected at the office of the architect, C. H. Strange, A.R.I.B.A., 20, Dudley Road, Tunbridge Wells. Any person desiring to tender must send in his name to the architect, accompanied with a deposit of £1, not later than noon on April 5. The tenders, on the form supplied, to be delivered to N. R. Stone, 23, Church Road, Tunbridge Wells, not later than noon on April 20.

April 20. Hawkinge.—Enlargement to the Council school, at Hawkinge, near Folkestone, Kent. Drawings and specification may be inspected at the office of the architect, Andrew Bromley, Radnor Chambers, Folkestone. Any person desiring to tender, must send in his name to the architect, accompanied by a deposit of £1, not later than noon on April 5. Tenders, on the form supplied, to be delivered to W. Thomas, 66, Broadmead Road, Folkestone, not later than noon on April 20.

April 21. Manchester.—Supply of terra-cotta for the Queen Street Municipal School. Plans may be seen and a copy of the bill of quantities (including specification) may be obtained at the Education Offices in Deansgate, Manchester, on a deposit of £1 rs. Tenders, on the forms and in the envelopes provided, must be delivered at the Deansgate offices of the Education Committee not later than April 21.

April 21. Mold.—Alterations and extensions to the County School, Mold, Flintshire, North Wales. Plans and specifications may be seen at the offices of the architect, Samuel Evans, N. & S.W. Bank Buildings, High Street, Mold, from whom bills of quantities may be obtained on payment of a sum of £2 rs. Tenders to be made out on forms to be supplied, and sent in to W. R. Howard Evans, solicitor, Mold, clerk to the Governors, by April 21.

April 21. Swindon.—Alterations and additions to Sanford Street Council School, according to plans prepared by R. J. Beswick, 10, Victoria Road, Swindon, where the plans, general conditions and specification may be inspected. A copy of the bill of quantities and form of tender can be obtained from the Architect on payment of £1 rs. Fair wages clause. Sealed tenders, on the prescribed form, endorsed "Alterations, Sanford Street Council School," and accompanied by priced (detail) bill of quantities under separate cover, to be delivered to Robert Hilton, town clerk, Town Hall, Swindon, by April 21.

April 23. Coventry.—Nurses' home, for the Coventry and Warwickshire Hospital Committee, in accordance with plans and specifications prepared by the architects, A. Hessel Tiltman, F.R.I.B.A., 1, Raymond Buildings, Gray's Inn, London, W.C., and Herbert W. Chataway, Trinity Churchyard, Coventry. Plans and specifications may be seen at the Architect's Office, Trinity Churchyard, Coventry, and bills of quantities and forms of tender can be obtained upon depositing the sum of £3 3s. Tenders, sealed and endorsed "Nurses' Home," to be sent to Ellis E. Crisp, secty., Coventry and Warwickshire Hospital, Stoney Stanton Road, Coventry, not later than 10 a.m. on April 23.

April 23. Eastbourne.—Additions to the Motor Omnibus House at Roselands. Plans and general conditions may be seen, and specification, bill of quantities, and form of tender obtained at the Borough Surveyor's Office, Town Hall, on payment of a deposit of £1 rs. Tenders endorsed "Motor Omnibus House" to be sent to A. Ernest Prescott, borough surveyor, Town Hall, Eastbourne, not later than noon on April 23.

April 23. Truro.—Detached residence at Short Lanes End, Truro, for Thomas Powell, according to plans and specification which may be seen at the office of A. J. Cornelius, architect, Truro. Sealed tenders, endorsed, to be sent to Thomas Powell, Treyew Road, Truro, on or before April 23.

April 23. Truro.—Alterations and additions to "Trevaunance," Truro (now known as Combridgey House), for E. L. Carlyon, according to plans and specification, which may be seen at the office of A. J. Cornelius, architect, Truro. Sealed endorsed tenders to be sent to E. L. Carlyon, Truro, on or before April 23.

April 24. Ilford.—Erection of a junior mixed and infants' school for 630 children, together with latrines, playsheds, fencing, &c., on the Water Lane site, Ilford, Essex. Plans and specifications can be seen, and bills

of quantities and forms of tender can be obtained at the office of the architect, Charles J. Dawson, 11, Cranbrook Road, Ilford, between the hours of 10 a.m. and 5 p.m., upon depositing £5 ss. Fair wages clause. Sealed tenders, endorsed "Tender for Water Lane School," are to be addressed and delivered to John W. Benton, Clerk to the Council, Town Hall, Ilford, Essex, by noon on April 24.

April 24. Boston.—New post office at Boston. Drawings, specifications and a copy of the conditions and form of contract may be seen on application to the Postmaster between 11 and 4. Bills of quantities and forms of tender may be obtained at H.M. Office of Works, Storey's Gate, S.W., on payment of £1 rs. Tenders must be delivered before noon on April 24, addressed to the Secretary, H.M. Office of Works, &c., Storey's Gate, London, S.W., and endorsed "Tender for Boston Post Office."

April 25. Brimington.—Alterations and additions to the Central Schools, Brimington, near Chesterfield. Plans, &c., can be seen and bills of quantities and all information obtained at the offices of W. C. Jackson, M.S.A., architect and surveyor, 29, Knifesmith Gate, Chesterfield, upon payment of £1 rs. Sealed tenders, endorsed "Brimington Schools," to be sent to C. J. Kerslake, clerk, Education Offices, Foljambe Road, Chesterfield, not later than April 25.

April 27. Chelmsford.—Widening a small brick bridge in the parish of Waltham Holy Cross, known as Broomstick Hall Bridge, for the County Council. Plans and specifications may be seen at the Surveyor's Offices at Chelmsford on any day. Tenders must be delivered to the County Offices, Chelmsford, not later than April 27.

April 27. Chelmsford.—Brick and concrete abutments, &c., for a small bridge at Radwinter, near Saffron Walden, for the County Council. Plans and specifications may be seen at the Surveyor's Offices at Chelmsford. Tenders must be delivered to the County Offices, Chelmsford, not later than April 27.

April 27. Waterloo.—Erection of public library and museum buildings adjoining the Town Hall, Waterloo, near Liverpool, for the U.D.C. Bills of quantities may be obtained from the clerk, upon payment of a deposit of £2 rs. Drawings and specifications may be seen at the office of O. D. Black & A. F. Milligan, architects, Central Chambers, South Castle Street, Liverpool. Sealed tenders, endorsed "Tender for Public Library and Museum," must be delivered to John I. Thompson, clerk to the Council, Town Hall, Waterloo, near Liverpool, not later than noon on April 27.

April 30. Tywardreath.—Renovation and alteration of the Wesleyan Church, Tywardreath, Par Station. Plans and specifications may be seen at the residence of Caleb Thomas, Tywardreath, Par Station, to whom tenders, sealed and endorsed "Church Tenders," must be sent on or before April 30. All further particulars may be obtained at the office of the architect, F. C. Jury, No. 1, Alma Villas, Tregonisey Road, St. Austell.

No date. Harsisehead.—Erection of a house at Harsisehead, for the Harsisehead Colliery Co., Ltd. For particulars apply to Fred C. Crimes, architect and surveyor, Liverpool Road, Kidsgrove.

No date. Apperley Bridge.—Additional wings and other work at Woodhouse Grove Schools. Persons desirous of tendering will please send their names to W. J. Morley, F.R.I.B.A., & Son, architects, 269, Swan Arcade, Bradford.

No date. Aldershot.—Erection of a villa in St. Michael's Road. Plan and specification may be seen or any further information obtained upon application to Friend & Lloyd, architects, Aldershot.

No date. Horsforth.—Extension to Springfield Convalescent Home. Contractors desiring to tender are requested to send in their names to Walter A. Hobson & Co., architects, 2, Basinghall Square, Leeds. A deposit of 10s. will be required for each set of quantities.

No date. Shaftesbury.—Erection of a new Wesleyan church. Plans and specifications may be seen and quantities obtained by application to the Rev. H. Hopkinson, Shaftesbury.

No date. Cardiff.—Erection of new warehouse premises, Tredegar Street. Plans and specifications may be seen and quantities obtained at the Tredegar Estate Office, Pearl Street, Roath, or at the office of Alfred Lewis, estate agent, 5, St. John's Square, on payment of £1 rs.

No date. Christow.—Erection of a cottage and other buildings. Builders wishing to tender should send their names to J. Archibald Lucas, F.S.I., A.R.I.B.A., architect and surveyor, Guildhall Chambers, Exeter.

ENGINEERING.

April 14. Christiania.—Bridge work. The Norwegian State Railway Department require tenders for bridge-building work, the total weight of ironwork in connection with the two bridges concerned amounting to about 328 tons. Copies of the general regulations, conditions and form of tender may be seen at the offices of the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall Street, London, E.C. A set of twenty-two drawings may be obtained at a cost of 11 kroner (about 12s. 3d.) per set, from the Chief Cashier of the Norwegian State Railways, No. 1, Jernbanetorget, Christiania. Tenders in sealed envelopes will be received in Christiania up to 10 a.m. on April 14.

April 17. Auldhous.—Removing the present bridge and erecting a new stone and concrete bridge on 11th Liebank Road, over the Auldhous Burn, and diverting the roadway there, for the First and Upper District Committee of the county of Renfrew. The drawings may be seen at the office of George B. Walker, measurer, 65, Bath Street, Glasgow, from whom copies of the specification, schedule of quantities and form of tender may be obtained on payment of £1 rs. Sealed tenders, marked outside "Tender for Auldhous Bridge," must be lodged with William H. Hill, district clerk, 194, Ingram Street, Glasgow, not later than 10 a.m. on April 17.

April 18. Wells.—Building a service reservoir to contain 100,000 gallons, for the Somerset and Bath Asylum. The reservoir is to be constructed of concrete and masonry, with brick lining and roof of reinforced concrete in accordance with plans prepared by William Phelps, C.E., of Crocombe, Wells. Plans and specification to be seen at the Asylum Clerk's Office. Tenders must be delivered at the Asylum not later than 10 a.m. on April 18.

April 23. Bamford.—Construction of the Bamford filters and the Derwent to Grindleford section of the Derwent aqueduct, in the county of Derby, for the Derwent Valley Water Board. The work will comprise:—Roughing filters, 3,500 sq. yds.; sand filters, 21,000 sq. yds.; cut and cover, $\frac{3}{4}$ mile; 45in. pipelaying, $7\frac{1}{2}$ miles; with valve-houses, stream crossings, &c. The specification and schedule of prices and copies of the drawings may be obtained on application to Edward Sandeman, M.I.C.E., engineer to the Board, on payment of £5 ss. Sealed tenders, enclosed in the printed envelope supplied with the documents, to be delivered to O. B. Steward, clerk to the Board, Bamford, near Sheffield, not later than 9 a.m. on April 23.

April 24. London, S.W.—Reconstruction of Victory Bridge over the Regent's Canal, in the borough of Stepney and the administrative county of London, for the County Council. Persons desiring to submit tenders may obtain the drawings, specification, bills of quantities, form of tender and other particulars, upon application to the chief engineer, Maurice Fitzmaurice, C.M.G., at the County Hall, Spring Gardens, S.W., upon payment to the cashier of the Council of the sum of £3. Tenders must be upon the official forms, and the printed instructions contained therein, must be strictly complied with. Fair wages clause. Each tender is to be delivered at the County Hall, in a sealed cover, addressed to the Clerk of the London County Council, Spring Gardens, S.W., and marked "Tender for the Reconstruction of Victory Bridge." No tender will be received after 10 a.m. on April 24.

April 25. London, E.C.—Deck spans (from 6ft. to 33ft. in the clear), as per specification, for the East Indian Railway Co. Specification, for which £1 rs. (not returnable) will be charged, can be obtained at the Company's Offices. Tenders to be marked "Tender for Deck Spans," and sent in to C. W. Young, secretary, Nicholas Lane, London, E.C., by noon on April 25.

April 25. Brussels.—Railway plant. For the construction of the Erezée to Hottot section of the local railway from Comblain la Tour to Manhay and Melreux. Estimated cost 168,000 fr. (6,720). A deposit of 16,000 fr. (£40) will be required. A copy of the specification may be obtained, price 1 fr., from M. l'Hoir, rue Edouard-Wacken, 10, Liège. Tenders in sealed envelopes should be addressed to the General Manager, Société Nationale des Chemins de Fer Vicinaux, 14, rue de la Science, Brussels, by April 25.

April 27. Sofia.—Bridgework. For the construction of a bridge over the Wladajafuss, at an estimated cost of 50,000 frs. (£2,030), for the Town Council, Sofia, by whom tenders will be received up to April 27.

April 30. Darlington.—Supply, delivery and erection of a counter current jet condensing plant complete with piping and cooling tower. Plans, specification and form of tender may be obtained from the Borough Electrical Engineer, Electricity Works, Houghton Road, Darlington, on payment of a deposit of £1 rs. Sealed tenders, endorsed "Condensing Plant," to be delivered at the office of H. G. Steavenson, town clerk, Houndgate, Darlington, on or before April 30.

May 2. London, E.C.—Extension of Parkston Quay and construction of a shed and sidings in connection therewith for the Great Eastern Railway Co. Persons desirous of tendering can, on application to the Engineer, obtain copies of the specifications and quantities, and the drawings can be inspected at his office at Liverpool Street on and after April 17 between 10 and 4. Sealed tenders, endorsed "Tender for Extension of Parkston Quay," Contract No. 1, should be addressed to W. H. Pepper, corne, and must be delivered at the Secretary's Office, Liverpool Street Station, not later than 10 a.m. on May 2. Tenders to be sent through the "General Post Office." Any sent otherwise will not be considered. The sum of £10 rs. will be charged to each applicant for the specification and quantities, schedules and form of tender.

May 8. Deptford.—Construction of a footbridge for the Borough Council, according to the drawings and specification which may be seen at the Borough Surveyor's Office at the Town Hall after April 23, during the ordinary office hours. It will be a condition of the contract that the steelwork must not be sublet. Fair wages clause. Bills of quantities prepared by W. T. Farthing & Son, together with the conditions of contract, may be obtained from the Town Clerk, Town Hall, Deptford, upon payment of a deposit of £1 rs. Persons desirous of tendering must send their names to the Town Clerk on or before April 17, to whom sealed tenders, in accordance with the Council's regulations printed on the form of tender, must be sent not later than 4 p.m. on May 8.

May 12. King's Lynn.—Waterworks extension. Contract No. 1: Supplying and fixing slow-speed steam engine (surface condensing, differential, or criss-compound horizontal), pumps, condensers and the necessary alterations to existing steam pipes, delivery mains, &c. Contract No. 2: Sinking and lining an 8ft. diameter well. Contract No. 3: Supplying and fixing one 24ft. by 6ft. 6in. Lancashire boiler, and a 48-tube economizer, with all the necessary seatings, chambers and alterations to existing flues. Contract No. 4: Supplying and fixing a cast-iron tank 13ft. by 9ft. by 4ft. 6ins. Contract No. 5: Extensions to engine-house and mechanics' shop. General conditions, stipulations, specifications, bills of quantities and forms of tender may be obtained from and drawings inspected on application to J. H. Webb, waterworks engineer, Town Hall, King's Lynn, on and after April 17, upon receipt of a deposit of £3 3s. for contract No. 1 and £1 rs. each for contracts Nos. 2, 3, 4 and 5. Sealed tenders, endorsed "Tender for Waterworks," to be delivered to J. W. Woolstencroft, town clerk, Town Hall, King's Lynn, by May 12.

(Continued on p. xxii.)

THE TIMBER TRADE.

London Market in March.

ALL wood markets kept still during March. The large business effected in February for shipment sufficed for the forward requirements of European importers, estimated on a low scale, and the latter are content to await events in regard to further purchases for the present. On the other hand shippers cleared their stock notes sufficiently to save them from all necessity for forcing further sales. Messrs. Churchill & Sim state that the probability seems still in favour of an easy maintenance of present quotations during the remainder of the season, and should the prevailing improvement in general trade overtake the wood trade in time it would have a further favourable effect very quickly. So far, however, there has been no sign of this, and the complaint of lack of demand continues very general from all markets. In London 1,000 standards less have been delivered from the docks than was the case in March, 1905, bringing the deficiency for the first quarter of the year up to 4,000 standards. Against this, 600 standards more in March and 2,200 standards more in the quarter have been passed over side.

The abstract of dock stock, consumption, &c., for March, published by Messrs. Foy, Morgan & Co., is given in the table at the foot of this page.

Dock Stock.

The stock of wood in the public docks on March 31st was:—

	Pieces.
Foreign deals and ends - - -	954,000
Do. battens - - -	1,630,000
Pine deals and battens - - -	683,000
Spruce do. do. - - -	594,000
Boards, rough - - -	2,988,000
Do. prepared - - -	5,568,000

totalling 12,417,000 pieces, as against 15,361,000 in 1905, 17,706,000 in 1904, and 14,636,000 in 1903.

In other kinds the stock was as follows:—

	Pieces.
Foreign wainscot logs - - -	148 pieces.
Do. oak timber - - -	358 loads.
Do. fir timber - - -	1,614 do.
Do. Oregon pine, &c., spars and masts - - -	5,325 do.
Colonial oak timber - - -	1,113 do.
Do. birch timber and planks - - -	3,143 do.
Do. elm and ash timber - - -	643 do.
Do. yellow pine - - -	262 do.
Do. red pine - - -	64 do.
United States pitch-pine timber - - -	11,011 do.
Do. do. deals - - -	19,000 pieces.
East India teak - - -	6,803 loads.

Deliveries.

The deliveries have been—

	First Quarter.	March.
	Pieces.	Pieces.
Foreign deals and ends - - -	854,000	286,000
Do. battens - - -	1,497,000	551,000
Pine deals and battens - - -	266,000	106,000
Spruce do. do. - - -	311,000	137,000
Boards, rough - - -	1,447,000	550,000
Do. prepared - - -	3,475,000	1,299,000

totalling 7,760,000 pieces for the first quarter, and 2,929,000 for March.

The deliveries direct from ship to craft have been—

	First Quarter.	March.
	P.s.h.	P.s.h.
Deals and battens - - -	7,063	2,153
Boards - - -	2,591	1,244
Total - - -	9,654	3,397

Soft Woods.

Swedish Deals and Battens.—The market both for deals and battens was very dull in London during March, and prices for the former have weakened here and there in the absence of demand. For battens prices have been maintained without change. For prepared boards the market has been much more lively, and the small stock has hardly proved adequate. Prices lifted materially during the month. Forward business has been on the smallest possible scale, but the lapses from established prices have neither been important nor significant.

Norwegian Boards.—The fresh arrivals in March to London were far below those of March last year. Prices progressed upwards through the month without bringing any signs of attracting larger supplies in the near future.

Russian Deals.—It was a difficult matter to keep the prices of Russian deals in London steady during March. The demand has been quite unsatisfactory, and but for the small stock and the absence of any pressure to sell, the weakness must have been more apparent. In further forward business little progress has been made, but rates have been fairly maintained on the whole.

Finnish Battens.—There is no change to report in this market for Finnish battens. Previous quotations have been maintained, both here and for arrival.

Prussian Timber.—The demand for fir timber continues to show fair activity, and in the absence now of any cheap competing supply market prices ought to be a good deal better than they are. There has, however, been no improvement so far. The market for foreign oak has also been disappointing, and the rally apparent in February has not been maintained.

Canadian Timber.—For pine deals there is no change to report in this market, the improvement reported for February having been maintained but not increased. For spruce deals there was quite a poor month's demand in London, and prices are more inclined to be a point down than anything else. Canadian hardwoods and yellow-pine timber have shown a little more cheerfulness. Quotations for sawn timber for arrival were again higher for the month, shippers being in great difficulties to find wood to fill their forward contracts. In London prices cannot get up to a parity with this state of affairs, but the small stock is going fast into consumption, and it is not easy to see on what basis it is going to be replaced. In the meantime, some sawn Oregon timber has been selling here very cheaply indeed. For pitch-pine planks the same causes are at work, but they have still less effect on prices in this market inasmuch as there is no general demand for them here and opportunities for selling them have to be competed for as they arise.

At the Birmingham Orthopædic Hospital a new outpatients' department is being erected. The department has a frontage to Great Charles Street of about 22ft., and extends backwards a distance of 85ft. The extra accommodation will comprise a waiting hall for outpatients, dispensary, dressing-rooms, surgeons', nurses', massage and exercising rooms, and two isolation wards.

Coming Events.

Wednesday, April 11.

EDINBURGH ARCHITECTURAL ASSOCIATION. — Associates' Annual Business Meeting.

JUNIOR INSTITUTION OF ENGINEERS.—Joint Meeting with the Discussion Section of the Architectural Association, at 18, Tufton Street, Westminster, at 7.30 p.m. Mr. S. Bylander, M.J.I.E., on "Ferrocement."

LIVERPOOL ARCHITECTURAL SOCIETY. — Annual General Meeting at 6 p.m.

Wednesday, April 18.

EDINBURGH ARCHITECTURAL ASSOCIATION. — Annual Business Meeting and President's Address.

Saturday, April 21.

EDINBURGH ARCHITECTURAL ASSOCIATION. — Visits to Pinkie House, Musselburgh, and Church and Presbytery of our Lady of Loretto, Musselburgh.

Monday, April 23.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.—Messrs. G. P. Bankart and Lawrence A. W. Turner on "Plasterwork," at 8 p.m.

SURVEYORS' INSTITUTION. — Ordinary General Meeting at 4 p.m.

SURVEYORS' INSTITUTION.—Mr. J. W. Willis Bund on "The Effect of the Education Act, 1902, on Rural Districts," at 4 p.m.

Thursday, April 26.

INSTITUTION OF MECHANICAL ENGINEERS. — Anniversary Dinner.

Friday, April 27.

ARCHITECTURAL ASSOCIATION.—Mr. Walter Cave on "Fenestration," at 7.30 p.m.

Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

DURING THE WEEK ending April 6th twenty-four failures in the building and timber trades in England and Wales were gazetted.

S. L. GRIST, builder, Enfield. R.O. March 26th.

E. YOUNG, builder, Eastleigh. Deficiency £503.

J. W. VAUGHAN, builder, Colwyn. R.O. March 26th.

P. H. PRICE, builder, Portsmouth. Liabilities expected to rank, £952; estimated surplus of assets, £203.

W. HUGHES, builder, Boodle. Liabilities £267; assets nil.

A. W. JAGGERS & Co., builders and contractors, Crofton Park. R.O. March 27th.

W. WALKER, plumber and glazier, Ashton-under-Lyne. P.E., Ashton-under-Lyne Town Hall, April 26th, at 12.

H. VULLIAMY, builder, Sutton Heston, near Hounslow. R.O. March 27th.

J. CHARLESWORTH, builder, Wolstanton. P.E., Hanley Town Hall, April 25th, at 11.

F. FRY, builder, Streatham Hill, late Mortlake. R.O. March 31st.

H. BANGOR, builder, East Grinstead. P.E., Tunbridge Wells Town Hall, May 7th, at 12.

J. BLAND, builder and contractor, Appleby. P.E., Kendal C.C., April 11th, at 11.30.

F. BESZANT, builder, Chippingham. First meeting, O.R.'s, Bristol, April 11th, at 11.30. P.E., Bath Guildhall, April 26th, at 11.30.

W. A. BODDY, builder, Scarborough. First meeting, O.R.'s, Scarborough, April 12th, at 4. P.E., Scarborough C.C., April 24th, at 12.

WILLEDEN GLASS, WHITE LEAD AND COLOUR CO. First meeting, London Bankruptcy Court, April 11th, at 12. P.E., same, May 18th, at 12.

G. H. MIGHALL, builder, West Hoathly. First meeting, O.R.'s, Brighton, April 14th, at 12. P.E., Tunbridge Wells Town Hall, May 7th, at 12.

W. E. WILLIAMS, plumber, Manchester. First meeting, O.R.'s, Manchester, April 11th, at 2.30. P.E., Manchester C.C., May 11th, at 10.

C. A. WATSON, builder and contractor, Spalding. First meeting, White Hart Hotel, Spalding, April 11th, at 12.15. P.E., Peterborough Law Courts, April 20th, at 12.

R. E. BEESLEY, builder, Wood Green. First meeting, 14, Bedford Row, W.C., April 11th, at 12. P.E., Edmonton C.C., April 23rd, at 11.30.

WITT & MANN, builders, Bracknell. First meeting, Queen's Hotel, Reading, April 12th, at 12.30. P.E., Windsor Town Hall, April 26th, at 11.

J. MANLEY & SONS, joiners and builders, Atherton. First meeting, 19, Exchange Street, Bolton, April 11th, at 2. P.E., Bolton C.C., April 11th, at 3.

ABSTRACT OF STOCK, CONSUMPTION, &c., IN LONDON DOCKS, FOR MARCH.

S.C. Dks. and M. Dks.	Deals (Fir).	Battens (Fir).	Pine.	Spruce.	Pitch-pine Deals.	Deals and Battens in Aggregate.	Rough Boards (All Countries).	Flooring.	Floated Timber.
	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Loads.
Public dock stock - - -	833,769	1,731,800	681,866	594,684	19,127	3,861,246	2,988,005	5,567,359	18,500
Monthly public dock consumption - - -	238,723	582,044	102,434	133,639	5,585	1,062,425	547,925	1,301,756	3,798
Overside stock - - -	248,272	605,326	106,531	138,985	—	1,099,114	569,842	—	—
Overside consumption (estimated of dock):—									
92 per cent. Sawn	219,625	535,480	94,239	122,948	—	972,292	504,091	807,089	—
62 " Planed									
Duration of supply at same rate of consumption - - -	2'36 months.	2'09 months.	4'01 months.	2'86 months.	3'42 months.	2'44 months.	3'38 months.	2'64 months.	4'87 months.

Tenders.

Addressed postcards on which lists of tenders may be stated will be sent post free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Fetter Lane, E.C.

Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Bournemouth.—For the erection of a house in Flag Head Road, Canford Cliffs, for Mr. W. Hamilton Thompson. Mr. P. Sturdy, architect, 4, Clarendon Buildings, Bournemouth:—

W. E. Jones & Son ... £1,938
J. Nichol, * Southampton ... 1,698
* Accepted.

East Ham.—For the erection of scarlet-fever and laundry blocks, porter's lodge, &c., on their isolation hospital site at Boundary and Roman Roads, for the East Ham Town Council. Mr. Adam Horsburgh Campbell, M.I.C.E., borough engineer:—

D. Parkins, Luton ... £8,807 0 0
S. E. Moss & Co., Southend ... 7,444 10 0
W. Harris, North Woolwich ... 7,200 0 0
A. E. Symes, Stratford ... 7,065 0 0
F. A. Willmott, Ilford ... 6,982 0 0
W. J. Maddison, Canning Town ... 6,808 0 0
H. Pilgrim Grays ... 6,750 12 0
Wallis & Sons, Maidstone ... 6,684 0 0
A. Bothwell, Canning Town ... 6,675 0 0
[Borough engineer's estimate, £6,988.]

Hereford.—For alterations and additions to Breinton Manor House, near Hereford. Messrs. Groom & Bettington, architects and surveyors, Hereford:—

H. Smith, Kidderminster ... £1,674 0 0 ... £34 ... 1,708 0 0
W. Rowberry ... 1,649 6 3 ... 40 ... 1,689 6 3
W. Powell ... 1,597 0 0 ... 28 ... 1,625 0 0
W. Bowers & Co. ... 1,498 0 0 ... 22 ... 1,520 0 0
C. Cooke ... 1,470 0 0 ... 20 ... 1,490 0 0
R. L. Friend ... 1,407 0 0 ... 25 ... 1,432 0 0
W. C. Bolt ... 1,400 0 0 ... 25 ... 1,425 0 0
E. W. Wilks* ... 1,380 0 0 ... 45 ... 1,425 0 0
* Accepted subject to modifications. [Rest of Hereford.]

London, W.C.—For extension of the British Museum, for H.M. Office of Works, &c.:—

First Contract.

J. Appleby & Sons ... £58,289 ... £10
Holliday & Greenwood ... 53,777 ... 68
J. Thompson & Co. ... 52,904 ... 37
B. E. Nightingale ... 49,029 ... —
W. Lawrence & Son ... 48,589 ... —
Martin, Wells & Co. ... 47,500 ... —
H. L. Holloway ... 47,474 ... 108
J. & M. Patrick ... 47,227 ... —
Sabey & Son ... 46,840 ... —
W. Downs ... 46,800 ... 30
E. Lawrence & Sons ... 46,650 ... 25
J. Parnell & Son ... 46,447 ... 26
Muirhead, Greig & Matthews ... 46,370 ... —
Spencer, Santo & Co. ... 45,987 ... 30
Foster & Dicksee ... 45,945 ... 50
McCormick & Sons ... 45,885 ... 20
J. Allen & Sons ... 45,850 ... —
Patman & Fotheringham ... 45,823 ... 100
A. Hudson & Co. ... 45,410 ... 16
W. S. Shepherd & Co. ... 45,184 ... 50
Dove Brothers ... 44,895 ... 10
F. Gough & Co. ... 44,800 ... 30
W. Willett ... 44,700 ... 21
D. R. Paterson ... 44,413 ... 57
J. E. Johnson & Son ... 44,226 ... 38
Leslie & Co. ... 43,988 ... —
G. Godson & Sons ... 43,914 ... 50
Killby & Gayford ... 43,836 ... 20
Higgs & Hill ... 43,644 ... 20
T. Rowbotham ... 43,580 ... 100
W. Johnson & Co. ... 43,560 ... 250
T. H. Kingler & Sons ... 43,411 ... 40
Holland & Hannen ... 42,698 ... —
J. E. Wallis & Sons ... 42,340 ... 60
F. & H. F. Higgs ... 41,600 ... —
J. Mowlem & Co. ... 40,450 ... 58
J. Smith & Sons ... 40,150 ... —
J. Chessum & Sons ... 39,700 ... 10
Holloway Brothers ... 39,480 ... —
C. Wall, Ltd.* ... 37,500 ... 20
A.—Allowance for old material. * Accepted.

Paignton.—For the erection of St. Andrew's schools, for the Trustees. Messrs. E. Appleton & Son, architects. Quantities by Mr. C. S. Sewell Appleton:—

Yeo & Sons, Torquay ... £1,561
Narraott, Stoke Gabriel ... 1,468
Webber & Sons, Paignton ... 1,450
E. Pike, Torquay ... 1,368
H. Drew, Paignton ... 1,345
Bovey & Son, * Torquay ... 1,290
Jackman, Torquay ... 1,270
* Accepted.

St. Columb Major.—For laying-out a new cattle market. Mr. Lewis Stevens, surveyor, Newton Abbot:—

Section No. 1.—Laying-out cattle market.
H. Bennallack, Friage, St. Columb ... £1,700 0 0
W. E. Bennett, Bodmin ... 1,417 0 0
Parker Brothers, Newton Abbot ... 1,326 0 0
J. Collier, Truro ... 1,292 8 0

Section No. 2.—Ironwork for fittings and pens, &c.
D. Rowell & Co., Westminster ... 690 0 0
J. Collier ... 569 4 0
Boulton & Paul, Norwich ... 540 4 7
W. E. Bennett ... 531 0 0
T. S. Harding & Sons, Torquay ... 489 2 7
J. Lysaght, Ltd., Bristol ... 476 7 3
W. J. Powell, St. Columb ... 462 10 5
Hill & Smith, Brierley Hill ... 422 18 10
W. Gratrix & Sons, Walkden ... 338 19 10

Selly Oak.—For the extension of King's Norton Union Infirmary and the erection of new nurses' home at Selly Oak, near Birmingham. Messrs. C. Whitwell & Son, architects, Birmingham:—

W. Bishop ... £36,777
T. Burslem & Sons ... 36,626
T. Loud & Sons ... 36,000

T. A. Cole & Son ... £36,000
W. Sapcote & Sons ... 35,887
T. Bowen & Son ... 35,690
G. E. Jackson ... 35,230
J. Dallow ... 33,658
B. Whitehouse & Sons ... 33,363
W. H. Gibbs ... 33,150
W. Moss & Sons ... 32,325
T. Johnson, * Great Brook Street, Birmingham ... 31,937
* Accepted subject to approval of Local Government Board.

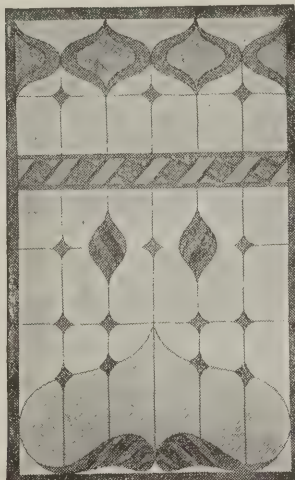
Sligo.—For the erection of a new wing to the Ursuline Convent. Mr. P. J. Kilgallon, architect, Abbey Villa, Sligo:—
D. McLynn, Sligo ... £3,557

J. Clarence, Balisodara, Sligo ... £2,800
C. Conolly, Sligo ... 2,650
J. Hughes, * Temple Street, Sligo ... 2,625
* Accepted.

Sunderland.—For the erection of the New Empire Theatre. Messrs. W. & T. R. Milburn, architects, Sunderland:—

W. Nicholson, Newcastle ... £21,681
A. Pringle, Gateshead ... 21,461
W. B. Cooper ... 21,247
T. Lumsden, Jarro ... 21,200
D. & J. Ranken ... 21,000
J. Huntley ... 20,910
S. Easton, Newcastle ... 20,400
J. W. White* ... 20,183
* Accepted. [Rest of Sunderland.]

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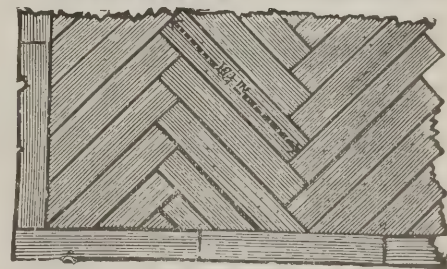
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17 1/2 x 3 x 2	8 3	7 9	
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**VIGERS BROTHERS,
TIMBER MERCHANTS,**

Only Address—67, KING WILLIAM STREET, E.C.

Telephone Nos. 601 and 602 Avenue.

(Continued from p. 199.)

May 1. London, N.—Hot-water heating apparatus for Pavilion No. 1 at the Northern (Convalescent) Fever Hospital, Winchmore Hill, N., for the Metropolitan Asylums Board, in accordance with drawings and specification prepared by W. T. Hatch, M.I.C.E., M.I.M.E., engineer-in-chief. Drawings, specification, conditions of contract and form of tender may be inspected at the Office of the Board, Embankment, London, E.C., and obtained upon payment of a deposit of £1. Tenders, addressed as noted on the form, must be delivered at the Office of the Board not later than 10 a.m. on May 1.

May 16. Brussels.—Railway plant. For the construction of the Jodoigne to Esmael section of the local railway from Jodoigne to Tirlemont and St. Trond, and of buildings and roads in connection therewith. The estimated cost is 401,000 fr. (£16,040), and a deposit of 40,000 fr. (£1,600) is required. A copy of the specification may be obtained on payment of 1 fr. from M. Darveville, rue de Turquie, No. 18, Saint Gilles, Brussels. Tenders, in sealed envelopes, should be addressed to the General Manager, Société Nationale des Chemins de Fer Vicinaux, 14, rue de la Science, Brussels.

May 23. Brussels.—Railway plant. For the construction of the Gembeles to Graide section of the local railway from Rochefort to Wellin and Graide. The estimated cost is 205,000 frs. (£8,200), and a deposit of 20,000 frs. (£800) will be required. A copy of the specifications may be obtained for 1 fr. from M. Rigot, rue Lucien-Namèche, 39, Namur. Tenders, in sealed envelopes, should be addressed to the General Manager of the Société Nationale des Chemins de Fer Vicinaux, 14, rue de la Science, Brussels.

May 23. Bristol.—Electrically-driven hydraulic pressure pumps. Erecting in the existing engine-house, Underfall Yard, testing and maintenance for twelve months after completion, of three sets of electrically-driven hydraulic pressure pumps. Each set is to be capable of delivering 150 gallons of water per minute against an accumulator pressure of 750 lbs. per sq. in. The contract includes the pumping machinery, and also the electro motors and accessories, and gearing for driving the pumps. On and after Thursday, April 12, copies of the specification, form of tender, form of contract and copies of contract drawings can be obtained from W. W. Squire, Engineer's Office, Cumberland Road, Bristol, on production of a receipt from the secretary of the Docks Committee showing that £5 has been paid as deposit. Tenders must be enclosed in a sealed envelope, endorsed "Tender for Electrically-driven Hydraulic Pressure Pumps," and addressed to the Secretary of the Docks Committee, 19, Queen Square, Bristol, and must be delivered to him, accompanied by the prescribed documents, before 10 a.m. on May 23.

June 2. London, N.—Supply and erection of a refuse destructor complete in all respects, for the Southgate U.D.C. Copies of the specification and full particulars may be obtained from C. G. Lawson, C.E., surveyor to the Council, on depositing a Bank of England note for £5 with him. Sealed tenders, endorsed "Tenders for Refuse Destructor," must reach W. M. Ellener, clerk to the Council, Council Offices, Palmer's Green, London, N., not later than June 2.

IRON AND STEEL.

April 18. London, S.W.—Supply of the following materials for the Secretary of State for India:—Rails and fishplates, fishbolts, spikes. The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W., and tenders are to be delivered at that office by 2 p.m. on April 18.

April 23. Sofia.—Steel nails, switching apparatus, bolts, &c., for the State Railway Directorate, Sofia, by whom tenders will be received up till April 23.

April 23. Belfast.—Supply of about two tons of best rolled steel girder tramway rails, with fish plates and bolts to suit, for the Harbour Commissioners. The section of the rail may be obtained from the harbour engineer, W. Redfern Kelly. The rails, &c., must be weighed on one of the Harbour Commissioners' weighbridges at the contractor's expense, and delivered on the county Antrim side of the harbour where pointed out. Sealed tenders, stating time of delivery, to be endorsed "Tender for Rails, &c.," and addressed to W. A. Currie, secy., Harbour Office, Belfast, by April 23.

April 24. London, E.C.—Supply of the following materials, for the Burma Railways Co., Ltd.:—(a) 8,176 tons steel rails, 60 lbs. per yd., and 425 tons fish plates; (b) 81 tons fishbolts; (c) 275 tons wrought-iron spikes. Specifications and form of tender may be obtained at the Company's Offices, 199, Gresham House, Old Broad Street, E.C. For each specification (a), (b) and (c) a fee of £1 will be charged, which will not be returned. Tenders, enclosed in sealed envelopes, and marked "Tender for Rails and Fish Plates," or as the case may be, must be delivered to A. G. Begbie, managing director, not later than noon on April 24.

April 30. Dublin.—Motor car shed 133ft. long by 44ft. wide of galvanized corrugated iron, &c., with steel principals at the Amiens Street Terminus, Dublin, for the Great Northern Railway Co. (Ireland). Parties wishing to tender for the work can see the drawings and specifications at the office of W. H. Mills, engineer-in-chief, Amiens Street Terminus, Dublin, or copies of them at the office of the District Engineer, Belfast, and forms of tender can be obtained at either of the above-mentioned places on payment of 1s. each (not returnable). Tenders made out on the forms supplied by the company, and endorsed "Tender for Motor Car Shed," should be delivered to T. Morrison, secy., Secretary's Office, Amiens Street Terminus, Dublin, not later than 10 a.m. on April 30.

May 16. Ploeshti.—Cast-iron pipes. For the supply of 16,200 metres cast-iron pipes of 500 to 200 millimetres for principal water conduits, and of 31,500 metres cast-iron pipes of 150 to 80 millimetres for secondary water conduits. A deposit equal to 5 per cent. of the value of the tender is necessary. Specifications may be obtained at the Mayorality, price 10 fr. Tenders to be sent to the Mayorality, Ploeshti, by May 16.

PAINTING AND PLUMBING.

April 12. Pontypridd.—Painting and decorating Peniel Calvinistic Methodist Chapel, Pontypridd, for the Trustees. Specification may be seen with Rev. W. Lewis, The Grove, Pontypridd. Sealed and endorsed tenders to be delivered to R. A. Lewis, Lloyd's Bank, Pontypridd, on or before noon of April 12.

April 12. Manchester.—Cleaning, painting and decorating the Municipal School of Art, Cavendish Street. Specifications may be obtained at the Municipal School of Technology, Sackville Street, Manchester, on a deposit of £1 1s. Tenders, addressed to the Chairman of the Education Committee, must be delivered at the Municipal School of Technology, Sackville Street, Manchester, not later than April 12.

April 12. Belper.—Painting at the Isolation Hospital. Specification can be seen on applying to the Matron at the Hospital. Tenders to be sent to Joseph Pym, clerk, Belper, not later than April 12.

April 12. London, S.E.—Cleaning and painting work at Newington Workhouse, Westmoreland Road, Walworth, S.E., for the Southwark Guardians. The specification can be seen and all information obtained at the offices of the Master of the Workhouse as above, between the hours of 10 and 4. Tenders, endorsed "Cleaning and Painting Work" should be addressed to the Guardians and delivered at the Union Offices, John Street West, Blackfriars Road, S.E., by 4 p.m. on April 12. Fair wages clause.

April 12. Warrington.—Painting part of the outside wood and ironwork at the Lancashire County Asylum. Persons desirous of tendering must measure up the work themselves, between 9 and 12 a.m. and 2 to 5 p.m. on any of the following days—the 28th, 29th and 30th inst. Tenders must be made up on forms, which can be obtained from H. Ellis, clerk, and must be delivered at the Asylum not later than 8 a.m. on April 12, addressed to "The Chairman," and endorsed "Tender for Painting."

April 12. Winchfield.—Supply of 5 tons of sheet lead (5 lbs. to the foot), carriage paid, to the Workhouse. Tenders, marked "Tenders for Lead," must reach W. H. Wright, clerk to the Guardians, Odiham, Hants, not later than 9 o'clock on April 12.

April 14. Barnstaple.—Painting the exteriors of the Albert Hall, Corn Market and Messrs. Bird's premises, for the U.D.C. Specifications may be seen at the office of Arnold Thorne, borough surveyor. Tenders, endorsed "Painting Albert Hall," will be received at the Town Clerk's Office on or before April 14.

April 17. Shrewsbury.—Supplying and fixing eleven slipper baths, with h. and c. water, supply pipes and valves, showers, waste pipes, &c. Specification and plan may be seen and printed form of tender and bill of quantities obtained at the office of the Borough Surveyor, on payment of £1. Sealed tenders, endorsed "Slipper Baths," to be addressed to W. Chapple Eddowes, borough surveyor, Borough Surveyor's Office, The Square, Shrewsbury, before 10 a.m. on April 17.

April 18. Macclesfield.—Outside painting to the north front of the main asylum buildings. Specifications and forms of tender (with copy of fair wages clause annexed) can be obtained on application to H. Beswick, county architect, Chester, and tenders must be endorsed "Tender for Outside Painting" and sent to A. C. Procter, clerk to Committee of Visitors, 23, King Edward Street, Macclesfield, by April 18.

April 19. London, N.—Whitewashing, &c., at the infirmary, Highgate Hill, N., in accordance with specification and conditions of contract, copies of which may be obtained on application to the Steward there between 8.30 a.m. and 5 p.m., up to April 15. Tenders must be sealed up, addressed to the Guardians, and delivered at the Guardians' Offices, St. John's Road, Upper Holloway, N., not later than 4 p.m. on April 19, endorsed "Whitewashing."

April 21. Blaydon.—Painting and colouring the following schools during the Midsummer recess:—Dunston Council, Swolwell Council, Martey Hill Colliery Council, Blaydon Council (Boys' and Girls' Department) High Spen Council. Specifications and forms of tender, to be returned not later than April 21, may be obtained from I. George Maguire, 7, Wallace Terrace, Ryton-on-Tyne.

ROADS AND CARTAGE.

April 12. Gravesend.—Supply of the following road materials:—Basalt or Penlee Elvan stone, Cherbourg quartzite, best pressed Staffordshire blue bricks, Penmaenmawr granite, and Kentish ragstone chippings. Specification, form of tender and all other information may be obtained on application at the office of the borough surveyor, F. T. Grant, Town Hall, Gravesend. Sealed tenders, which will only be received on the form supplied, endorsed "Tender for the Supply of—," must be delivered at the Town Clerk's Office not later than April 12, with samples of the materials which it is proposed to supply.

April 13. Helston.—Steam-roller, scarifier, stone-crusher, water-cart and living-van for the R.D.C., as follows:—One 10-ton compound steam road-roller (convertible into a traction-engine if required, but the Council do not now invite tenders for traction wheels) with all necessary tools, together with a winding drum and wire rope; a road scarifier such as would be usually affixed to a 10-ton roller as aforesaid; a portable stone-crusher with all necessary belts and tools. Parties tendering for the supply of this machine should quote for machines of the following size at the mouth, viz.:—16ins. by 9ins., 14ins. by 8ins., 12ins. by 8ins., and should also give the weight of each machine, the width of wheels of which should not be less than 6ins.; a water-cart to contain about 200 gallons; a travelling or living-van for two men, complete with all and every necessity for immediate use. Tenders, with copies of the specification of each kind of machine, van or cart tendered for, should be sent to A. E. Ratcliffe, clerk of the Council, Helston, by April 13.

April 14. Sutton Bridge.—Supply of the following road materials, for the U.D.C.:—XX granite, 202 tons; X granite, 81 tons; 1½in. slag tailins, 186 tons; granite chips, 40 tons; paving sand, 20 tons; shingle, 170 yds.; 1½in. ballast, 82 tons; Wansford stone, 80 yds. Tenders, marked "Tenders for Road Material," to be sent to L. C. Harvey, clerk to the Council, Holbeach, Sutton Bridge, by April 14. Samples to be sent to the Surveyor, Oddfellows' Hall, Sutton Bridge. No form of tender supplied.

April 17. Chelmsford.—Granite and team labour for the Town Council, as follows:—Granite: 1,500 tons of granite (more or less as the Council may require), uniformly broken to a 1½in. gauge, to be delivered either at the Chelmsford Station of the Great Eastern Railway, or on to the wharf of the Chelmer and Blackwater Navigation Co., Springfield, near Chelmsford. Tenders to state prices for contracts for periods of one, two and three years; team labour, for the period ending 25th March, 1907. The contractor will be required to water such of the roads within the district, and also to do any carting that may be required at such times as the Borough Surveyor may direct, and provide horses, harness and men necessary for that purpose, the carts being provided by the Council. Tenders must state price per day. Should it be necessary for the contractor to provide a cart, gd. a day will be allowed for the same. The contractor will be paid for the time actually worked on the roads, whether a full day or not. Further information may be obtained of Cuthbert Brown, borough surveyor, 16, London Road, Chelmsford. Tenders, endorsed "Tender for Granite" (with samples of granite) or "Team Labour," to reach the Town Clerk's Office by noon on April 17.

April 18. Denton.—Forming, sewerage, draining, ballasting, kerbing and other work required in the extension of Acres Street. Plans, specifications, &c., may be seen and bills of quantities obtained at the office of E. Garside on payment of a deposit of 10s. Sealed tenders, endorsed "Tender for Acres Street," to be delivered to Edward Garside, A.M.I.C.E., Town Hall Chambers, Ashton-under-Lyne, not later than April 18.

April 19. Bromley.—Tar paving about 1,650 yds. super.; breaking-up and re-topping about 3,160 yds. super.; and re-topping about 2,824 yds. super., in accordance with the specification prepared by the Borough Engineer. Materials to consist of Kentish limestone, and to be manufactured within twenty-five miles of Bromley. Specification and form of tender may be obtained on payment of 10s. 6d. at the Town Clerk's Office. Tenders, endorsed "Tar Paving," must be delivered to F. B. Norman, town clerk, Bromley, Kent, not later than 3 p.m. on April 19.

April 19. Houghton-le-Spring.—Supply of machine-broken blast furnace slag and slag riddings. Full particulars as to quantity, quality, dimensions and places and times of delivery, with forms of tender, may be obtained from the surveyor of the Council, D. Balfour, M.I.C.E., Houghton-le-Spring, R.S.O. Sealed tenders, addressed to the Chairman of the Highways Committee, R.D.C. Offices, Houghton-le-Spring, R.S.O., endorsed "Tenders for Road Material," to be sent not later than 10 a.m. on April 19.

April 20. Ripon.—Team labour for the R.D.C., for the period of twelve months. For full particulars, see posters, and for forms of tender apply to the surveyor, J. W. Plewes, 16, Ure Bank Terrace, Ripon. Tenders, marked "Team Labour," to reach Charles F. P. Edmundson, clerk to the Council, Ripon, not later than April 20.

April 20. Preston.—Levelling, paving, flagging, channelling and making good Great Townley Street, Dunderdall Street, Cave Street, Redmayne Street, Samuel Street, Lowndes Street and Emmanuel Street. Plans, sections and specifications may be seen and schedule of quantities and forms of tender obtained at the office of the Borough Surveyor, Town Hall, Preston, to whom sealed tenders, endorsed "Tender for Paving, &c.," must be delivered not later than noon on April 20. Fair wages clause.

April 21. Harrow-on-the-Hill.—Making-up the following private streets:—Butler Road (part 2), Vaughan Road (part 2), Merivale Road, Bowen Road, Heath Road, Alma Road, Alma Crescent and Waldron Yard. Drawings may be seen and specifications, quantities and forms of tender obtained from J. Percy Bennetts, engineer and surveyor to the Council, on a deposit of a £5 Bank of England note. Sealed tenders, on the forms supplied, endorsed "Private Street Works," to reach John Strachan, clerk to the Council, by April 21.

April 21. Oakham.—Supply of granite and slag, for the R.D.C., as follows:—Ashwell, 680 tons granite, 30 tons slag; Ketton, 505 tons granite, 30 tons slag; Luffenham, 200 tons granite, 40 tons slag; Manton, 422 tons granite, 30 tons slag; Oakham, 2,505 tons granite, 500 tons slag; Stamford, 175 tons granite; South Witham, 805 tons granite; Whissendine, 330 tons granite, 50 tons slag. The material is to be delivered free of charge and at the contractor's risk, in such quantities and at such times as the Council shall from time to time require. The contractors will be paid quarterly. Forms of tender, with specifications and conditions of contract may be obtained at the Clerk's Office, Catmose Street, Oakham. Samples, addressed to the Board-room, Oakham, are to be delivered free, not later than April 21. Sealed tenders, marked "Materials," are to be delivered at the Clerk's Office not later than 4 p.m. on April 21.

April 21. Oakham.—Team labour required in the repair and maintenance of the highways and main roads in the rural district. Tenders may be sent in for the whole or any part of the team labour. Forms of tender, with conditions of contract, may be obtained at the Clerk's Office in Oakham. Sealed tenders, marked "Team Labour," are to be delivered to William Batts, clerk to the R.D.C., Catmose Street, Oakham, not later than 4 p.m. on April 21.

April 23. South Moor.—Execution of works in the formation of several private streets, for the Stanley U.D.C. Plans, sections and specifications may be seen and quantities and forms of tender obtained from J. Routledge, surveyor, Council Offices, Stanley, on the 11th, 16th, and

23rd instants, between 10 a.m. and 3 p.m. Sealed tenders, endorsed "Street Works," to be sent to John G. Ridley, clerk to the Council, Stanley, R.S.O., by April 23.

April 23. London.—For the following paving work, for the Corporation, according to the specifications to be seen at the office of the Engineer to the Corporations where forms of tender may be obtained:—Carriageways to be paved with asphalt: London Wall (Moorgate Street to Blomfield Street), Cheapside (Ironmonger Lane to Newgate Street), Finsbury Pavement, Moorgate Street (London Wall to Telegraph Street), Kingham Street, Beech Lane, Aldermanbury Avenue. Footways to be paved with asphalt: Finsbury Pavement (west side—Short Street to Ropemaker Street), Billiter Street (half east side), Farringdon Street (Ludgate Circus half-way to Plumtree Court), Ludgate Circus (N.E. and S.E. Quadrants). Carriageways to be paved with wood: Old Bailey, Plumtree Court, Finsbury Circus (Circus Place to West Street), Goddard Street (St. Paul's Churchyard to Knightbridge Street), West Smithfield. Carriageways to be paved with stone: Dowgate Dock, Bush Lane, Little Bush Lane. Footways to be paved with stone: West Smithfield, west side (Giltspur Street to Long Lane), London Wall (Moorgate Street to Blomfield Street), Farringdon Street (both sides from the end of the asphalt to Plumtree Court), Billiter Street (half east side). Maintenance.—Carriageways: Lawrence Lane, Milk Street (north end) Milk Street (south portion), Wood Street (Gresham Street to Cheapside), Wood Street (Gresham Street to Adde Street), Friday Street (Cannon Street to Knightbridge Street), Broad Street (Watling Street to Queen Victoria Street), Bucklersbury (Cheapside to Queen Victoria Street), Carter Lane (west of Creed Lane), Dorset Buildings, Aldermanbury Postern, Jewin Crescent, Fore Street Avenue, Moorfields, Ropemaker Street, Moor Lane, South Place, St. Helen's Place, Devonshire Street and Square, Duke Street, Aldgate, Goring Street, Catherine Wheel Alley, Ellison Street, Sandy's Row, Whittington Avenue, London Street, Cornhill, Throgmorton Street. Footways: Mason's Avenue, Redcross Street (west side), Edmund Place, Throgmorton Street, Bucklersbury (Queen Victoria Street to Walbrook), Old Jewry, Chapel Place, Nicholas Lane, Ingram Court, Fenchurch Street, Bell Yard, Gracechurch Street, Hart Street and Crutchedfriars. Tenders must be on the before-mentioned forms, and must be addressed Town Clerk, Public Health Department, and delivered at the office of the Hallkeeper, Guildhall, between 12.30 and 1.30 p.m. on April 23.

April 24. Desborough.—Supply of about 300 tons of granite, delivered at Desborough Station, Midland Railway, for the U.D.C. Forms of tender may be had on application to D. J. Diver, surveyor, to whom samples are to be sent. Tenders, endorsed "Tender for Granite," are to be delivered at the Surveyor's Office by April 24.

April 27. Rawdon.—Supply of the following road-metal, broken and unbroken, during the year ending Mar. 31, 1907 to be delivered at Yeaton Railway Station as and when required by the U.D.C.:—Whinstone macadam; granite macadam; dark blue limestone macadam; dark blue limestone macadam, unbroken. Sealed tenders, marked outside "Road Metal," must be delivered by post or otherwise to John H. Pratt, Royal Bank, Rawdon, by April 27.

May 24. Aldershot.—Granite for the U.D.C. For the supply, free on rail at either the London and South Western Railway or South Eastern and Chatham Railway Stations, Aldershot, of 1,300 ft. run of 12 in. by 6 in. dressed, flat, granite kerbing, and 1,000 ft. of 12 in. by 6 in. Kemton or blue pennant channelling all in lengths of not less than 33 in. by 6 in. Tenders, endorsed "Kerb and Channelling," stating the price per foot of each material, to be sent to F. C. Uren, district surveyor, Aldershot, on or before April 24.

SANITARY.

April 16. Motherwell.—Proposed outfall sewer from Orbiston Street to Todhole Burn, for the Town Council. Providing and laying of about 275 lineal yds. of 18 in. fire-clay pipes and about 1,480 lineal yds. of 15 in. fireclay pipes, together with the construction of the necessary manholes, &c. Drawings and specification may be seen at the Burgh Engineer's Office, Town Hall, Motherwell, where copies of the schedule may be had on payment of 2s. Sealed tenders, marked "Outfall Sewer to Todhole Burn," must be lodged with James M'Callum, engineer, Town Hall, Motherwell, not later than noon on April 16.

April 23. Blackburn.—Erection of a sewage pumping station at Witton Eyes, within the borough of Blackburn. Specification, bill of quantities and form of tender may be obtained at the Engineer's Office. Sealed tenders, properly endorsed, to be delivered to William Stubbs, A.M.I.C.E., borough and water engineer, Municipal Offices, Blackburn, not later than noon on April 23.

April 23. Macroom.—Construction of sewerage works in accordance with plans and specification prepared by A. W. Barnard, C.E., to be seen at the Clerk's Office. Sealed tenders, addressed to the presiding chairman, and containing the names of two solvent sureties willing to enter into a bond with the contractor for double the amount, of the contract for the due and faithful fulfilment of same, to be lodged in the tender box in the Council Office up to 4 p.m. on April 23. A sum of £10 in cash to be lodged with each tender, which will be returned on completion of the bond.

April 23. London.—Destroying and filling-in disused sewer in Finsbury Pavement (between London Wall and West Street) according to specification and plan to be seen at the office of the Engineer to the Corporation, Guildhall, where forms of tender may be obtained. Tenders must be on the before-mentioned forms, and must be addressed Town Clerk, Public Health Department, and delivered at the office of the Hallkeeper, Guildhall, between 12.30 and 1.30 on April 23.

April 25. St. Columb Minor.—Construction of sewers, from 7 ins. to 6 ins. in diameter, with manholes, lampholes and other appurtenances, and for certain works in connection with the preparation of lands for sewage irrigation, for the R.D.C. The total length of sewer is

intended to be about 2,500 yds. General and detail drawings may be seen, the specification examined, and bills of quantities obtained at the office of the engineer, R. Hansford Worth, 42, George Street, Plymouth. All tenders must be delivered in sealed envelopes, endorsed "Tenders for St. Columb Minor Sewerage," accompanied by fully priced out and totalled bills of quantities, and addressed to Charles E. Whitford, clerk, Fore Street, St. Columb Major, Cornwall, by April 25.

April 30. Carlisle.—Sewage-disposal works. Contract No. 1: The erection and construction of pumping station, sedimentation tanks, filters, &c. Contract No. 2: Centrifugal pumps, motors, switchboards, &c. Contract No. 3: Sewage screens, elevators with motors. Parties desiring to submit tenders may inspect the drawings and conditions of contract and obtain specification, bills of quantities and forms of tender and other particulars upon application to H. C. Marks, city engineer, on deposit of the sum of £5 in the case of Contract No. 1 and £2 2s. in the case of each of the Contracts Nos. 2 and 3. Tenders must be on the official forms, and the printed instructions contained therein must be strictly complied with. Each tender, in a sealed envelope, together with the filled-up bill of quantities, must be endorsed "Tender for Sewage Works," and delivered to Henry C. Marks, M.I.C.E., city engineer and surveyor, 36, Fisher Street, Carlisle, not later than 10 a.m. on April 30.

April 30. Middleton.—Construction of three circular tanks, catchpits, conduits, &c., at the Sewage Outfall Works at Rhodes. Plans may be seen and specifications, quantities and form of tender (which includes a fair wages clause) obtained on and after April 5 by applying to W. Welburn, borough surveyor, Town Hall, between 9.30 and 10.30 a.m., on depositing £1 rs. Tenders, endorsed "Tender for Tanks," are to be addressed to the Chairman of the Surveyor's Committee, and delivered at the Town Clerk's Office on or before April 30.

May 2. Hayes.—Construction of 8 1/2 lineal yds. of 12 in. diameter and 156 lineal yds. of 9 in. diameter cast-iron pipe sewers, and 953 lineal yds. of 9 in. diameter glazed stoneware sewers, together with all necessary manholes and other contingent works, to be laid in Wood End Green, Angel Lane, Morgan's Lane, and Grange Road, within the said district. Drawings may be seen and specification, bill of quantities and form of tender obtained at the Surveyor's Office upon the deposit of the sum of £2. Sealed tenders, endorsed "Tender for Sewers," and addressed to "The Chairman of the Works Committee," must be sent in to C. Dudley-Lewis, clerk, Council Offices, Hayes, Middlesex, not later than 4 p.m. on May 2.

No date. Cienfuegos.—Construction of an aqueduct and sewerage works for the municipality. A public call for tenders will be made for carrying out a portion of these works at the upset price of—(1) aqueduct construction, 1,754,325 dollars (about £350,805); (2) sewerage works, 788,275 dollars (about £157,655), in accordance with plans which will be on view at the offices of the municipality when the date of the adjudication is announced. Tenders will be received for either or both of these works.

April 18. Wakefield.—Construction of main pipe sewers, together with the necessary manholes, and other appurtenant work; and also for disposal works for the treatment of the sewage at Walton, for the R.D.C. Plans and specifications may be seen and forms of tender obtained at the office of Frank Massie, M.I.C.E., on payment of £2 2s. Tenders, properly endorsed "Tender for Walton Drainage," to be delivered to H. Beaumont, clerk to the Council, Tetley House, 47, Kirkgate, Wakefield, not later than 10 a.m. on April 18.

TIMBER.

No date. London, E.C.—Australian hardwood. An Austro-Hungarian firm requires lowest quotation for and samples of blocks of Australian hardwood in dimensions of 9 by 3 by 4 English in., delivery to be effected not later than the end of April. For further particulars application should be made by letter to the Secretary, Austro-Hungarian Chamber of Commerce, 29, Martin's Lane, Cannon Street, E.C.

MISCELLANEOUS.

April 16. Wigan.—Supply of the following stores for the Gas Committee:—Wrought-iron tube and fittings; brass and copper tube and fittings; lead gas pipe; street lamps; merchant iron; shovels and coke forks; wood troughing and covering; galvanized stove pipe and connections; cast mains and connections; screw and retort bolts; galvanized buckets. Forms of tender may be obtained from J. Simmins, engineer, Gas Works. Tenders, sealed and endorsed with the name of the article tendered for, to be delivered to Harold Jevons, town clerk, Town Hall, on April 16. A sample of each article to be forwarded, addressed to the Gas Engineer.

April 23. Glasgow.—Supply of the following materials, for the Electricity Department:—Main cables; small cables and wires; electricity meters; and carbons for a period of twelve months. Copies of the specifications and forms of tenders may be obtained on application to W. W. Lackie, engineer, 75, Waterloo Street, Glasgow, on making a deposit of £2 for each specification. Sealed offers, marked "Electricity Department, Tender for—," and addressed to A. W. Myles, town clerk, City Chambers, Glasgow, by April 23.

April 30. Wolverhampton.—For the following works, for the Education Committee:—Painting of schools; building work in connection with the installation of heating apparatus, Willenhall Road School; asphalt and repairing playgrounds. Particulars and conditions may be obtained on application to T. H. Fleeming, architect to the Committee, 10, Queen Square, Wolverhampton. Tenders addressed to "The Chairman, Sites, Buildings and General Purposes Sub-Committee, Education Offices, Town Hall, Wolverhampton," must be received not later than April 30. Fair wages clause.

NEW LONDON BUILDINGS.

At yesterday's meeting of the London County Council the Building Act Committee reported the following applications under the London Building Act, 1894, their recommendations as to consent or refusal being appended in *italics*:—

Addition to the porch in front of No. 9, Cambridge Place, Victoria Road, Kensington, on the application of Totten & Willett, on behalf of Simpson, Rushforth & Co. (*Consent.*)

Retention of a projecting sign in front of No. 184, Brompton Road, Kensington, on the application of Boynton, Sons & Trevor, on behalf of Cox & Yeman, Ltd. (*Consent.*)

Iron and glass shelter in front of St. George's Hall, Langham Place, Marylebone, on the application of J. G. Buckle, on behalf of J. N. Maskelyne. (*Consent.*)

Porch in front of Nos. 33 and 35, Plumstead Common Road, Plumstead, on the application of F. J. Gurney, on behalf of the Plumstead Common Road United Conservative and Unionist Club. (*Consent.*)

Porches to five houses on the eastern side of Latchmere Road, Lavender Hill, on the application of W. L. Ingram, on behalf of J. Jenkins. (*Consent.*)

Retention of an iron and glass hood over the entrance to No. 22, West Kensington Mansions, North End Road, Fulham, on the application of Clarke & Co. (*Consent.*)

Buildings on the north side of Half Moon Lane, Dulwich, to abut also upon Holmdene Avenue, on the application of W. Graham, on behalf of the trustees of the late Henry Fisher. (*Refusal.*)

Dwelling-house and a one-storey office building on the western side of Harvey Road, Camberwell, southward of No. 6, with external walls at less than the prescribed distance from the centre of the roadway of the street, on the application of W. Smith. (*Consent.*)

Building on the southern side of Lamerton Street, Greenwich, with external walls at less than the prescribed distance from the centre of the roadway of the street, on the application of F. J. Gorham. (*Consent.*)

Retention of an iron and glass porch in front of No. 4, Addison Road, Kensington, on the application of E. K. Purchase, on behalf of A. du Cros. (*Consent.*)

Bringing forward of the frontage of No. 142, Piccadilly, and the erection of a porch and balcony in front of such building, on the application of Thurgood & Martin, on behalf of Miss A. de Rothschild. (*Consent.*)

Deviation from the plans approved on December 12th, 1905, for the erection of two glass and iron shelters at the Aldwych Theatre, to abut upon Aldwych and Drury Lane, Strand, so far as relates to an alteration in the construction of the shelter at the main entrance to the theatre, on the application of W. G. R. Sprague. (*Consent.*)

Extension of the period within which the erection of six houses and shops on the site of No. 174, Lavender Hill, and houses on the east side of Latchmere Road, Battersea, was required to be completed, on the application of W. L. Ingram. (*Consent.*)

Two iron and glass shelters at the Kennington Theatre, Kennington Park Road, Newington, on the application of McVeay & Co., on behalf of R. Arthur. (*Refusal.*)

Iron and glass shelter in front of Nos. 161A and 166, Strand, on the application of R. J. Worley, on behalf of The Colonnade, Ltd. (*Refusal.*)

Porch in front of No. 213, King's Road, Chelsea, on the application of D. Blow. (*Refusal.*)

Buildings on the site of Nos. 321 and 323, Oxford Street, to abut also upon Dering Street, on the application of Gordon & Gunton, on behalf of Hitchings, Ltd. (*Consent.*)

External wood and iron staircase at the rear of No. 13, Great James Street, Holborn, to abut upon Cockpit Yard, on the application of C. I. Jones, on behalf of G. Angold. (*Consent.*)

Buildings on the site of No. 11, Philpot Street, Stepney, to abut upon Nelson Street, on the application of E. H. Abbott, on behalf of C. Martin. (*Refusal.*)

New streets for carriage traffic on the Fairfield House estate, Tooting, to lead from Mitcham Road to Totterdown Street, and in connection therewith the widening of a portion of Mitcham Road, on the application of W. C. Poole, on behalf of Ayre & Kingcome. (*Consent.*)

Extension of the time within which the roadways of proposed new streets for carriage traffic out of the east side of Merton Road, Wandsworth, were required to have been clearly defined throughout by posts and rails or so otherwise as the Council should permit and thrown open to the public as highways, on the application of C. W. Braine, on behalf of the Wandsworth & Putney Gas Light & Coke Co. (*Consent.*)

Plans as amended on the application of H. Mair, on behalf of the Hammersmith Metropolitan Borough Council, for the construction of additions at the generating station, Fulham Palace Road, Hammersmith. (*Consent.*)

The Theatres and Music Halls Committee also reported the following:—

Extension of the period within which the erection of a music hall building on a site abutting upon the east side of High Street and north side of Limes Grove, Lewisham, was to have been commenced, on the application of W. Stephens. (*Consent.*)

Drawing submitted by Wylson & Long, showing certain alterations which it is proposed to carry out at the Oxford Music Hall with a view to preventing the gangways on each side of the stalls being used for standing room. (*Consent.*)

Drawing submitted by G. J. Earle, showing a proposal to extend the platform at the Queen's Park Hall, Harrow Road. (*Consent.*)

Drawing submitted by J. Jeffrey, showing the proposed construction of a room, to be used for postal purposes only, over the existing post and telegraph office at the Royal Agricultural Hall, Islington. (*Consent.*)

Current Market Prices

METALS.

	£ s. d.	£ s. d.
Standard Copper ... per ton	84 10 0	84 15 0
Do. Strong sheets...	do. 94 10 0	95 0 0
Lead, Soft Foreign...	do. 15 15 0	16 0 0
Do. English ...	do. 15 12 6	15 15 0
Do. pipes ...	do. 18 15 0	19 0 0
Do. sheets ...	do. 18 10 0	18 12 6
Galvanised Corrugated sheets ...	do. 12 7 6	12 10 0
Spelter G.M. ...	do. 25 10 0	25 15 0
Angles, Scotland...	do. 6 15 0	7 0 0
Bars ...	do. 7 15 0	8 0 0
Marked bars. Staffs ...	do. 9 0 0	—
Common bars do. ...	do. 7 5 0	7 10 0
Angles, M'boro. ...	do. 6 10 0	6 12 6
Joists do. ...	do. 6 7 6	6 10 0
Angles, Midlands ...	do. 6 10 0	6 15 0
Joists do. ...	do. 7 0 0	7 5 0
Girder plates, Midlands.	do. 7 15 0	8 0 0
Angles, Foreign, c.i.f. Thames ...	do. 5 18 0	6 0 0
Tees do. do. do. ...	do. 6 2 6	6 5 0
Joists do. do. do. ...	do. 5 12 6	5 15 0
Channels do. do. do. ...	do. 5 16 0	—
Nails, Wire do. do. ...	do. 9 10 0	—
Tin, Foreign ...	do. 175 0 0	175 0 0
Do. English ingots ...	do. 172 0 0	173 0 0
Zinc, sheets, Silesian ...	do. 27 0 0	—
Do. do. Vielle Montaigne	do. 27 5 0	—

TIMBER.

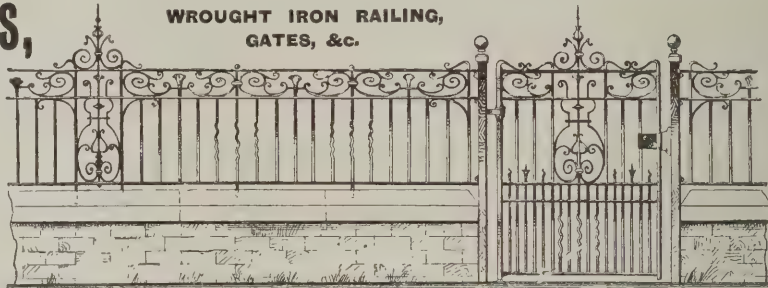
Soft Woods.

Fir, Dantzie and Memel ... per load	2 15 0	5 0 0
Pine, Quebec, Yellow ... do.	4 2 6	7 10 0
Do. Pitch, American ... do.	2 19 0	5 0 0
Laths, log, Dantzie ... per cu. fath.	4 0 0	6 0 0
Deals, Trangsund, Yellow, 1st & 2nd, 2½ x 7 ... per std.	9 5 0	—
Do. do. do. 1st & 2nd, 2½ x 7 ... do.	10 5 0	—
Do. Montreal, Red Pine, 1st, 4 x 7 ... do.	12 0 0	—
Do. do. Spruce, 3rd, 3 x 9 ... do.	9 10 0	—
Do. Archangel, White, 1st, 3 x 9 ... do.	12 5 0	—
Do. do. do. 2nd, 3 x 11 ... do.	11 10 0	—
Do. do. Yellow, 2nd, 3 x 9 ... do.	12 10 0	—
Do. do. do. 3rd, 3 x 9 ... do.	11 5 0	—
Do. Petschora, Yellow, 4th, 3 x 11 ... do.	9 10 0	—
Do. Nederkalix, Yellow, 2nd, 3 x 8 ... do.	9 5 0	—
Do. Gothenburg, Yellow, Unsorted, 2½ x 7 ... do.	9 10 0	—
Do. Ingramport, Yellow, Unsorted, 2½ x 7 ... do.	8 10 0	—
Do. Quebec, Spruce, 2nd, 3 x 9 ... do.	10 0 0	—
Do. do. do. 2nd, 3 x 7 ... do.	9 0 0	—
Battens, Lulea, Yellow, 2nd, 2½ x 6½ ... do.	8 5 0	8 10 0
Do. Gefle, Yellow, Unsorted, 2½ x 3 ... do.	8 5 0	—
Do. do. do. Inferior, 5th, 2 x 9 ... do.	8 10 0	—
Do. do. Yellow, 2nd, 2 x 7 ... do.	9 15 0	—
Do. Nederkalix and Lulea, Yellow, 2nd, 2 x 7 ... do.	9 5 0	—
Do. do. do. 2nd, 2 x 4½ ... do.	8 5 0	—
Do. Skelleftea, Yellow, Unsorted, 2 x 6 ... do.	9 0 0	—
Do. do. do. 2 x 5 ... do.	8 15 0	—
Do. do. White, Unsorted, 2 x 4½ ... do.	7 15 0	—
Do. Ingramport, Yellow, Unsorted, 2 x 7 ... do.	7 10 0	—
Do. Fredrikshamn, Yellow, Unsorted, 2 x 5 ... do.	8 0 0	—
Do. Trangsund, Yellow, 1st & 2nd, 2 x 4½ ... do.	8 5 0	—
Do. Christianssand, Yellow, Unsorted, 2 x 4 ... do.	8 10 0	—
Floorings, Skutskar, Yellow, 1st, 1 x 7 per square	0 11 9	—
Do. do. do. 2nd, 1 x 7 ... do.	0 11 0	—
Do. do. do. 2nd, 1 x 6 ... do.	0 10 6	—
Do. Gefle, Yellow, 1st, 1 x 7 ... do.	0 11 6	—
Do. do. do. 1st, 1 x 6 ... do.	0 11 0	—
Do. do. do. 1st, 1 x 5½ ... do.	0 10 6	—

Floorings, Hudikswall, Yellow, 2nd, 1 x 6½ per square	£ s. d. 0 11 0	£ s. d. —
Do. do. do. 3rd, 1 x 6½ do.	0 10 0	—
Do. Christiania, White, Unsorted, 1 x 4 do.	0 7 0	—
Do. Fredrikstad, Yellow, 3rd, 1 x 7 do.	0 9 3	—
Do. do. Yellow and White, 1 x 7 do.	0 7 6	—
Do. do. do. do. 7 x 6½ do.	0 7 9	—
Do. do. do. do. 1 x 6 do.	0 7 6	—
Floorings, Fredrikstad, Yellow and White, 1 x 5½ per square	£ s. d. 0 7 6	£ s. d. —
Do. do. do. do. 1 x 5½ do.	0 7 3	—
Do. do. do. do. 1 x 5 do.	0 7 3	—
Do. do. do. do. 1 x 5 do.	0 6 9	—
Do. do. do. do. 1 x 4½ do.	0 6 6	—
Do. do. Mixed Yellow, 1 x 5½ do.	0 8 9	—
Do. do. do. 1 x 5 do.	0 8 3	—
Do. do. do. 1 x 4½ do.	0 7 9	—

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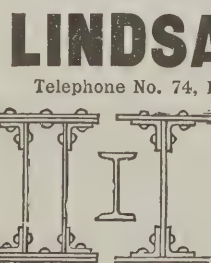
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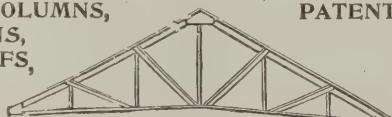
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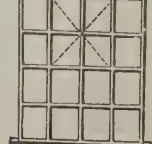
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THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD.

April 11th, 1906.

FIRE SUPPLEMENT (MONTHLY).

THE LONDON FIRE RECORD.

THE annual report on the London Fire Brigade for 1905, which was issued last week by the London County Council, makes interesting reading.

In the preface by the chief officer special attention is called to the fact that in almost every instance the lives lost by fire were due to carelessness and the lack of ordinary precautions against fire, such as fire-guards, &c., which apparently no efforts on the part of the fire brigade—after the call was received—could have minimized.

Attention is called to the fact that most of the serious fires in which the cause is described as unknown were probably due to spontaneous combustion, owing to the lack of proper iron receptacles for oily and general rubbish, which materials should always be kept separate.

It is pointed out that if the suggested amendment to the London Building Act as to prevention of the spread of fire, as proposed in the Council's Building Act Amendment Bill of 1905, were made law, the danger of large fires would be considerably minimized, and we certainly fully endorse this observation.

From our point of view one of the interesting features in the recent development of the fire brigade has been the attention accorded to the fire-preventive side. Theatres, lodging-houses, large factories, tube railways, certain Government property, and the like, now come under the inspection of the brigade's superior officers, who have been lately supplemented by several mechanical and electrical engineer assistants, who deal particularly with the engineer's aspect of the work.

With this increasing necessity for attention to the fire-preventive side, the number of superior officers must naturally be increased gradually, and the only point that we regret in the Council's recent policy is the veto put upon it from the Finance Committee as to the appointment of a further assistant divisional officer.

In the evolution of the brigade and the development of its resources everything certainly appears to be eminently satisfactory. The introduction of the motor steam fire-engine, the introduction of the soft long ladder and other modern appliances are steps in the right direction. As to the actual working of the brigade and its efficiency in tackling fires we have had occasion several times to record during the past year the very excellent work done under exceptional difficulties, and "stops" made which not only impressed those conversant with the subject at home but also abroad.

As to figures, the London Fire Brigade has now 75 land stations and 5 river stations. It has 78 land steam fire-engines, 2 motor steam fire-engines and 5 floats. There are 1,150 public fire-alarms available. The number of fires in 1904 was 64 serious and 3,447 slight fires; making together 3,511. Under the heading "serious" fires the follow-

ing points are considered, namely, the nature and approximate amount of damage, the surrounding risks, the class of stock, and estimated value, description of the building, hydrants and appliances at work, and loss of life. This, we believe, is a somewhat different classification to what has been common hitherto, when the classification we think was according only to the number of hydrants used.

As to the known causes of fire, 677 are described as due to lights thrown down. The summary of the causes of fire says that considerable attention is being paid to enquiring into the causes, for only 419 out of 3,511 fires are recorded as "cause unknown."

In examining the list of fires in detail we observe that there were 178 fires within the area of the City, and that of these 178, thirteen are classed serious. This means that about one-fifth of the serious fires of London occur in the City proper. The proportion of fires in the City area is too high.

POPULARIZATION OF FIRE-PROTECTION.

NOTHING could do more towards popularizing the subject of fire-protection than the series of Cantor lectures given by Prof. Vivian Lewes at the Society of Arts. These Cantor lectures, which are arranged under the terms of a bequest, were this year of a most exceptional character, and their only regrettable feature was the short duration of the time limit, namely, one hour, and the small number of lectures available, namely, only four. Supplemented by experiments, presented in a most entertaining manner, fire-protection would verily be a most popular subject if it always had such an excellent exponent as the learned professor.

Speaking generally, no one could but be in agreement with the Professor's arguments and their moral, but we think he was not quite in touch with modern fire-preventive practice when he generalized in his condemnation of fire-resisting buildings. It is popular in certain fire-service circles to scoff at faulty building construction, more particularly at that which goes by the misnomer of "fireproof," but there is no doubt about it that there are numerous modern forms of construction which are fire resisting to a very high degree, and which have stood both in experimental and in actual fire the severest tests of high temperature and severe flame. No better example could have been presented than those given in an earlier supplement of the fire at Glasgow, when the entire contents of a very large drapery business were entirely burnt out and yet the whole of the construction practically remained intact—concrete floors and all—so that only a certain amount of making good, refurbishing and painting was necessary to put the building into working order again.

Recent experiments have also shown that

the due observance of small matters of detail is frequently most effective in results in fire-resistance. Allowance of space for expansion, careful selection of aggregates, and similar small matters are essentials in fire-resisting construction. A general condemnation of concrete by Professor Lewes was thus scarcely in place, though a general condemnation of unsuitable concrete would have been quite apropos. Thames ballast concrete is notoriously inefficient as a fire-resistant; clinker and several other forms of concrete eminently serviceable.

In dealing with the question of fire-prevention we are, however, pleased to see that Professor Lewes pointed out the necessity of discriminating between the fire-resistance necessary in a villa or residential property as distinct from that in a warehouse or factory building. It is this lack of discrimination that has been so unfortunate in the development of fire-preventive methods, and we trust the classifications under the universal standards of "temporary protection," "partial protection" and "full protection," which has now found favour amongst those best conversant with the subject in Great Britain and on the Continent, as also in the United States, will do much to put an end to some of the old misnomers.

Lastly, one word on "flameproof" or "non-inflammable" wood. Professor Lewes devoted quite half of his last lecture to that subject. We have from the outset been strong advocates of the usefulness of properly prepared "flameproof" wood if thoroughly impregnated with suitable chemicals. We have also frequently pointed out the expense of using treated wood, as compared with non-treated wood, may be heavy if the one material *versus* the other be compared, but the expense on the total outlay on a building is small. It would be well if Professor Lewes's strong advocacy of this important question of the usefulness of flameproof wood obtained a wide hearing.

RAILWAY FIRES.

MENTION has been made twice during the past few weeks at the London County Council of fires on the electrified railways, namely, on the District and Metropolitan Railways.

We do not know if the rules of the Board of Trade are retrospective, *i.e.*, whether these useful regulations which are applied to new tube railways, and which have been most efficiently applied to the Baker Street and Waterloo Railway which has just been opened, are also brought into force for existing lines like the Metropolitan and District Railways. If not, some special legislation is necessary, for we are afraid that both these lines do not quite come up to modern ideas as to fire-protection, and we understand that even in the carriages of the Metropolitan Railway there is still a very considerable amount of ordinary woodwork, which is, of course, *ipso facto*, a grave error and a serious responsibility for the management.



FIRE AT ROBINSON'S WAREHOUSE, BRISTOL.

THE RECENT BRISTOL FIRE.

LAST year we had several times occasion to refer to the fires at Bristol and to there being something radically wrong in the fire-protection of that city. As far as we can make out, the extent of the large fires of last year was mainly due to lack of proper separation between individual risks, a separation which could have been easily effected under the existing regulations if these regulations had been enforced and had not been merely on paper.

We now have another fire to record, namely, that of Messrs. Derham's boot factory, involving considerable loss of property, disorganization of business, and throwing (according to the local press) about 500 people out of work.

Need for Reform.

A succession of fires of this description points only too plainly to the need of urgent revision of the fire-preventive arrangements, a re-modelling of certain building regulations, and a strict enforcement of the rules already available. It is indeed regrettable that so much property should be wasted, so much business disorganized and so many made workless when preventive methods should have done much to minimize the loss and perhaps have prevented it entirely.

As to the fire-brigade aspect of the question, this is scarcely within our scope, but it would certainly seem that a stronger brigade and heavier equipment in up-to-date appliances would not be inappropriate. Bristol is getting quite a bad reputation on this question of fires in its industrial districts, and we are afraid the insurance companies will soon have to raise their rates if this state of affairs continues.

Description of the Fire.

The location of this fire is easily explained from the accompanying plan. The structure does not perhaps lend itself for illustration for technical purposes as much as some of the

other Bristol fires we have illustrated, but one of the remarkable features in this case was the manner in which the fire spread to adjoining premises. The plan indicates how the sparks spread, and had it not been for various favourable circumstances Bristol might very well have had a great conflagration.

Another Bristol Fire.

Whilst referring above to the recent fires at Bristol we think we should also reproduce an illustration of a notable fire that occurred a few years back at Messrs. Robinson's warehouse in Victoria Street, Bristol. This was one of the worst burn-outs on record in Bristol and district, and the photographs very clearly show to what extent the premises were gutted. An interesting feature of one of the photographs is the protection afforded by certain iron doors, which, although apparently buckled, kept their position well.

The Building Act Amendment Bill is now receiving the careful attention of the Building Act Committee of the London County Council, and a draft may be shortly expected to be laid before that body.

The Milan International Fire Congress has been timed to open on May 28th, and the second day of the meeting will be devoted to a discussion on the question of the fire-resistance of reinforced concrete.

Mr. James Sheppard, A.I.E.E., one of our contributors and a member of the Executive of the British Fire Prevention Committee, has been awarded the gold medal "For Zeal" with the ribbon of St. Stanislaus, by His Imperial Majesty the Czar, the King having granted permission for this distinction to be worn.



FIRE AT ROBINSON'S WAREHOUSE, BRISTOL.

FIRE TESTS.

Impending Tests.

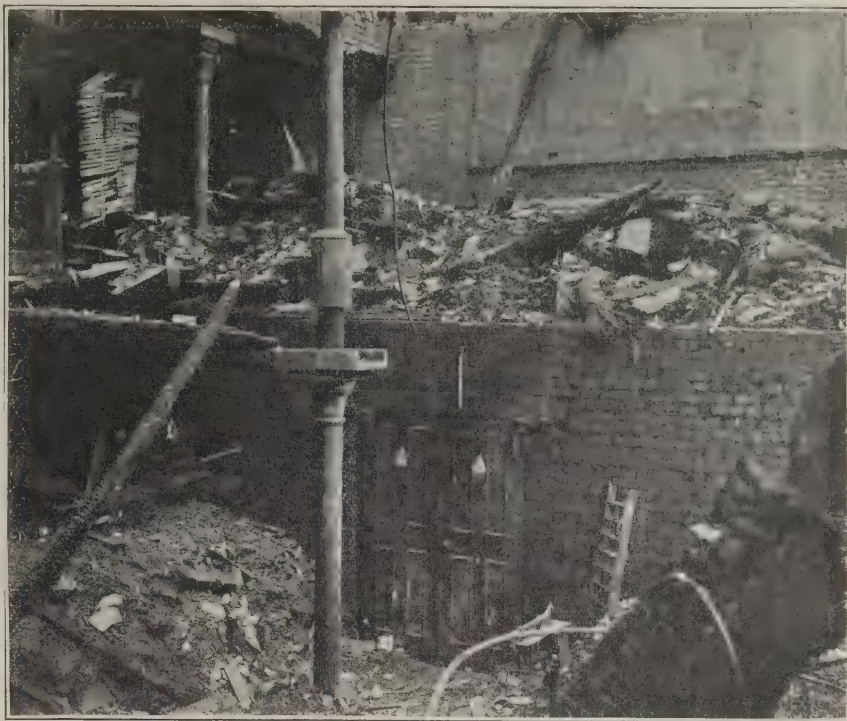
THE arrangements of the British Fire-Prevention Committee for tests during the current month include the testing of a reinforced concrete floor and a steel roller shutter to a window opening.

Regarding the reinforced concrete floor, this will be one on the Coignet system, and the section under test will measure 15ft. by 22ft. We understand it was the intention of the designers to plan this floor under fire office rules, thus protecting the steelwork with concrete to a greater extent than has been common practice up to the present. The concrete to be used is, we understand, slag concrete with "Ferrocete" cement. The test applied for is that of the "full protection," class B, namely, a four hours' test, followed by the application of water from a steam fire-engine for five minutes, the temperature to range above 1,800 degs. Fahr. The same designers put forward a floor some little time back, which was under test for three hours.

Regarding the roller shutters for window openings, we understand it is the "Kinnear" pattern of shutter that will be under test, put forward by Messrs. Arthur L. Gibson & Co. It is intended to afford protection to ordinary deal windows glazed with ordinary 32oz. glazing, and to show to what extent such shutters will afford protection to ordinary windows.

Impending Reports.

Regarding reports on tests completed, we understand that two reports on tests will be issued in the course of a few days, on the experimental tests with concrete floors supported by broad-flange girders, the floors being respectively of Thames ballast concrete and of clinker concrete, the broad flange girders having been provided by Messrs H. J. Skelton & Co. These reports will be issued simultaneously and are an important contribution to experimental work on the question of fire-resistance undertaken by the Committee.



AN IRON DOOR THAT HAS WITHSTOOD A SEVERE FIRE.

Later in the month we understand the report will be issued regarding the test which was recently undertaken with a floor of the New Expanded Metal Co., in which broken-brick concrete was used.

In May these reports will be followed by two reports on reinforced concrete floors on the Coignet system, in which—as mentioned above—in one instance slag concrete will be used, whereas in the previous instance we believe clinker-concrete was used.

The series of reports on floor tests with the different concrete aggregates should form a useful collection, and their particular advantage is that they are full-sized tests, as distinct from laboratory tests—that is to say, the smallest section of any of this concrete work measured 10ft. by 22ft.

IRON DOORS.

OUR attention has been called to the fact that although iron doors have many serious disadvantages owing to their great weight, which very often prevents their being closed when they ought to be closed, and owing to the lack of suitable fastenings and tendency to buckle, iron doors when really well constructed, well hung and with fastenings at several points, and if constructed with an air space intervening, are of considerable efficiency. We are illustrating one of the double doors to which our attention has been called where in a serious fire the fire doors kept well in position, and it is well to observe the manner in which they are hung and fastened.



FIRE AT DERHAM BROTHERS' BOOT FACTORY, BRISTOL.



PLAN OF RECENT BRISTOL FIRE AT DERHAM BROTHERS' BOOT FACTORY.

AUTOMATIC SPRINKLERS.

The Fire Offices Rules.

IN continuation of our series of Fire Office Rules we are now publishing the first part of the sprinkler rules which are issued by the Fire Offices' Committee; and we have taken the rules dated March, 1905, which is the eleventh edition, i.e., the eleventh variation of the rules in question, we believe.

The automatic sprinkler is now being installed in innumerable fire-risks, and not limited, as in its early days, merely to factories and mills. It is a matter of importance to all architects to be thoroughly conversant with the requirements of the Fire Offices in respect to these rules.

The economical advantage of the introduction of sprinklers is the very material rebate accorded by the fire-insurance companies for sprinkler risks, but if the architect is going to apply a sprinkler installation it is well that we should know exactly what is required in the early stages, for even in certain directions his design will be governed by some of the sprinkler requirements: thus, for instance, the all-important requirement of the height of the tank above the topmost sprinkler, a dimension which frequently necessitates the erection of a tower or turret for containing the tank in question.

As to the actual sprinkler to be used, quite a dozen sprinklers meet the requirements of the insurance offices, so that there is quite a considerable field to choose from. Of these certain sprinklers are considered to be worked by a ring or tariff of sprinkler manufacturers, whilst the others are made by new-comers outside the ring who are competing in prices.

As to the relative efficiency of the different sprinklers, it would lead too far to enter into detail here, but, speaking generally, of course, any sprinkler passed by the Fire Offices will obtain for the client the rebate that he requires, and there are at present no independent public reports as to the relative efficiency and usefulness of different sprinklers on the market in this country.

In one point there has been a notable result of investigation by the British Fire Prevention Committee, and that is that the temperatures stamped upon the sprinklers as indicating the temperature at which they will act are not necessarily reliable, and that such marked temperatures apparently relate to a hot-water test, which is a very different matter from the actual test in practice where the question of the conductivity of the pipes and the atmospheric conditions have to be taken into consideration. The architect will be quite safe in assuming that in actual practice a higher temperature is required to set the sprinkler going than that marked on some of the makes.

The rules for automatic sprinkler installations are as follows:—

FIRE OFFICES' COMMITTEE'S RULES.

As regards tanneries these rules do not apply to risks in Bermondsey and elsewhere on the south side of the River Thames within a radius of three miles of the Leather Market, Bermondsey.

Buildings to be Protected.

1. All the non-fireproof portions of any building fitted with automatic sprinklers (except silos or grain bins in corn mills) must be protected by sprinklers in manner hereinafter described, and, except as hereinafter provided, all the non-fireproof portions of every building communicating therewith otherwise than by double fireproof doors, or adjoining and not having a party-wall carried up to and through the roof, must also be so protected.

Corn Mills.—Silos or grain bins inside buildings which are otherwise efficiently protected by sprinklers in accordance with these rules need not themselves be protected by sprinklers.

2.—(a) When a sprinklered building communicates by any opening not protected by a fireproof door with an adjoining shed having a fireproof floor, in which non-hazardous processes, i.e., any process after spinning but not including drying by artificial heat, only are carried on, it is not required that such shed should be protected by sprinklers in all its parts provided that every such opening be adequately protected by a sprinkler or sprinklers placed in the shed in close proximity to it.

N.B.—For the purpose of this rule the term "drying by artificial heat" is not to include the drying of yarn or cloth on steam-heated cylinders and/or ballooning.

(b) Corn Mills, Flax Warehouses (Scotland and Ireland).—In these risks this rule does not apply.

(c) Tanneries.—In these risks the shed does not require to have a fireproof floor, but it must be occupied solely as tan or lime pits, and/or for unhairing, fleshing or other wet process.

(d) Shipbuilders (England and Wales) and Metalworkers (Northern Counties, England, and Metalworkers and Woodworkers (Scotland).—In these risks the shed must be without galleries or lofts; it must be built of brick or stone and slated or tiled or glazed, or constructed of iron, on iron or wooden framework without wooden linings, and in any case having an incombustible floor or a wooden floor resting on an incombustible surface without cavities, and used only for metal-working or for the storage of incombustible material. Wooden louvres in the roof are not to be deemed timber construction.

Sprinkler Heads.

3. Sprinkler heads, which must be of a pattern approved by the fire-insurance companies, must be suitably arranged in distributing pipes supplied with water, as hereinafter provided. An adequate supply of spare sprinkler heads should always be kept on hand.

Spacing of Sprinklers.

4.—(a) Sprinkler heads must not be more than 10 ft. apart, nor more than 5 ft. from walls or the face of heavy ceiling beams, except as otherwise specially provided in the following table:—

In case of	Width of bays in feet from centre to centre of beam.	Number of rows required in each bay.	Maximum distance of heads.				Minimum number of heads required to floor area.
			Across the bays.	Down the bays.	From face of heavy beams or walls parallel with bays.	From walls at end of bays.	
Roofs or ceilings in bays underdrawn with plaster, wood or metal, or constructed of planks without joists.	Not over 10	1	10	11	5	6	1 to each 100 sq. ft. of bay, measuring from centre to centre of beam.
Do. do. -	Over 10, not over 11	1	11	10	6	6	do.
Roofs or ceilings in bays, but being open joisted or having common rafters of roof exposed.	Not over 10	1	10	10	5	5	do.
Do. do. -	Over 10, not over 11	1	11	8	5½	4	do.
Do. do. -	Over 11, not over 22	2	11	10	5½	5	do.
Fireproof roofs or ceilings	Not over 11	1	11	11	6	6	do.
Do. do. -	Over 11, not over 11½	1	11½	11½	5½	5	do.
Do. do. -	Over 11½, not over 23	2	11½	11½	5½	5	do.
Corn mills, except warehouses not communicating with mill otherwise than by double fireproof doors.	Not over 8½	1	8½	8	4½	4	1 to each 64 sq. ft. of total area.
Do. do. -	Over 8½, not over 9	1 and 2 alternately	8	8	4½	4	do.
Do. do. -	Over 9, not over 16	2	8	8	4	4	do.

NOTE.—When carrying out the requirements of this rule the bays in a roof are understood to be formed by the spaces between the principal rafters.

(b) Flax Warehouses (Scotland and Ireland).—In the case of these risks there must be a clear space of 18 ins. kept below roofs and ceilings. All racks and/or stock must therefore be kept this distance below. Where the ceiling is open-joisted the measurement to be taken from the bottom of the joists. In rooms where the external walls are of wood the sprinklers must not be a greater distance than 4 ft. from such walls.

(c) Shipbuilders (England and Wales) and Metalworkers (Northern Counties, England, and Metalworkers and Woodworkers (Scotland).—In rooms where the external walls are of wood, whether louvered or not, or of iron, wood-lined, the sprinklers must not be a greater distance than 4 ft. from such walls.

(d) Tanneries.—In rooms where the external walls are of wood, whether louvered or not, the sprinklers must not be a greater distance than 4 ft. from such walls.

N.B.—It is recommended that, where practicable, the level of the hides or skins hung in the hanging and/or drying-room be not within 12 ins. of the sprinkler heads.

Protection of Concealed Spaces.

5. The spaces between the ceilings and roofs, either at the apex or at the sides of buildings, must be efficiently protected. The maximum number of sprinklers need not exceed the number in the room below.

Hoists, Gearing Boxes, &c.

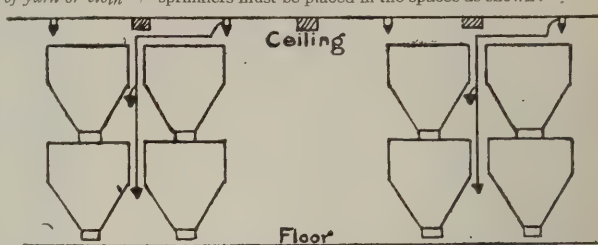
6.—(a) All hoists, elevators, shoots, rope or strap races, non-fireproof w.c.'s, gearing boxes and non-fireproof staircases (including the undersides) inside buildings must be protected by sprinklers.

(b) Corn Mills.—There must be at least one sprinkler head (1) in the box of every elevator so placed as to command the head and both the legs or shafts of the elevator; (2) at the head of every dust trunk or spout, and (3) inside the dust trunk or spout connected with every exhaust fan, either independent or forming part of any machine other than a middlings purifier collecting its own dust, the sprinkler in every instance to be fixed on the delivery side of the fan and close to it.

(c) Corn Mills.—All oblique dust trunks at an angle of less than 70 per cent. and all horizontal dust trunks must also be protected with sprinklers fixed inside the trunks at intervals of not more than 10 ft. from each other.

(d) Corn Mills.—When the centrifugals and similar machines are placed one above another in tiers, as in the

diagram below, and are less than 3 ft. from each other, sprinklers must be placed in the spaces as shown:—



(e) Tanneries.—All dust trunks must be protected by placing a sprinkler inside the trunk on each side of and close to the fan.

(f) Shipbuilders (England and Wales) and Metalworkers (Northern Counties, England, and Metalworkers and Woodworkers (Scotland).—All exhaust fans for collecting refuse must be protected by placing a sprinkler inside the trunk on each side of and close to the fan.

Water-supplies.

7.—(a) Every ordinary sprinkler installation must be provided with two separate and adequate sources of water-supply always available; one of such sources of supply must be practically unlimited.

(b) The following are accepted sources of supply:—
 (1) Town's mains.
 (2) Elevated tank or private reservoir.
 (3) Pressure tank.
 (4) Pumps.
 (5) Injector apparatus of approved pattern in connection with public hydraulic mains.

N.B.—An injector apparatus can in no case be regarded

as one of the "accepted sources of supply" unless and until full particulars of the installation have been submitted and specially approved by the fire-insurance companies.

(c) In special cases where only one water-supply is provided the installation will be specially considered by the fire-insurance companies, but the source of supply must be one of the following, viz.:—

(1) Town's mains;
 (2) Elevated private reservoir having a minimum capacity of 50,000 gallons;
 (3) Automatic pump; or
 (4) Injector apparatus of approved pattern in connection with public hydraulic mains.

N.B.—When the source for a one water-supply installation is town's mains there must be, in addition to the requirement of rule 8 (a) a pressure at the level of the highest sprinkler of at least 15 lbs. to the square inch when in the case of 1 in. installations, a 1 in. drip valve is fully open and, in the case of installations over 1 in., a 2 in. drip valve is fully open.

(d) The minimum size of the feed pipe from each source of supply must be in accordance with rule 16.

(e) The use of sea water is not allowed.
 N.B.—Water-supplies which have fibrous or other objectionable matter in suspension should not be used, as such matter is liable to cause accumulations in the pipes.

Town's Water.

8.—(a) Town's water can only be accepted if it gives, during both day and night, a pressure at the level of the highest sprinkler of at least 15 lbs. to the square inch.

(b) The water must be brought into the building direct from the street main by a supply pipe leading to the main stop valve and used only for fire services, except that one pipe not larger than 1½ in. in internal diameter or its equivalent sectional area in smaller pipes, may be taken off such supply pipe for ordinary service.

N.B.—To calculate the sectional area of a pipe multiply the square of its internal diameter by .7854.

(c) If the town's main be of insufficient size, according to the table appended to rule 16, it cannot be accepted as a source of supply, but connections from two mains which in the aggregate are the equivalent in sectional area to the pipe required will be accepted as one supply, provided the original supply to these mains is of adequate capacity.

(d) Connections to two separate public mains, supplied

from independent sources, will be accepted as a duplicate service.

Elevated Tanks and Reservoirs.

9.—(a) Elevated tanks or private reservoirs must have their capacity at least 15 ft. above the highest sprinkler, and must have the following capacity:—

When the sprinklers on any one floor or on the corresponding floors of buildings communicating otherwise than by fireproof doors or shutters do not exceed 150, 5,000 gallons; do not exceed 200, 6,500 gallons; exceed 200, 7,500 gallons.

N.B.—Private reservoirs which do not comply with these requirements will be specially considered by the fire-insurance companies.

(b) The tank must always be kept full of water, except where its capacity is in excess of the sprinkler requirements, in which case the excess may be drawn off for other purposes, provided that the outlet for that purpose be placed at such a height above the bottom of the tank that the quantity of water in the tank can in no case be so reduced through such outlet as to leave less than the specified quantity required for the sprinklers.

(c) The tank must be fitted with an indicator showing the depth of the water therein, and should be cleaned at least once in every half year.

(d) The tank must be covered in, and provision must be made to prevent the water in it from freezing.

Pressure Tanks.

10.—(a) Pressure tanks must be fixed inside a protected building and as high as possible, preferably in the top room.

(b) The capacity of the pressure tank to be not less than 5,000 gallons, of which two-thirds (say 3,333 gallons) must be water, and such an air-pressure must be pumped up and maintained as will give not less than 75 lbs. initial pressure on the highest sprinkler when the tank is on a level with it, but when the tank is on a lower level a further air-pressure of 1½ lbs. to the square inch must be maintained for every foot or part of such between the tank and the said highest sprinkler.

(c) As an alternative arrangement, and in order to reduce the air-pressure to be maintained, it is permissible to erect a tank or tanks containing in all at least 3,333 gallons of water, one-half of the contents of each tank being air and the other half water, and in such cases the initial pressure to be pumped up and maintained in the tank or tanks will be 45 lbs. to the square inch when the tank is on a level with the highest sprinkler, but when the tank is on a lower level a further air-pressure of 1 lb. to the square inch must be maintained for every foot or part of such between the tank and the said highest sprinkler.

(d) The tank must be fitted with an air-pressure gauge, as well as with gauge glasses to show the level of the water, and the stop taps on the latter should be kept shut. There must also be a stop valve and a back pressure valve on the pipe feeding the tank with water, also on the pipe through which air is pumped into the tank, and these valves should be fixed close to the tank.

Pumps.

11.—(a) Pumps must be fixed in an easily accessible position where they are not liable to be damaged by fire or other causes.

(b) Pumps must be quadruple acting and must have a capacity—

	Gals. per min.	Diam. of plungers.
do not exceed 100	250	6 ins.
do. 200	500	7 ins.
exceed 200	625	8 ins.

N.B.—The capacity of a pump must be calculated on a plunger speed not exceeding 150 ft. a minute for each plunger.

(c) Pumps must take water from a practically unlimited source.

(d) Pumps may be either automatic or non-automatic, except where the town's water or a hydraulic injector apparatus is one of the supplies, when they must be automatic and constantly moving under steam.

(e) A warranty must be inserted in policies that power sufficient to drive the pumps at an efficient pressure will be available at all times throughout the year.

Hydraulic Injector Apparatus.

12.—(a) The hydraulic injector apparatus must be fixed in an easily accessible position where it is not liable to be damaged by fire or other causes.

N.B.—See also the N.B. appended to rule 7 (b).

(b) The capacity of the apparatus must be the same as provided for pumps in rule 11 (b).

(c) The water in the hydraulic main must have a constant pressure of not less than 600 lbs. to the square inch.

(d) A pressure gauge must be fixed on the hydraulic connection.

(e) The hydraulic accumulator connected with the injector apparatus must be fitted with a small outlet so that it will be under constant slow motion, and there must be an indicator to show the number of strokes made.

(f) A constant supply of water, either from the town's main, or from some other practically unlimited source, must be provided, and if obtained by a direct connection with the town's main the sizes of the main and connection must be in accordance with the table appended to rule 16.

(g) If a direct connection with a town's main is not allowed, a suction tank having an automatic supply must be provided of not less than the following capacity:—

Apparatus	250 gallons per minute, 2,000 gallons.
delivering 500 "	3,000 "
delivering 625 "	4,000 "

The feed pipe to the suction tank must be in accordance with the table appended to rule 16, and must be supplied from a practically unlimited source. The necessary ball valve must be full way and equal to the size of the supply pipe.

If one of the water-supplies is the town's main the suction tank in connection with the hydraulic injector apparatus must be of the capacity as required by rule 9 for elevated tanks and reservoirs.

Dry Pipe System.

13. In buildings not artificially heated, in which there is any chance of the pipes freezing, the sprinkler installation must be erected upon an approved dry pipe system. When the dry pipe system is used it must be so arranged that not more than 700 sprinklers be controlled by one main stop and air valve.

Pressure Gauges.

14.—(a) To all installations there must be a pressure gauge fixed above the alarm valve, and another below the alarm and main stop valves, and in the case of installations which have the town's water as one of the supplies there must be a third gauge fixed on the branch from the main, and on the outside of the back-pressure valve in such branch so as to register the pressure in the main at all times.

(b) Also when a pump or hydraulic injector apparatus forms one of the supplies to an installation there must be a pressure gauge fixed on the delivery pipe from the pump or apparatus, and on the pump or apparatus side of the back pressure valve on such pipe.

Valves and Supply Connections.

15.—(a) A main stop valve must be provided which, when closed, will shut off all supply of water to the installation. All the water-supplies must be connected before passing through the main stop valve, with the exception that in installations not on the dry pipe system where one of the sources of supply is worked by a non-automatic pump, such pump may be connected with the installation at such point as may render it most readily available. Each supply pipe must be fitted with a back-pressure valve. The main stop valve must be placed at or near the ground level, and must be properly protected from the action of frost and from being tampered with, but readily accessible to authorized persons. It must be secured open by a riveted or padlocked strap.

N.B.—In installations having one water-supply back pressure valves are unnecessary.

(b) Subsidiary stop valves are not allowed on any supply pipes except on the supply pipes from town's mains, private reservoirs, non-automatic pumps and pressure tanks. The valve in the case of pressure tanks to be secured open by a padlocked chain.

(c) In special cases small shut-off cocks may be allowed on the supply pipes to sprinkler heads fixed inside wheel-boxes and gearing towers, or to sprinklers in exposed water-wheel places, cartways, loading places, outside hoists or gangways and outside closets where there is a risk of freezing. The cocks to be of the plug type with fixed handles.

Sizes of Pipes.

16. From the main stop valve a main pipe must be fixed to supply the distributing pipes in each room of the building. The minimum size of the main pipe must be determined by the greatest number of sprinklers in any one floor or corresponding floors of communicating buildings, according to the tables below. The size of each of the distributing pipes must be determined, according to the same tables, by the number of sprinklers which it is intended to serve:—

Sprinklers allowed.

Size of Pipe.	TABLE A. Applicable to all cases except as specified in Table B.	TABLE B. Applicable to drying stoves and drying rooms where the maximum temperature exceeds 100 degs. Fahr.
	Ins.	
1	1	1
1½	3	2
2	5	4
2½	9	6
3	18	12
3½	28	16
4	46	28
4½	78	
5	115	No pipe to exceed 3 ins. If more than 28 sprinklers are required, more than one feed pipe must be provided.
6	125	
	150	
	over 150	

N.B.—For the purpose of this rule buildings are considered to be communicating with each other unless the openings between them are protected by fireproof doors or shutters.

N.B.—Tanneries.—Where the floors are wholly or partially open-boarded or sparred, the sprinklers in the two or more floors so communicating which, together with corresponding floors of communicating buildings, have the largest number of heads must be taken cumulatively when carrying out the requirements of this rule and also rules 7, 8, 9, 11 and 12.

N.B.—Shipbuilders (England and Wales) and Metalworkers (Northern Counties, England), and Metalworkers and Woodworkers (Scotland).—Where the floors are wholly or partially open-boarded or sparred, or constructed of perforated or other open ironwork, the sprinklers in the two or more floors so communicating which, together with corresponding floors of communicating buildings, have the largest number of heads must be taken cumulatively when carrying out the requirements of this rule and also rules 7, 8, 9, 11 and 12.

The sprinklers under all galleries or stages must be taken cumulatively with the remainder of the building.

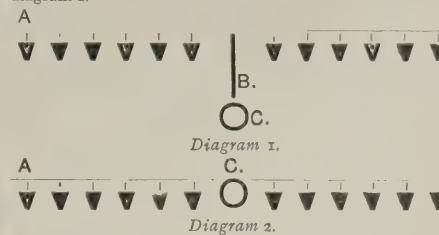
When individual sprinklers in concealed roof spaces, either in the ridge or at the sides thereof, are fed by ½ in. pipes from the room below, the sprinklers in such concealed spaces and in the room below must be taken cumulatively up to the number allowed off a ½ in. pipe.

Use of Pipes.

17. None of the pipes mentioned in rule 16 must be used for any other purpose than to feed the sprinkler installation or to test the alarm signal. The diameter of the testing cock should be ½ in.

Arrangement of Distributing Pipes and Sprinklers.

18.—(a) The distributing pipes for all installations must be so arranged that not more than twelve sprinklers shall be fed in one row, as shown in the diagrams below, and in any case not more than six sprinklers must be fixed on either side of the upright pipe directly feeding the row when the arrangement of pipes is in accordance with diagram 1, or on either side of the main distributing pipe when the arrangement of pipes is in accordance with diagram 2.



A, distributing pipe. B, Upright pipe. C, Main distributing pipe.

(b) It is to be understood that the sprinklers are not necessarily to be fixed pendent, but may be placed upright, and therefore above the distributing pipe, when required.

(c) In dry-pipe installations, however, it is imperative that all sprinklers be placed upright and above the pipe line.

N.B.—In the case of very large premises comprising distinct buildings it may be considered necessary that the sprinkler equipment be divided into two or more installations, although one set of water-supplies will suffice for all. It is strongly recommended that this sub-division be adopted whenever practicable.

Alarm.

19. Every installation must be fitted with an approved automatic alarm signal to give notice as soon as any sprinkler is opened. This must be properly protected and tested at frequent intervals.

Regulations as to Devices for Testing Dry-pipe Installations.

20. There must be a ½ in. pipe testing tap on the installation side of the air-valve; and where an ordinary alarm valve is fixed in addition to the air-valve, a ½ in. testing cock may be fixed between the two valves for the purpose of frequently testing the gong as required by rule 19. When the installation is under water the alarm must be tested by opening the ½ in. test cock above the air-valve.

Examination of Sprinklers.

21. Corn Mills.—Every sprinkler must be examined at least once a week and all dough and other accumulation removed therefrom.

Ordinary Appliances.

22. Automatic sprinklers are intended to be in addition to, not in substitution for, other fire-extinguishing appliances, which must also be provided in accordance with the requirements of the fire-insurance companies and maintained in thorough working order.

N.B.—For notice to be given to the fire-insurance companies before turning off the water in case of repairs, &c., see No. 1 of "Precautions" below.

Precautions to be taken

When an installation or its water supplies, or the tank only when the installation has for its sole water-supply a tank and non-automatic pump, are rendered inoperative from any cause.

1. Notice must be given to the fire-insurance companies having policies on the risk at least three days before the date of turning off the water, and written permission obtained from them for the purpose.

2. Alterations and/or additions to the installation or its water-supplies must be proceeded with with all possible speed, so that the sprinklers may remain inoperative as short a time as possible.

3. In manufacturing premises the installation must not in any case be rendered inoperative except during daylight. When the alterations or repairs are extensive, and whenever it is necessary to "break" a pipe exceeding 1½ ins. in internal diameter, or to take out a main stop valve, alarm or back-pressure valve from its position, all machinery must be stopped until the installation is again operative. The water must not be turned off at the main stop valve until one hour has elapsed from the time of the stoppage of the machinery, and then only after a thorough examination of every part of the premises has been made and no indication of fire perceived.

4. Before turning the water off, all the ordinary fire-extinguishing appliances must be brought out and put in readiness: the stand pipes must be laid down to the hydrants, and the hose nozzle and coupled up to the stand pipes and/or to the plugs or pump as the case may be, and a sufficient number of men qualified to make efficient use of the appliances, and under the control of a foreman, must be kept at their several posts, so that should occasion arise—the best possible service may be rendered. The number of men required will be in the proportion of 1 to every 150 or fraction of 150 sprinklers fitted up. In no case, however, must there be less than four men.

5. The water must be turned on again as soon as the alterations or repairs are completed, and always, if possible, before dark.

6. Smoking is to be strictly prohibited, and no intoxicants allowed on the premises during the progress of the work.

7. In the event of an installation becoming inoperative through accident the above precautions, so far as the same are applicable, must be observed with the least possible delay.

8. An adequate supply of spare sprinkler-heads should always be kept on hand.

FIRE-RESISTING CONSTRUCTION.*

By Alfred E. Corbett, A.R.I.B.A.

(Concluded from p. 23, No. 579.)

WE now turn to some British floors and to some results of the British Fire Prevention Committee's tests.†

No. 34 Red Book deals with the very usual type of floor in which the concrete is flush with the top and bottom flanges of the supporting steel joists, these flanges being unprotected. The bottom flange quickly gets red hot and expands, and as the top part remains cool a considerable deflection is bound to take place. In this case, during a moderate test of 1½ hours, the floor deflected 10½ ins. in a span of 10 ft., and then half of it collapsed. This was entirely owing to the unprotected soffits of the joists, the concrete standing the fire well, and clearly demonstrates the danger of this very common form of flooring.

No. 61 describes a gin. floor of 5 to 1 coke-breeze concrete in which the steel joists are protected underneath by zins. of concrete.

The test was severe—a fire rising to a temperature of 2,230 degs. Fahr. and lasting for 2½ hours—but no deflection occurred, and the concrete was quite sound except for a disintegration of ¾ in. where the water jet struck it, and for small cracks.

This test proves that a good coke-breeze concrete floor erected by the general contractor can be made thoroughly fire-resisting by the simple precaution of putting zins. thickness of concrete below the steel joists; and for it to be worth while to pay a greater price for some patent floor it is necessary to have some other advantage than mere fire-resisting properties, such, for instance, as less transmission of sound, less weight or thickness, less steelwork, &c.

A Porous Tile Floor.

Of the few patented floors that have been tested by the British Fire Preventive Committee the most severe test was resisted successfully by a hollow tile floor by the National Fireproofing Co. (of Pittsburg and London) described in Red Book No. 96.

* A paper read before the Manchester Society of Architects on February 8th, 1906.
† [The author's opinions must not be taken to represent our own.—Ed. B.J.]

In general principle this floor is curiously like the Baltimore floors which failed so disastrously; with the addition of a steel wire reinforcement on the principle of reinforced concrete construction, and with the vital difference that the material was semi-porous instead of hard-burnt terra-cotta. A complete temporary wooden centering is required for this floor.

The test lasted four hours, with a heat up to 1,880 degs. Fahr., and the blocks were intact at the end of the test. The maximum deflection during test, with a load of 2½ cwt. per sq. ft., was only ¾ in. in a span of 10 ft., and there was not permanent deflection.

The soffit was plastered with "Sirapite" plastering 1 in. thick, and this seems to have stood the test extremely well, although some small patches flaked off in fifty minutes, but at the end of the test it was washed off where struck by the water.

Possible Weakness.

Though it may seem hypercritical to suggest a defect after such a satisfactory test, I would draw attention to one possibility of weakness in this floor which may be found to a greater extent in nearly all floors.

The opinion of many experts is that for complete protection all steelwork should be enclosed by at least zins. of concrete or of porous terra-cotta. In this floor the joist was protected by 1½ ins. of terra-cotta and 1 in. of plaster, which proved sufficient for this test. We have seen that when the fire hose was turned on to the ceiling it washed the plaster off. Now in an actual fire it would be quite likely that a jet might be turned on the ceiling for a few minutes in the early stages of a fire, and the firemen then be driven back and the fire go on burning fiercely. The few minutes of wetting would have brought down the greater part of the plaster, and there would then be only 1½ ins. of terra-cotta between the flames and the steel instead of the zins. recommended. This might be just sufficient, but in many floors there would only be ¾ in. or ¾ in. of protection left when the plaster had been knocked off, and it is very probable that in such cases the joists would get very hot, causing serious deflection.

The Columbian Floor.

Red Book No. 23 describes a very satis-

factory test of the Columbian Fireproofing Co.'s floor, a patent floor somewhat resembling an ordinary joist and concrete floor. The soffits of joists are specially protected by zin. slabs of concrete cast separately, strengthened by wires, and fixed by metal anchors which are eventually completely embedded in concrete.

The test lasted for 2½ hours, rising to a temperature of 2,300 Fahr., but without having any effect on the floor beyond the falling of a few flakes of plaster. When the water jet was applied at the conclusion of test about one-third of the area of the ceiling fell.

My point as to danger when plaster is knocked off does not apply to the girders in this case, but it does apply to the small joists or bars, which would only have 1 in. of concrete under them if the plaster were removed.

Comparing this floor with No. 61, the ordinary coke-breeze and steel-joist floor, there is little to choose between them as regards fire-resisting qualities. The Columbian is thinner, and therefore lighter, but this may possibly imply more easy transmission of sound.

Saving of Centering.

These floors, and many others, require a temporary wooden centering. There is a large class of patent floors which avoid this drawback by providing a permanent centering, generally in the form of terra-cotta or fireclay lintels.

Unfortunately none of these has been tested by the British Fire Prevention Committee. It would be a good thing if architects would show patentees that they attach importance to these tests, as without independent tests it is impossible for them to appraise the real value of the claim of each inventor that his floor is the best.*

A ventilated floor that has been tested by the British Fire Prevention Committee (Red Book No. 64) is that of the Banks' Fireproof Construction Syndicate. The floor was of breeze-concrete and steel joists, with the joist soffits uncovered; but under the floor

* [Here the author gave particulars and criticisms of several other floors on the market which have not been officially tested, and we think it best to omit reference to these.—Ed. B.J.]

The Author's Summary of Partition Tests by the British Fire Prevention Committee.

The order given by the author was intended to indicate the order of merit of the results, based on the length of test and its severity, and on the amount of damage done. Neither THE BUILDERS' JOURNAL nor the British Fire Prevention Committee were responsible for this classification, which was only approximate, and we have had to make some omissions where it was erroneous.—Ed. B.J.

	Number of Red Book.	Partition tested by B.F.P.C.	Duration of test unbroken.	Maximum temperature on fire side.	Maximum temperature outside.	Weight in lbs. per sq. yd.	Finished thickness.	Comment.
			Hours.	Degs. Fahr.	Degs. Fahr.	Lbs. 378	Inches. —	
FULL PROTECTION.	84	Jabez Thompson's "Terrawode" brick-wood, not plastered, set in mortar of equal parts sand, fireclay and plaster-of-Paris.	4	2,130	230	215	4 $\frac{3}{8}$	Approximate weight of 4 $\frac{3}{8}$ in. common brickwork, unplastered; given for comparison only.
	99	Porous terra-cotta hollow tile by the National Freproofing Co., $\frac{3}{8}$ in. asbestic and lime plaster.	2 $\frac{1}{2}$	1,980	—	? 130	2 $\frac{1}{2}$	Buckled to a maximum in the centre of 2 $\frac{1}{2}$ ins. Five bricks flaked up to 1 $\frac{1}{2}$ ins. deep.
PARTIAL PROTECTION.	88	"Kulm" slabs, H. W. Cullum & Co. $\frac{3}{8}$ in. plaster on fire side.	2	2,010	210	150	3 $\frac{1}{2}$	Bulged 2 $\frac{1}{2}$ ins. Face of one tile split off.
TEMPORARY PROTECTION.	52	"Mack" slab. J. A. King & Co. 1in. plaster inside, $\frac{1}{2}$ in. outside.	1 $\frac{1}{2}$	2,050	125	—	3 $\frac{5}{8}$	No buckling.
	63	Banks' Fireproof Construction Syndicate, Ltd., helical lathing fixed to x standards 2ft. apart, 2 $\frac{1}{2}$ in. coarse stuff with 50 per cent. Portland cement.	1 $\frac{1}{2}$	2,100	128	—	2 $\frac{3}{4}$	Lathing and studs partly exposed.
	44	Mural and Decorations Co.'s partition terra-cotta lathing, plastered both sides.	1 $\frac{1}{4}$	2,130	Did not light a match.	—	2 $\frac{1}{2}$	
	83	Jabez Thompson's thin white partition slabs, not plastered.	1 $\frac{1}{4}$	1,800	100	150	21 $\frac{3}{16}$	
	74	Phoenix slabs. Van der Vijgh Brothers. $\frac{1}{2}$ in. plaster inside, $\frac{1}{2}$ in. outside.	1 $\frac{1}{4}$	1,940	125	—	3 $\frac{1}{2}$	
	22	Brick-nogged studded partition, brick-on-edge, 3in. by 2in. studs, plastered both sides.	1	2,000	—	215	4 $\frac{1}{2}$	Studs charred. Outside almost intact.
	37	Gypsine Brick Co.'s partition. Thin coat of fireclay on fire side.	1	1,950	Did not light a match.	—	3 $\frac{1}{2}$	
	57	"Non-flammable" deal matchboarding, 1in. boarding on 3in. by 2in. studs.	$\frac{3}{4}$	1,545	100	—	4	Inner boarding partly burning.

special metal ceiling bars supported helical metal lathing, which was plastered with coarse stuff and Portland cement $1\frac{1}{2}$ ins. thick. A ventilated space was left between floor and ceiling. The floor satisfactorily resisted a test of three hours, but the fact that it deflected $2\frac{1}{2}$ ins. in a span of 22 ft. suggests that the joist soffits need more protection than a mere ceiling, as the lower flanges evidently got hot. A concrete protection could easily be added without materially altering the design. This result is not quite as good as the Columbian floor test, on account of the deflection, but the Banks floor gains in its soundproof quality through its separation of floor and ceiling.

A test (No. 14) of a ventilated floor by the New Expanded Metal Co., in which naked joists under a concrete floor were only protected by a suspended ceiling, showed similar results to the Banks' floor test, a deflection of $1\frac{1}{2}$ ins. in a $1\frac{1}{2}$ hours' test proving the protection to be insufficient.*

Reinforced Concrete.

I must now refer to floors of reinforced concrete, a comparatively new material which is certain to be widely used in the future; one which presents great possibilities with regard to fire-resistance as well as in other ways. It is impossible in the short time available to discuss the principles of this construction, but I may remind you that it is a combination of steel and concrete arranged to utilize to the greatest advantage the tensile strength of the steel and the compressive strength of the concrete.

Reinforced concrete materially differs in its properties from either steel or concrete, and is virtually a new material. To-night we can only consider its value as a fire-resistant. I may say at once that I fully believe it to be one of the most valuable materials available for this purpose, provided that the ordinary principles of steel protection are observed. There is, however, a great tendency, owing to commercial competition, to cut down the protection to a dangerous degree.

Floor slabs or beams of this material consist of a slab of concrete with a small proportion of steel embedded in it, in the form of some kind of rods or network. In order to get the greatest strength these rods must be as near as possible to the bottom of the concrete, and in most systems we find that there is only from $\frac{1}{2}$ in. to 1 in. of concrete below the steel rods. This is perfectly correct when only strength is required, but for fire-resistance we must remember the principle that 2 ins. should be the minimum thickness of protection, and we should add sufficient concrete to ensure at least 2 ins. below every steel rod.

This is stipulated in the Metropolitan Building Act, which has just come into force. The Fire Offices Committee's rules for reinforced concrete construction stipulate that each steel rod shall be protected by at least twice its own thickness of concrete, provided that the thickness is at least 1 in., and it need not exceed 2 ins. This would be quite efficient for thick rods, as 1 in. rods would have 2 ins. of protection, but it seems illogical to allow $\frac{1}{2}$ in. rods to have only 1 in. of protection, as they might be just as vital to the strength of the floor.

This point has not yet been adequately tested by the British Fire Prevention Committee, and great caution is necessary in regard to reports published by the various patentees describing successful tests of their manufactures.†

I give a table (see previous page) sum-

* [This Company's test was superseded by them on February 27th by a four hours' test on a floor measuring 22 ft. by 10 ft., under the usual British Fire Prevention Committee's conditions, with less than 1 in. deflection.—Ed. B.J.]

† [Since this paper was written two floors on the Coignet system, two designed by Messrs. Skelton, and one by the New Expanded Metal Co. were under test, but are not yet reported upon.—Ed. B.J.]

marizing the British Fire Prevention Committee's tests of partitions, and in this I have attempted to classify the results in order of merit, and giving reference to the number of the Red Book describing such test. This classification is only my personal opinion, based on these tests, and I may mention that in every case the British Fire Prevention Committee's reports only state facts, not opinions.

I had hoped to consider columns, doors, sprinklers and various other branches of this very wide subject, but time fails me. Full information on the entire subject can be obtained from the many publications of the British Fire Prevention Committee, which may be seen in Manchester at the King Street reference library or at the School of Technology library.

I will conclude with a quotation from a paper by Mr. Blashill, late architect to the L.C.C.: "The architect will get no help from public opinion nor from private persons. One never meets with anyone who will seriously contemplate the chance of fire in any private house or public building in which he or his may be present . . . Life would be too dismal if we were always contemplating possibilities against which the odds are a thousand to one. But when a catastrophe has occurred the public feels it must make atonement for its neglect and looks out for a scapegoat—the scapegoat is the architect. It is the architect who may reasonably be supposed to know most about the danger of fire and the means of fire-prevention. It is to him, and not to his client, that the public will look in case of accident through neglect of precautions. It is to him, indeed, that the client himself will look if there is loss by fire, although he may have shut his eyes to risks and begrudged the cost of the structure as it stood. The architect must face the whole responsibility."

UNIFORM BY-LAWS.

Recommendations of the National Board of Fire Underwriters for the Construction of Fireproof Buildings.

EVERY building erected or altered to be used as a theatre, lodging-house, school, jail, public station, hospital, asylum, institution for the use, care or treatment of persons, the height of which exceeds three storeys and not more than 40 ft. in height, and every building erected or altered to be used as a hotel or an apartment house which exceeds four storeys and not more than 50 ft. in height, and every other building the height of which exceeds 55 ft. or more than four storeys in height, shall be built fireproof. Such is the recommendation of the National Board of Underwriters to all cities and towns to secure greater safety of life and property from the destructive effects of fire. The adoption of this recommendation would mean more uniform building laws throughout the country, which, if consistently enforced, would put an end to holocausts and conflagrations. How this result is to be accomplished is set forth as follows in sections 106 to 110 of the building code proposed by the National Board of Fire Underwriters for universal adoption:—

Fireproof Buildings.

They shall be constructed with walls of brick, stone, Portland-cement concrete, iron or steel in which wood beams or lintels shall not be placed, and in which the floors and roofs shall be constructed with rolled wrought-iron or steel floor-beams, spaced not more than 5 ft. on centres, for stores, warehouses and factory buildings, and for all other buildings not more than 8 ft. on centres, and otherwise so arranged as to spacing and length of beams that the load to be supported by them, together with the weights of the materials used in the construction of the said floors,

shall not cause a greater deflection of the said beams than $\frac{1}{80}$ th of an inch per foot of span under the total load. The beams shall be tied together at intervals of not more than eight times the depth of the beam with suitable tie-rods.

Between the floor and roof beams shall be placed brick arches springing from the lower flanges of the steel beams, or the spaces between the beams may be filled with hollow tile arches of hard-burnt clay of porous terracotta, or arches of Portland-cement concrete, plain or reinforced with metal, or such other fireproof composition may be used, provided that in each and all cases the strength and method of construction shall conform to the requirements of this code.

The stairs and staircase landings shall be constructed of brick, stone, Portland-cement concrete, iron or steel, or a combination of these materials.

No woodwork or other inflammable material shall be used in any of the partitions, furrings or ceilings in any such fireproof buildings, excepting, however, that when the height of the building does not exceed eight storeys nor more than roof, the doors and windows and their frames and trims, the casings, the interior finish when filled solidly at the back with fireproof material, and the floor boards and sleepers directly thereunder, may be of wood, but the space between the sleepers shall be solidly filled with fireproof materials extending up to the underside of the floor boards.

When the height of a fireproof building exceeds eight storeys or more than roof, the floor surfaces shall be of stone, cement, tiling or similar incombustible material. All outside window frames and sash shall be of metal.

The inside window frames and sashes, doors, trim and other interior finish may be of metal or of wood covered with metal, or of such other incombustible material that may be approved by the Commissioner of Buildings.

Hall and Permanent Partitions.

All hall partitions or permanent partitions between rooms in fireproof buildings shall be built of fireproof material, and shall not be started on wood sills nor on wood floor boards, but be built upon the fireproof construction of the floor and extend to the fireproof beam filling above.

But this shall not preclude the use of wood block under each iron upright or stud in partitions constructed of iron uprights and lathed with iron, or filled in solidly between the iron studs or uprights with approved fireproof material, provided said wood block or cushion which is to allow for the possible lengthwise expansion of the uprights by heat does not exceed in thickness $\frac{1}{16}$ th of an inch to the foot of the height of said uprights.

The tops of all door and window openings in such partitions shall be at least 12 ins. below the ceiling line.

In all fireproof partitions other than when made of solid brickwork, the openings for doors and windows in same shall be framed on both sides with iron studs or uprights secured at top and bottom to the floor beams, and with like iron horizontals between the said uprights for the window openings and door-heads.

In all fireproof buildings, other than stores, warehouses and factories, if exceeding three storeys or 40 ft. in height, the stair halls shall be enclosed on each storey with fireproof material, same as required for elevators, to so form an enclosure the floor area of which shall not be more than three times the united area of the floor openings for the elevators and stairs.

Fireproof Floor Fillings between Beams.

Between the wrought-iron or steel floor-beams shall be placed brick arches springing from the lower flanges of the steel beams.

Said brick arches shall be designed with a rise to safely carry the imposed load, but never less than $1\frac{1}{4}$ ins. for each foot of span between the beams, and they shall have a thickness of not less than 4 ins. for spans of 6 ft. or less and 8 ins. for spans over 6 ft., or such additional thickness as may be required by the Commissioner of Buildings. Said brick arches shall be composed of good, hard brick or hollow brick of ordinary dimensions laid to a line on the centres, properly and solidly bonded, each longitudinal line of brick breaking joints with the adjoining lines in the same ring and with the ring under it when more than a 4 in. arch is used. The said arches shall spring from protecting skew-backs of burnt clay resting on and covering the lower flanges of the beams, so as to afford a minimum protection of 2 ins. of solid burnt clay material underneath the flanges, or otherwise entirely incasing the said flanges as provided for in this section. The brick shall be well wet and the joints filled in solid with cement-mortar. The arches shall be well grouted and properly keyed.

Hollow Tile Arches of Burnt Clay or Terra-cotta.

Or the space between the beams may be filled in with hollow tile arches of hard-burnt clay, semi-porous or porous terra-cotta of uniform density and hardness of burn. The shells and webs of hollow tile arch blocks shall not be less than 1 in. in thickness.

Skew-backs shall be used with all forms of hollow tile arches and be of such form and section to properly receive the thrust of the arches. The shells and webs of the skew-backs shall be not less than $1\frac{1}{4}$ ins. in thickness, except that the portion extending under the lower flanges of the beams shall be not less than 2 ins. of solid material not interrupted by any interior cavities or spaces. The said arches shall be of a depth and sectional area to carry the load to be imposed thereon without straining the material beyond its safe working load, but the thickness of the shells and webs shall in no case be less than herein required, and the depth shall not be less than $1\frac{1}{4}$ ins. for each foot of span, not including any portion of the depth of the tile projecting below the underside of the beams a variable distance being allowed of not over 6 ins. in the span between the beams if the soffits of the tile are horizontal; but if said arches are segmental, having a rise of not less than $1\frac{1}{4}$ ins. for each foot of span, the depth of the tile shall be not less than 6 ins. The joints shall be solidly filled with cement-mortar as required for common brick arches and the arch so constructed that the key parts shall always fall in the central portion. The shells and webs of all end construction blocks shall abut, one against another.

Arches of Portland-cement Concrete Plain or Reinforced with Metal.

Or the space between the beams may be filled with arches of Portland-cement concrete, segmental in form, and which shall have a rise of not less than $1\frac{1}{4}$ ins. for each foot of span between the beams. The concrete shall be not less than 4 ins. in thickness at the crown of the arch and shall be mixed in the proportions required by this code. These segmental arches, if reinforced, shall in all cases be reinforced or protected with steel rods or bars, reticulated or meshed steel, or similar metal weighing not less than 1 lb. per square foot and having openings not larger than 3 ins. square. Such reinforcing metal if essential to secure the required strength of the arches shall be so embedded that the metal is covered by not less than 1 in. of the concrete; but if used partly or wholly as a centering for, and if not essential to secure the required strength of the arches, the metal centering need not be wholly embedded in the concrete.

No concrete work shall be installed in freezing weather nor allowed to freeze after being put in place.

Various Fillings between Floor Beams.

Or between the said beams may be placed solid or hollow burnt clay, brick or concrete slabs in flat or curved shapes, concrete or other fireproof composition, and any of said materials may be used plain or in combination with wire cloth, expanded metal, wire strands, or wrought-iron or steel bars; said metal if used to be in all cases so embedded in the fireproof composition or combination that the metal shall be covered by not less than 1 in. of the fireproof material; but in any such construction, and as a precedent condition to the same being used, tests shall be made as herein provided by the manufacturer thereof under the direction and to the satisfaction of the Commissioner of Buildings, and evidence of the same shall be kept on file in the Department of Buildings showing the nature and result of the test. Such tests shall be made by constructing within enclosure walls a platform consisting of four rolled steel beams 10 ins. deep, weighing each 25 lbs. per lineal foot, and placed 4 ft. between the centres and connected by transverse tie rods, and with a clear span of 14 ft. for the two interior beams, and with the two outer beams supported on the side wall throughout their length, and with both a filling between the said beams, and a fireproof protection of the exposed parts of the beams of the system to be tested, constructed as in actual practice, with the quality of material ordinarily used in that system and the ceiling plastered below, as in a finished job; such filling between the two interior beams being loaded with a distributed load of 150 lbs. per square foot of its area and all carried by such filling; and subjecting the platform so constructed to the continuous heat of a wood fire below, averaging not less than 1,700 degs. Fahr. for not less than four hours, during which time the platform shall have remained in such condition that no flame will have passed through the platform or any part of the same, and that no part of the load shall have fallen through, and that the beams shall have been protected from the heat to the extent that after applying to the underside of the platform at the end of the heat test a stream of water directed against the bottom of the platform and discharged through a $1\frac{1}{2}$ in. nozzle under 60 lbs. pressure for five minutes, and after flooding the top of the platform with water under low pressure and then again applying the stream of water through the nozzle under the 60 lbs. pressure to the bottom of the platform for five minutes, and after a total load of 600 lbs. per square foot uniformly distributed over the middle bay shall have been applied and removed, after the platform shall have cooled, the maximum deflection of the interior beams shall not exceed $2\frac{1}{2}$ ins. The Commissioner of Buildings may from time to time prescribe additional or different tests than the foregoing for systems of filling between iron or steel floor beams, and the protection of the exposed parts of the beams. Any system failing to meet the requirements of the test of heat, water and weight as herein prescribed shall be prohibited from use in any building hereafter erected. Duly authenticated records of the test heretofore made of any system of fireproof floor filling and protection of the exposed parts of the beams may be presented to the Commissioner of Buildings, and if the same be satisfactory to said Commissioner it shall be accepted as conclusive.

Protection against Injury by Freezing.

No filling of any kind which may be injured by frost shall be placed between said floor beams during freezing weather, and if the filling is placed during any winter month it shall be temporarily covered with suitable material for protection from being frozen.

Cinder-concrete Filling on Top.

On the top of any arch, lintel or other device which does not extend to the plane of the underside of the floor finish, cinder-concrete or other suitable fireproof material shall be placed to solidly fill up the space to a level with the top of the said floor beams, and shall be carried to the underside of the wood floor boards in case such be used.

Cinder-concrete shall be made with not less than 1 part of Portland cement by volume to 10 parts of other material, and the top flanges of all beams shall be entirely embedded in it to a depth of not less than 2 ins.

Temporary Centering.

Temporary centering when used in placing fireproof system between floor beams shall not be removed within twenty-four hours, or until such time as the material has set.

Strength for Fireproof Floor Fillings.

All fireproof floor systems shall be of sufficient strength to safely carry the load to be imposed thereon without straining the material beyond its safe working load.

Pipe Openings through Fireproof Floors.

Openings through fireproof floors for pipes, conduits and similar purposes shall be shown on plans filed in the Department of Buildings.

After the floors are constructed no opening greater than 8 ins. square shall be cut through said floors, unless properly boxed or framed around with iron. And such openings shall be filled in with fireproof material after the pipes or conduits are in place.

Roof Domes.

Nothing in this section contained shall be deemed to prohibit the construction of the roof domes provided that the materials used therefor are in accordance with those specified in this section, and that the unit stresses do not exceed those fixed in this code, and that the construction shall be satisfactory to the Commissioner of Buildings.

Encasing Interior Columns.

All cast-iron, wrought-iron or rolled steel columns, including the lugs and brackets on same, used for vertical supports in the interior of any fireproof building, or used to support any fireproof floor, shall be entirely protected with not less than 4 ins. of hard-burned brickwork, terra-cotta, concrete or other fireproof material, without any air space next to the metal, securely applied; but no plaster-of-Paris or lime-mortar shall be used for this purpose, nor shall any plaster, whether or not on metal lathing, be considered a part of the covering required.

No single block or unit of insulating material used for column covering shall have a greater vertical dimension than 6 ins. when placed in position, nor shall the shells and webs of hollow tile or terra-cotta blocks be less than 1 in. in thickness, and these blocks shall be laid up with Portland-cement mortar, and suitably tied or anchored together.

The extreme outer edges of lugs, brackets and similar supporting metal may project to within $\frac{1}{2}$ in. of the surface of the fireproofing.

The fireproof coverings shall start upon the fireproof floors and continuously extend to the fireproof ceilings or underside of girders above, and be entirely independent of any ornamental base or capital.

No pipes, wires or conduit of any kind shall be encased in the fireproofing surrounding any column, girder or beam of steel or iron.

Where the fireproof protection of columns is exposed to damage from the trucking or handling of merchandise, such fireproof protection shall be jacketed on the outside for a height not less than 4 ft. from the floor with sheet metal or with vertical strips of oak; and if the oak be used for such purpose the vertical strips shall be sufficiently separated from each other always to show that the woodwork of the guard has been placed entirely on the outside of the fireproof material which encases the metal column.

(To be continued.)

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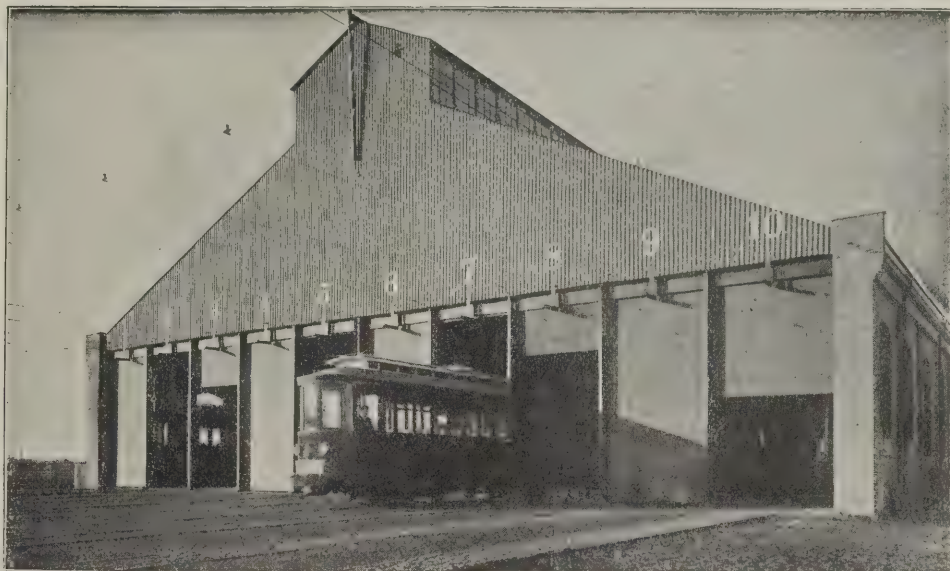
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VIEW SHOWING FERRO-CONCRETE FLOOR SUSTAINING BURNT-OUT PORTION OF ADLER CYCLE COMPANY'S WAREHOUSE AT FRANKFORT-ON-MAIN.

THE FIRE-RESISTANCE OF FERRO-CONCRETE.

AN interesting pamphlet has just been published by Mr. L. G. Mouchel, of 38, Victoria Street, London, S.W., the licensee of the Hennebique Patents for this country, in which particulars and illustrations are given of the results of some actual fires that have taken place in buildings constructed in Hennebique ferro-concrete. Two of these illustrations are reprinted herewith.

Instructive as tests may prove, there always remains in one's mind the thought that all the constructions used for the tests may have been made with special care, or, at any rate, with much more care than would be exercised in the case of an ordinary building; therefore, one is apt to wonder how a construction erected in the ordinary course of business would have stood the ordeal of a violent fire. Such doubts are dispelled by the results of actual conflagrations in various buildings erected on the Hennebique system by the firm's licensed contractors in various parts of the world. The following are abstracts of accounts given in the pamphlet which demonstrate that these buildings erected by different contractors, and composed of materials of absolutely different origin, have shown in every case eminently satisfactory results:—

A fire at the electric power station of Chèvres which occurred in September, 1898, resulted in its destruction, the iron girders, beams, &c., being twisted into all kinds of fantastic shapes and the ground being actually covered with an indescribable mixture of molten metal, showing the intensity of the fire. The only part which the fire left intact at the western end, where the fire was fiercest, was the gallery in ferro-concrete, constructed on the Hennebique system. The roof and all the floors were consumed, the burning débris falling on the Hennebique floor which covered the pump-room, and it was this floor which stopped the fire. It remained perfectly intact. The pumps, being thus protected, escaped injury.

A fire occurred in October, 1900, at a six-storey warehouse of the

Adler Cycle Co. at Frankfort-on-Main, all the floors and pillars of which were in Hennebique ferro-concrete, the walls being of brick. The fire broke out on the fourth floor, where a large stock of celluloid was kept. A violent explosion followed, which completely blew outwards the brick walls of the upper floors, lifted the roof in the air several feet high, and caused the upper storeys to fall back with terrific force on the floor of the third storey. That floor withstood the impact without damage, and saved the lower storeys from destruction. The view published shows the floor sustaining the enormous load of débris.

A fire which raged for two hours in July, 1901, at Mr. Van Hoegarten's spinning mill at Court St. Etienne, Belgium, did no damage to the Hennebique ferro-concrete construction.

At the dye works of Mr. Paul Miray a fire occurred in the Hartmans' dryer, installed in a building constructed on the Hennebique system. This building remained intact, and

acted as a fire screen, preserving the upper and lower floors and surrounding buildings.

The casino of Trouville was partially destroyed by fire in 1900, the saving of a portion being due to a floor in Hennebique ferro-concrete.

The dye works of the Union Industrielle de Tarare (France) were completely destroyed by fire except for a floor constructed in Hennebique ferro-concrete, which remained intact, sustaining heavy débris of machinery.

A fire at a maltings at Furnes, Belgium, in November, 1905, destroyed the two floors of a storehouse constructed in concrete and steel joists, but the floor in Hennebique ferro-concrete resisted perfectly, although it had to carry the two floors which fell on it, with the goods stored upon them.

The second illustration here given is of a fire at Bilbao which occurred in September, 1902, in the stores of the "Bodegas Bilbaines." The Hennebique floor not only withstood the fire, but supported the shock produced by the fall of the roof and the walls.

A fire occurred in January, 1906, at Newcastle-on-Tyne in the seven-storeyed warehouse built entirely in ferro concrete in 1900, and belonging to the Co-operative Wholesale Society, Ltd., of West Blandford Street, Newcastle-on-Tyne. The fire broke out in the third floor of this building, where large quantities of bran were stored. The other floors were full of groceries of various kinds and other inflammable goods. When the alarm was given it took about two hours before the firemen could reach the seat of the fire, owing to the smoke and fumes. They brought to play two jets which were working at a pressure of about 100 lbs. per sq. in. As it was impossible to play the water direct on the burning materials, the jets were directed on the panel of the floor immediately above the worst part of the fire, and these jets were kept centred on the same spot for over an hour. Owing to the high pressure and the great force of the jets and the length of time they played on the intensely hot floor, a small portion of the ceiling rendering was disintegrated and the lower bars exposed for a small part of their length, but the floor itself was very little affected, and was repaired at a cost of a few pounds. The floor pillars and partitions were undamaged, and no water found its way to the floor below. The actual damage was absolutely confined to the goods of this floor.



HENNEBIQUE FERRO-CONCRETE FLOOR AFTER THE FIRE AT THE STORES OF THE BODEGAS BILBAINES BILBAO, SPAIN.

THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

April 18, 1906. Vol. 23, No. 584.

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Ritz Hotel, Piccadilly, London. Mewès & Davis and John P. Bishop, Architects. Steel-work designed by S. Bylander -	- 207-9

Modern Material at South Kensington. The Londoner wandering through the courts and galleries of South Kensington Museum rarely stops to consider its architectural features—a fact partly due to the long delays in its completion. The exterior indeed is now hidden by the great screen of scaffolding, behind which Sir Aston Webb's work, the Victoria and Albert Museum, is growing to completion. The court—or "courtyard" as popular parlance will have it—is remarkable for the combination of red brick and terra-cotta in deeply recessed loggias, triple arches, and small Venetian balustrades, while in the interior there is the court generally devoted to objects lent by private individuals, a court remarkable for an early and successful use of iron, glass and mosaic for the purposes of a museum. The court is divided by a gallery supported by coupled iron columns fluted in spirals, similar columns surrounding the entire area, with light arches of simple ironwork rising from them; they are painted in light brown and pale blue harmoniously combined, and touched with gold. The glass roof is supported by iron arches of similar style, the rivet heads emphasized by being gilt. The upper storey is a "blind" arcade, decorated with flat mosaic figures of architects and artists in colours on a gold ground; they are too numerous to mention, but William of Wykeham, Giotto, Cimabue, Ghiberti, Jean Gougon, Inigo Jones and Wren are exceptionally fine; while, at either end, in large lunettes on the walls, are Lord Leighton's great frescoes of industrial art applied to Peace and War. As another example of a different kind, but essentially a modern example, we may turn to the refreshment room. Here tiles are applied to the entire surface of the walls, mainly in cream white

or very light tones, the room being divided by an open arcade rising from coupled piers, all faced with tile, the piers having capitals of an Ionic character—a feature difficult to reproduce faithfully in that material: was it wise indeed to reproduce it at all, in the circumstances? The feature, however, which best deserves attention is the ceiling, painted in light arabesques on—iron! with thin sheets of that material fastened by rivets which are plainly seen. The chamber suffers somewhat from excess of decorative ornament, which covers every inch of available surface; the effect is rich, interesting and somewhat embarrassing, but after the Loan Court, flooded with light, the place is a little sombre and the transition too abrupt. There is an additional room adjoining it decorated in the low toned colours so much in vogue a few years ago—and here rendered even lower by a bad light. The galleries devoted to the exhibition of ceramic ware are also examples of tile decoration, and there is much in the interior of the building generally which speaks well for the artistic courage and freedom from convention of the men of "the day before yesterday."

The Nonchalant Planner.

THE haphazard way in which the English architect's planning of compartments seems to gather itself together has often been remarked upon and compared very unfavourably with the planning of French architects and those in America who have followed on the lines of the French school. The want of care is chiefly displayed in the design of domestic buildings. Of course, there is a good deal of excuse for this in respect of the smallest houses, because the question of cost stipulates that the building shall be squared-up, and thus the planning becomes a question of dovetailing rooms within the confines of the regular figure, but when we get beyond these into the large buildings there seems to us no excuse for irregular-shaped rooms and straggling plans. The method by which these are arrived at is evidently to start with a few general principles, and then to draw compartments of an approximate size and let the work in with each other as best they can. A corner is sheared off here and an unoccupied space of irregular shape thrown in there, with the result that nothing seems properly thought-out, yet it is apparent that by a little rearrangement a very much more logical solution of the problem could have been secured. All these little corners and irregular-shaped compartments are not only wasteful, but they often preclude the possibility of properly furnishing the rooms: furniture indeed is hardly ever considered. Architects seem to think that as there is so much variety in furniture their clients can just go and buy articles to fit the rooms, but in regard to almost all the most important

articles of furniture there are general sizes within which all the varieties come, and if there is no space for an article of furniture—and, indeed, if there is too much—the house is defective. Bedrooms, for instance, are often planned without any regard to the position of the bed, the placing of the chimney-breasts, or the positions of the doors and windows. The shape often means that a large room cannot be used for the purpose which its size warrants, and its appearance can never be made satisfactory. The same thing applies to other articles in the room besides the bed. There are wardrobes, chests of drawers, blinds and carpets to be considered, each in relation to the room and to each other. The other rooms in a house require just as much care. In the dining-room the table and sideboard need consideration, while in the drawing-room sofas, cabinets and pianos should be studied. One often finds the fire so placed that it is quite impossible to get a grand piano in a room of large dimensions without throwing everything else out of gear. Another very important room in any house is the kitchen. This compartment is most used of any in the house, and here space should be given for easy working. The furniture to be arranged for are tables, dresser, cupboards, &c. The scullery too has its special furniture. The question of furniture is important; therefore, because it is a necessary part of the lives of the occupants, and if the rooms are deficient in this respect they do not serve their function, and the planning must be held to be incompetent. Architects do not sufficiently enquire into the working of the buildings they design, and, what is of still greater importance, they do not take sufficient care. Not only is this want of thought too often visible in the planning of houses, but it applies in commercial buildings almost as much, although the fact that special requirements need special treatment seems more realized here, and, consequently, architects take the trouble to enquire about the more obvious things.

Line Drawings for Reproduction. WE are frequently asked by architects how line drawings for reproduction in our columns should be prepared. We would point out therefore that all plans should be in straightforward black and white, every line being clear; faint lines are useless, because, however effective they may look on the original drawing, they will come out in the reproduction just the same as the strong lines. Lettering should be large and bold—even rather coarse—and lines tending to thickness rather than to thinness. There must be no tinting, as this would come solid. With wash drawings or photographs the case is different, as they are reproduced by another process which renders all tones in proper gradation.

REINFORCED CONCRETE.

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(Concluded from p. 177, No. 582.)

Double Reinforcement.

MOST beams are constructed with a single reinforcement only, this being placed in the tensile side. If we place a similar reinforcement in the compression side we have what is termed a double reinforcement.

Concrete in compression, when reinforced by longitudinal rods only, has, when under strain, no additional properties similar to those found by experiment when under tension. Thus the total strength of the portion in compression is the sum of that due to the concrete and to the reinforcement separately.

Assuming then, as before, that strain is proportional to the distance from the neutral axis, we may obtain fundamental equations similar to those of a single reinforcement, but more complicated, due to the additional reinforcement introduced. The following simpler method was proposed by Considère.

Suppose the beam in Fig. 11 to have at first a single lower reinforcement only, and that the position of the neutral axis has been found as in dotted line.

Let s = stress intensity on this lower reinforcement, and a = its area.

If now we add an upper reinforcement a_1 , and an additional lower reinforcement a_2 , so that $\frac{a_2}{a_1} = \frac{x}{y}$, the total stress above the neutral

axis will still equal that below, since additional areas are inversely as the stress intensities on them; and the additional moment due to the new couple introduced is $sa_2(x+y)$.

This method may be conveniently applied thus:—

To find, for example, the moment of resistance curve of a unit beam where the top reinforcement is one-half the lower. With the single reinforcement of 1 per cent. we find by the previous method $x = .625$ in. and $f = 30,000$ lbs. per sq. in. The reinforcement we will assume placed $\frac{a_2}{a_1} = \frac{275}{525}$ from the top of the beam. We have then

by principle above; and $a_1 = \frac{1}{5}(a + a_2)$, by condition that top reinforcement is one-half the lower; from these, since $a = 1$, we find $a_1 = .68$ per cent. and $a_2 = .36$ per cent., giving the total top reinforcement as .68 per cent. and the total lower as 1.36 per

cent. The additional moment is $f \times a_2 \times (.525 + .275) = 30,000 + \frac{36}{100} \times 0.8 = 86.8$ in.-lbs.

Adding that for a single 1 per cent. reinforcement 292.3 „

Total moment of resistance 379.1 in.-lbs.

Working out several cases, we get the full line curve on Fig. 12, the total percentage of reinforcement being plotted horizontally, and it is clear how similar curves can be obtained with a top reinforcement in any ratio to the lower. Comparing this curve with that on Fig. 3 (preceding article), we see how for high percentages of reinforcement we get a greater value of m with a double reinforcement but a less value with low percentages. This might have been anticipated, for looking at Figs. 3 and 5 we see that with high percentages the concrete is fully stressed while the steel is at a very low stress, and so inefficiently used. It is analogous to a steel girder with the lower flange much stronger than the top. So, clearly, it would be of advantage to remove some of the steel from the lower side and strengthen the weaker member—that is, the top side—with it, at the same time using the steel still remaining at a higher stress intensity, and thus more efficiently.

But at low percentages it is the lower side that is the weaker member (see Fig. 5); the steel is fully stressed and, of course, any removal to strengthen the top portion is only strengthening that which is already too strong and weakening that which is already too weak. If we do so we decrease the moment of resistance, as a comparison of Figs. 3 and 12 shows. At about 2 per cent. total reinforcement the bend in the curve shows we have the critical percentage; with a higher percentage the top portion, though reinforced, is still the weaker member, and thus beyond this value a double reinforcement of the same total percentage, but with a still greater proportion in the top, will give a still higher value of m .

Economic Percentage.

For cases of simple beams the following investigation gives an idea of the comparative economy of different percentages of reinforcement. We cannot perhaps state exactly the relative cost of the constituent materials in the beam, but, pricing the concrete at 24s. per cub. yd. and the steel at £7 per ton, and taking its weight at 450 lbs. per cub. ft., gives the relative cost of steel to concrete at 100 to 2.9 per equal volumes.

We may take also such proportion as 100 to 3.4 and 100 to 2.4, and we will have curves practically parallel to those to be deduced, showing that the principle holds for reasonable variations of cost. Adopting the ratio 100 to 2.9, we can easily compile Table IV. For the various percentages of reinforcement we have the values of m for the unit beam where $b = d$. Its area is 1 sq. in., which we have multiplied by 100 to avoid decimals—making clearly no difference for comparative results. The areas of each element are next given, and multiplying by 2.9 and by 100 gives the cost of each and the total cost. Then $\frac{\text{total cost}}{m}$ is the cost per in.-lb., and

is the cost number for comparison as to the most economic percentage of reinforcement. It is seen from the table and also from Fig. 13, plotted from these values, that the critical percentage is also the most economic but that the comparative cost rises very slowly for percentages higher than the critical and much more quickly for percentages lower than the critical. This table is for a beam proportioned with $b = d$; but the curve will be of the same type whatever ratio b is to d provided $b \times d = 1$. For instance, if $b = \frac{4}{5}$ in. and $d = \frac{5}{4}$ in. (whence b is almost

$\frac{2}{3}d$) the area remains constant and so the cost also. The value of the moment of resistance for this unit beam is now

$$m \times b d^2 \quad m \times \frac{4}{5} \times \left(\frac{5}{4}\right)^2 = 1.4m.$$

Hence $\frac{\text{cost}}{\text{moment of resistance}}$ is now $\frac{4}{5}$ ths of

its former value for each percentage, and so the curve will be flatter but will rise or fall in the same way.

As already stated, the critical percentage is also the most economic, which, it may be said, is quite to be expected, since at that point we are working both steel and concrete at their maximum allowable stress intensity. But if we increase the relative cost of steel and concrete to 700 to 2.9, the cost numbers so calculated are shown in the second lowest row of Table IV.; and if we increase to 1,000 to 2.9, they are as shown in the lowest row, in which case the cost rises continually with the percentage reinforcement. It is a question of whether the increased moment of resistance obtained by the higher percentage of reinforcement is proportional to the extra

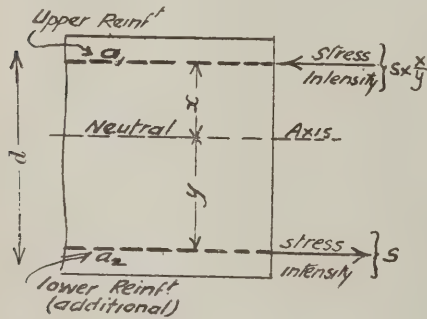


Fig. 11

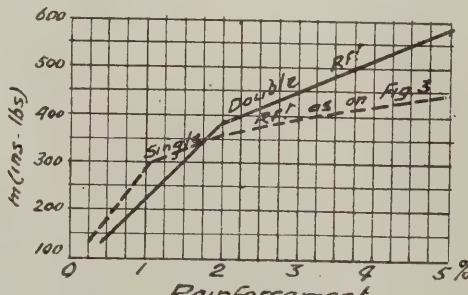


Fig. 12

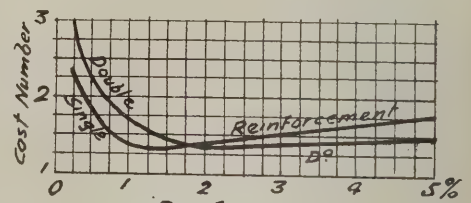


Fig. 13

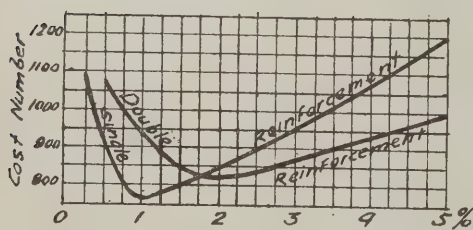


Fig. 14

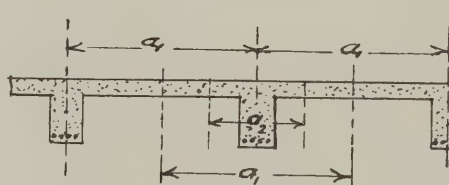


Fig. 15

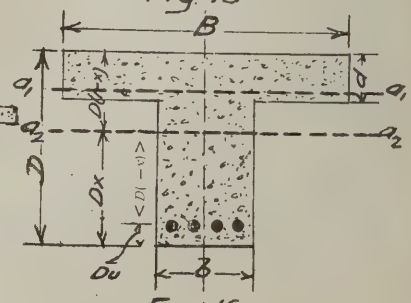


Fig. 16

TABLE IV.—SINGLE REINFORCEMENT.

Reinforcement percentage.					1.	2.	1.	2.	3.	5.
<i>m</i>	-	-	-	-	130'2	182'4	292'3	355'6	388'0	437'3
Area	{ Concrete	-	-	-	99'75	99'5	99'0	98'0	97'0	95'0
	{ Steel	-	-	-	0'25	0'5	1'0	2'0	3'0	5'0
Total area					100'0	100'0	100'0	100'0	100'0	100'0
Cost	{ Concrete	-	-	-	289'3	288'5	287'1	284'2	281'3	275'5
	{ Steel	-	-	-	25'0	50'0	100'0	200'0	300'0	500'0
Total cost					314'3	338'5	387'1	484'2	581'3	775'5
Cost per in.-lb.					2'38	1'83	1'32	1'35	1'49	1'77
"	Steel = 700	-	-	-	3'56	3'45	3'38	4'70	6'13	8'64
"	" = 1,000	-	-	-	4'14	4'24	4'40	6'38	8'45	12'05

cost of the steel relative to the concrete. It is clear that if the relative cost of the steel were such as to make that of the concrete negligible, the cost number would increase continually with the percentage unless a proportionately higher moment of resistance was obtained. Fig. 3 shows this is not so, hence the cost number would rise continually. So at about the actual relative costs the critical and economic percentages agree, but this is a coincidence only.

If now we calculate in a similar way the cost numbers for a double reinforcement, we shall find that the critical percentage is again the most economic, and that the cost number at this percentage (2 per cent. total) is 1·30—practically the same as that of a single reinforcement at its economic percentage. The curve so found is also shown on Fig 13. If we

compare the curves with $b = \frac{2}{3}$ in. and $d = \frac{3}{2}$ in.

in both types of reinforcement we shall obtain the same result; and this is so no matter what ratio b is to d , as is obvious from previous considerations of the effect of this ratio. If we calculate similar curves with $b = d = 1$, or b in any ratio to d , on a basis of a parabolic stress diagram above the neutral axis, taking also $c = 500$ and $f = 10,000$, we again find a similar result. This is contrary to the general idea of the relative economy of single and double reinforcements. This method of comparison has been proposed, but it hardly represents the practical side of the question, for we have compared the costs of beams of the same size but with different percentages of reinforcement, and so each develops a different moment of resistance. Percentage reinforcement being the same, the cost varies as bd , while the moment of resistance varies as bd^2 ; hence for a large beam the ratio $\frac{\text{cost}}{\text{moment of resistance}}$ is less than for a smaller one. Practically we want the most economic beam possible to develop a definite moment of resistance; as we increase the percentage of reinforcement, m increases, and so the size of the beam to develop this definite moment of resistance decreases; hence the cost of a high percentage relative to that of a lower percentage beam, if each develops the same moment of resistance, will be greater than that given in Table IV. and Fig. 13.

Working out a case for different percentage reinforcements of beams to develop a definite moment of resistance, we shall find this corroborated. We must adopt some ratio of b to d —say $b = \frac{2}{3}d$.

If M = moment of resistance, $M = mbd^2 = \frac{1}{2}md^3$.

α may have any value; different values will only alter the gradient of the curve and make no difference in the position of the minimum value of the cost number; and it will not effect the comparison of single and double reinforcement cost numbers as regards this minimum value.

Taking $M = 1,000,000$ ins.-lbs., to find the cost of a 1 per cent. single reinforcement beam we have $1,000,000 = \frac{2}{3} 292 \cdot 3 d^3$, whence $d = 17 \cdot 24$ ins. and $b = 11 \cdot 49$ ins. Hence area of

concrete = 196 sq. ins. and reinforcement
198 sq. ins.

Cost of concrete	$196 \times 2.9 = 569$
------------------	------------------------

Cost of reinforcement $1.98 \times 100 = 198$

Total - - 767

For a 2 per cent. total reinforcement of which the upper is one-half the lower, $d = 15.8$ ins. and the cost comes out 818—higher than that of the single reinforcement, and both are taken at their critical percentages. Curves so found for different percentages are shown on Fig. 14. It is seen that in this figure also the critical percentage is in both cases the economic, but that the most economic beam of all is that with a single reinforcement. If, however, for any reason we adopt a higher percentage of reinforcement, the double reinforcement becomes the less costly, and more so the greater the percentage. Hence, if owing to limitation of constructional depth we adopt a beam of small depth it may be necessary to use a high percentage of reinforcement, and in this case from either method the double reinforcement will be the more economic.

Comparing the cost at high with that at low percentages, it is seen that it is much higher proportionately in the curves of Fig. 14 than in those of Fig. 13.

This comparative cost result cannot, of course, be rigidly applied in practice, as it is deduced from the consideration of a single isolated beam, while in actual structures other factors of influence come in. But it can be taken into account and be given its due weight in the actual circumstances just as is done in other types of construction.

The curves deduced here are only for this method of calculation and for the unit stresses adopted. But whatever unit stresses are adopted it is evident that similar curves may be obtained; and that of Fig. 3 enables the necessary size of a beam to develop any moment of resistance to be found with very little labour. And whether we adopt in calculation Considère's method as described here, Professor Hatt's method as described in the "Engineering Record" (1902), that given in Marsh's "Reinforced Concrete," or any of the other proposals put forward, similar curves may be obtained.

T-Shaped Beams.

So far we have dealt with beams rectangular in cross-section in order to show the method of calculation. But in most practical cases the beams are T-shaped—a portion of the floor forming the table of the T and adding to the moment of resistance of the beam. Having shown the principles of calculation by consideration of rectangular beams the investigation of T-shaped beams is a simple step. In our calculations we will, as is recommended by most investigators, neglect the tension of the concrete, knowing now that it gives a greater factor of safety below the critical percentage and makes little difference above that percentage; it greatly simplifies calculations of T-beams however, as will be seen from the investigation to follow.

Fig. 15 shows a section of a floor; the

slabs between the girder-beams are calculated as rectangular beams; but since the whole of the concrete of the slab is not at the maximum allowable stress, it is customary to include part of the slab in the cross-sectional area of the girder-beams also. To take length a_1 as the table of the T seems excessive, considering it is already under stress as a floor slab; we will take length a_2 as forming the table, where $a_2 = \frac{1}{2}a_1 = \frac{1}{2}$ distance between the girder-beams—that is, the table extends on each side one quarter the distance apart of the girder-beams. Suppose the dimensions of the T beam are as on Fig. 16, and let $b = 24\text{ins.}$, $d = 16\text{ins.}$, $b = 8\text{ins.}$, $d = 4\text{ins.}$

Consider the beam at present as of solid section $b \times d$ and that $p = \frac{3}{8}$ per cent. of $b \times d$. By former methods we find $x = .778T$. The neutral axis then lies $.778 \times 16\text{ins.} = 12.45\text{ins.}$ from the bottom of the beam, or 0.45in. above the lower edge of the T, as shown by a_1, a_1 . Since we have neglected the tension of the concrete, clearly the fact that the beam is not of solid rectangular section below a_1, a_1 makes no difference to the calculated strength, and hence the moment of resistance of the T-beam is $m b d^2$, where m is the value of the moment of resistance of the unit beam with $\frac{3}{8}$ per cent. reinforcement calculated with $t = 0$.

Take next a case when $p = 1\frac{1}{2}$ per cent. of $b \times d$, and consider again that beam is of solid section $b \times d$. We find that in this case $x = .61$, and the neutral axis now lies $.61 \times 16$ ins. = 9.76 ins., that is, 2.24 ins. below the lower edge of the table, as shown by a_3, a_2 . It again does not matter for the section of the concrete in tension, as it is neglected, but in these calculations the concrete is supposed of complete rectangular section above the neutral axis. This is not so now, and with this value of x it is clear that, owing to the lessening of the concrete area, c will be less than r .

We must establish new equations for a case where the neutral axis falls below the lower edge of the table. Taking dimensions as on Fig. 16, let p = ratio of reinforcement to $b \times d$; k and u as before; and also let $b = m b_0$, and $d = n d_0$, where m and n are less than unity. We have under assumptions as in the former case of rectangular beams,

$$\frac{c}{kf} = \frac{1-x}{x-u} \quad . \quad . \quad . \quad (4)$$

This is exactly as equation (1) before ; and for the second equation we have

$$\frac{c}{2} \text{BD} (1-x) - \frac{c_1}{2} (B-b) \{D(1-x) - d\} = f p \text{BD},$$

where c_1 = stress on the concrete at the underside of the table—that is,

$$\frac{c}{2}(I - x) - \frac{c_1}{2}(I - m)(I - x - n) = fp.$$

But $\frac{c_1}{c} = \frac{D(1-x) - d}{D(1-x)} = \frac{1-x-n}{1-x}$.

Hence $\frac{c}{2}(1-x) - \frac{c(1-x-n)^2(1-m)}{2(1-x)} = fp$,

which becomes

$$\frac{c}{2(1-x)} \{ (1-x)^2 - (1-m)(1-x-n)^2 \} = fp.$$

If $b = B$, then $m = 1$, and we have the former equation (2). Putting value of f from (4), this becomes on cancelling

$$\{(1-x)^2 - (1-m)(1-x-n)^2\} = \frac{2p(x-u)}{k} \quad (5)$$

This equation enables us to find the neutral axis when we know that it must fall below the lower edge of the table. Applying it to the above case—

$$(1-x)^2 - (1-\frac{1}{3})(1-x-\frac{1}{4})^2 = \frac{2 \cdot \frac{1.5}{100} (x-\frac{1}{10})}{\frac{1}{10}}$$

This becomes $x^2 - 3.9 \times 1.965 = 0$.

A root must be between 0 and 1, and drawing the graph for this portion gives $x = .592$.

The neutral axis is now lowered to .592 × 16 ins. = 9.47 ins. from the bottom of the beam, or 2.53 below the underside of the table.

Taking moments of c and F about the neutral axis, we have

$$M = \frac{c}{2} D (1-x) B \frac{2}{3} D (1-x) - \frac{c_1}{2} (B-b) \left\{ D (1-x) - d \right\} \frac{2}{3} \left\{ D (1-x) - d \right\} + f p B D \cdot D (x-u),$$

which becomes

$$\frac{M}{B D^2} = \frac{c}{3} \left\{ (1-x)^2 - \frac{1-m}{1-x} (1-x-n)^2 \right\} + f p (x-u) \quad (6)$$

From the position of the neutral axis it is clear that $c = 2,140$ lbs. and $f = 25,750$ lbs.

per sq. in. Calculating $\frac{M}{B D^2}$ from equation

(6), we get, with $p = 1\frac{1}{2}$ per cent. of $B D$,

$$\frac{M}{B D^2} = 115 + 190 = 305 \text{ ins.-lbs.}$$

If now, to avoid the lengthy equation (5), we use equation (2), thus finding $x = .61$ as before, but adopt equation (6) to determine the moment of resistance, we obtain

$$\frac{M}{B D^2} = 105 + 214 = 319 \text{ ins.-lbs.}$$

In this case $c = 2,140$ and $f = 27,950$ lbs. per sq. in. In each case the first portion of

$\frac{M}{B D^2}$ is that due to the concrete and the second that due to the reinforcement; of course, taking $x = .61$, the total compression and tension over the section cannot balance.

If, as a second approximate calculation, we assume the beam to be of solid section $B \times D$, we can find the moment of resistance by equation (3); $f = 27,950$ lbs. per sq. in.

again, $x = .61$, and $\frac{M}{B D^2} = 323$ ins.-lbs.

Comparing these approximate calculations with the correct calculation, the first is 4.6 per cent. and the second 5.9 per cent. in excess.

In this example the neutral axis is well below the lower edge of the table, and, finding a difference of only about 6 per cent. between the correct calculation and the approximate calculation by assuming the beam of solid rectangular section, it is doubtful if it is worth while to use the more tedious equations (4), (5) and (6), especially when we consider that the breadth B is fixed by the very arbitrary assumption that it is half the distance between the girder-beams. It would seem that by calculating the moment of resistance on the assumption of a solid section $B \times D$, and deducting a percentage depending on the position of the neutral axis, we would obtain a result accurate enough for practice with much less work than by adopting the correct equations (4), (5) and (6). The percentage to be deducted for T-beams of various proportion and with different positions of the neutral axis could be determined by working out a few examples by the correct and approximate methods, and tabulating them. Then the curves of Figs. 3 and 4 with this correction would be applicable to T-beams also. To draw curves of $\frac{M}{B D^2}$ for T-beams calculated by the correct equations would involve a large number of curves in order to give the value for any proportion of beam—that is, for any value of m and n and with all possible and practical combinations of these values.

Had we left out the projecting portions of the floor slab in the calculation of the girder-beams we would have had a solid rectangular beam $b \text{ in.} \times d \text{ in.} = \frac{1}{3} B \times D$ in section. The reinforcement of $1\frac{1}{2}$ per cent. of $B D$ is now $4\frac{1}{2}$ per cent. of $b d$, and the moment of resistance is $m b d^2$. From curves of Fig. 3 $m = 432$, for $p = 4\frac{1}{2}$ per cent.

Hence moment of resistance is $M = 432 b d^2 =$

$432 \frac{1}{3} B D^2 = 144 B D^2$, or $\frac{M}{B D^2}$ is now 144. The gain in strength due to the monolithic character of this construction is therefore $305 - 144 = 161$ ins.-lbs. This is in the ratio of $\frac{161}{144}$, or 111 per cent. Comparing similarly the case where $p = \frac{3}{8}$ per cent. of $B D$, or $1\frac{1}{2}$ per cent. of $b d$, the gain is 72 per cent., the less increase being due to the fact that from $\frac{3}{8}$ per cent. to $1\frac{1}{2}$ per cent. the increase of m is much greater proportionately than from $1\frac{1}{2}$ per cent. to $4\frac{1}{2}$ per cent. reinforcement.

Double Reinforcement T-Beams.

In a T-beam with double reinforcement—the top being one-half the lower reinforcement—the curve of Fig. 12 gives the value of

$\frac{M}{B D^2}$ provided the neutral axis lies within the table section. If not, we would have to establish equations similar to (4), (5) and (6), including also the top reinforcement stresses, since Considère's method for double reinforcement, previously described, is suitable to get curves of m only and not to get the moment of resistance of a definite section. For the same reasons as with single reinforcement, the curves of Fig. 12 with a correction depending on the position of the neutral axis would seem to give sufficiently accurate values of $\frac{M}{B D^2}$ —this varying correction to be determined as before.

In adopting the results of calculations carried out as described here it is necessary in all types of beams to be sure that the beam is of sufficient strength to resist the shearing stresses induced. Especially is this so in the case of T-beams; it is this consideration, in fact, that is an important factor in determining the limiting proportion of such beams. For, considering the tendency to shear along the horizontal plane at the lower edge of the table, the total shearing stress along this plane for half the length of the girder produces the total stress in the table at mid-span, if the maximum bending moment occurs there. The ratio of b to B to effect this without exceeding the maximum allowable stress intensity in shear depends then on the relative ratios of this allowable shearing stress intensity to that of compression, and of D , d , and b to the span. A general rule is that if b is not greater than $6b$ ample allowance is made for this stress.

Calculations for the reinforcement necessary for shearing stresses were not, however, taken up in the paper, as it would have caused it to be of undue length.

LOUTH, LINCOLNSHIRE.

By W. H. Watts.

LINCOLNSHIRE is one of the richest in architectural interest. Despite the small number of important towns and the comparatively sparse population, its architectural monuments are surprisingly numerous. The cathedral city of Lincoln—one of the most ancient towns in the country, Stamford with its many churches and fine old houses, and Crowland Abbey—are instances familiar to every architectural student.

The town of Louth, though not so famous as any of the places mentioned, has an interest all its own. It contains many buildings quite worthy of careful study.

First attention has been given to the church, which is undoubtedly the finest in the county, but the Renaissance work in the town seems to have been ignored by students; yet several houses date from about 1600 and are good examples of the Early English Renaissance period, though the greater quantity of work belongs to the Later English Renaissance period, and the continuous decay through the Georgian and Early Victorian classic is recorded in many of the houses. The character given by the better work, however, has preserved the town from many of the banalities. The Gothic Revival and later manners have had little opportunity of leaving their impress, as there has been little call for extensive building, and so to-day Louth remains a fine Renaissance town surrounding a noble Gothic church. Its quiet streets carry one back to the provincial life of the eighteenth and early nineteenth century—it typifies for us the life of our great-grandfathers. Nothing is known of the early architects who so dominantly stamped their individuality on the houses, but it is evident they were men of no mean ability, and it is very possible that some of the earlier work, if not the later, might be traced to well-known men of the period. Apart from this, however, the history of the town can be followed fairly easily. Louth is of course small compared with modern manufacturing towns, but it was of considerable importance in the days when England was chiefly engaged in agriculture, for towns then were merely centres for the district.

Louth is situated in the centre of a rich grazing and agricultural area, and about ten miles as the crow flies from the sea. It derives its name from the Lud—the small river on the banks of which it is built. It



CHURCH OF ST. JAMES LOUTH.

was known in ancient times as Ludes or Luda, and natives call themselves by the resounding title Ludensians. Evidence of its occupation by the Romans has been discovered, several Roman coins having been found in various parts of the town. It is thought that a branch road from the Foss way reached here. In 1822 some ancient oak coffins supposed to date from Saxon times were discovered in the Market Place, and the town is also mentioned in the Domesday Book. Louth Abbey, situated about a mile from the town, was founded about 1140.

The inhabitants have on several occasions taken a more or less prominent part in the many religious risings which have occurred in Lincolnshire. There is some record of these disturbances as far back as the reign of King John, but the principal one was the Lincolnshire Rebellion during the reign of Henry VIII. After the suppression of this rising the vicar of Louth, together with a number of other men, was executed at Tyburn. Some small part was also taken in the civil war between Charles I. and Cromwell. The latter passed through the town after the battle of Winceby.

The period of Louth's greatest prosperity, when the majority of its Renaissance work was erected, was after the construction of the canal which runs from here to Hull. The fever for constructing canals which occurred before the railway boom brought prosperous times in many cases to agricultural districts, and built up industries that had been forced to remove to more convenient centres or had decayed by competition from those more favourably situated. The railway came to Louth later, but has done little for it. The canal at Louth was completed about 1765. A few vessels still trade with Hull, Grimsby and London, but its prosperous days are over: hence we see on the banks of the canal many disused mills and factories.

Without doubt the town enjoyed its greatest prosperity in the latter part of the eighteenth and early part of the nineteenth century. This was the time during which the canal flourished, and there are also several other facts which bear out this conclusion. One of the largest factories bears the date 1818 and the pump in the Market Square 1820. There are also several houses which date from about a century ago to 1830, and but a few years later than this the Town Hall and new Corn Exchange were built.

The first thing one notices on approaching the town from any direction is the church. Lincolnshire churches are as famous as they are numerous, and of them all the finest is St. James's, Louth. The graceful outline of the tower and spire can be seen for miles around. The nave and aisles are, without doubt, the oldest portions of the building. They were commenced some time in the thirteenth century and completed about the year 1380. The nave is very lofty, although viewed from outside the great height of the spire gives it a long low appearance. It is built on the site of a much narrower one, the foundations of the piers of which were discovered during comparatively recent excavations. The chancel, built about 1480, consists of four bays of lofty pointed arches. The east end of the church contains a very fine window flanked by two canopied buttresses and surmounted by a parapet, termi-



CHURCH OF ST. JAMES, LOUTH.

From "Gothic Architecture in England" (Batsford).

nating in a cross. Pinnacles surmount the buttresses on each side of the church.

The most interesting portions of the church are the north and south doorways, and some of the pillars and arches of the nave, which are the only remains of the older church. These are fine specimens of early thirteenth-century work.

The tower and spire, together nearly 300 ft. high, are of very beautiful design. The tower is extremely massive, the walls of some portions being 7 ft. thick, and it is thought at one time to have stood detached. The lower portion contains the western doorway, and a five-light Perpendicular window, with coupled windows over the aisles on the north and south sides, and a lofty arch opening into the church on the east. Above this on all four sides are coupled two-light windows deeply recessed, and above this again similar windows and with richly ornamented canopies. The finials, pinnacles and the flying buttresses to the spire complete a tower than which for beauty of design and graceful proportion no superior can be found.

Restoration of various portions of the church have been frequent, but, on the whole, have been marked by extreme care and taste, a feature too often lacking in church restoration of modern times. The church is in an excellent state of preservation and, with due care, no drastic renovation will be necessary for a great many years.

The tower in its present form was completed in the year 1844 under the supervision of Mr. L. N. Cottingham. In 1861 the chancel and east window were restored, and at the same time the church was repaved and reseated, and again in 1869. A reredos has been added and both the porches rebuilt, the south being from the designs of a Mr. Withers. The restorations were carried out under the supervision of a local architect, Mr. James Fowler. The sedilia have been restored and two new stained-glass windows inserted in the north aisle and two in the south aisle.

The church was considerably damaged during the time of Cromwell by the Puritans, and quite a number of images and figures were taken from niches in the outside walls,



DOORWAY IN WESTGATE.

as they were considered to be symbols of Popery. A spot on the London Road is still shown where Cromwell is said to have placed cannon in position to demolish the church, but at the last moment the beauty of the structure overcame even his inartistic soul, and he countermanded the order for its destruction.

As a whole it is a spacious and elegant building in the Perpendicular style, lacking however much of the elaborate and stiff decoration common to this style, doubtless owing to the fact that it is a comparatively early specimen.

The original parish church, St. Mary's, stood on the north-west side of the town somewhat back from the road. It is known to have been in a dilapidated condition during the reign of Henry VII., and in 1552 the portions then standing were used as the grammar school. No portion, however, is now existing, and, in fact, the exact site is not known.

The earliest Renaissance work in the town is to be found in Westgate. In this delightful old street almost every house is of interest and many are of early date, namely about 1600. This evidently was the chief residential street in the earlier part of the town's history. Several views of houses in this street are given in the centre plates of the present issue, but one is compelled to omit some which are of interest because of the impossibility of obtaining photographs owing to the narrowness of the street. There

are hardly two houses alike, although they are very similar in character. On this page are given a photograph of a doorway and an interior view of one of the houses in Westgate, the list of the occupiers of which is

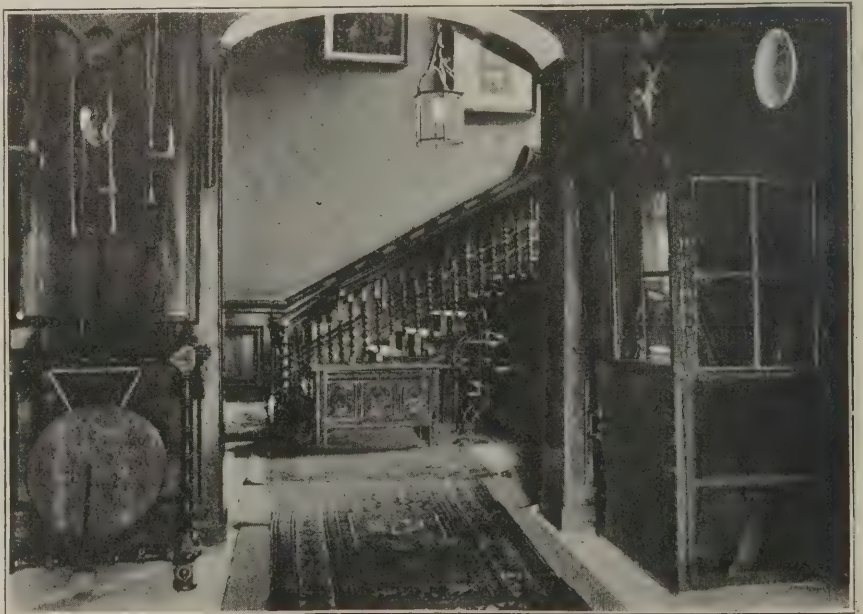
in existence, the names dating from 1610. Another house in this street, illustrated in the plates, had a doorway in place of the centre window which gave relief to the front, but the present occupier recently had the entrance transferred to the side. The other house in this street of which two illustrations are given in the centre plates is evidently of later date.

The work of the later period is to be found in a good many streets in the town; illustrations are here given of the houses in Uppgate (the London road) and in the Corn Market and Bridge Street. Respecting the buildings in the Corn Market, that shown on the left of the view in the centre plates has typical old shops below and a meeting-hall above. The other view shows early shop fronts of different date, together with a heavy pilastered front in stucco of the late debased kind, but still preserving some sedateness. In the corner of this square is the Corn Exchange itself, an atrocious example of later "Italian Renaissance" work, profusely decorated. This dates from about 1867, and is constructed of an exceedingly soft stone which is rapidly decaying.

The largest building in the town next to the parish church, and excepting a factory or two, which have been built within the last few years, is the town hall. This was built in Italian Renaissance style in 1854. Although a large and pretentious building, it has been erected in the narrowest part of the street, and, fortunately, by reason of its position, does not obtrude. It also is weathering badly.

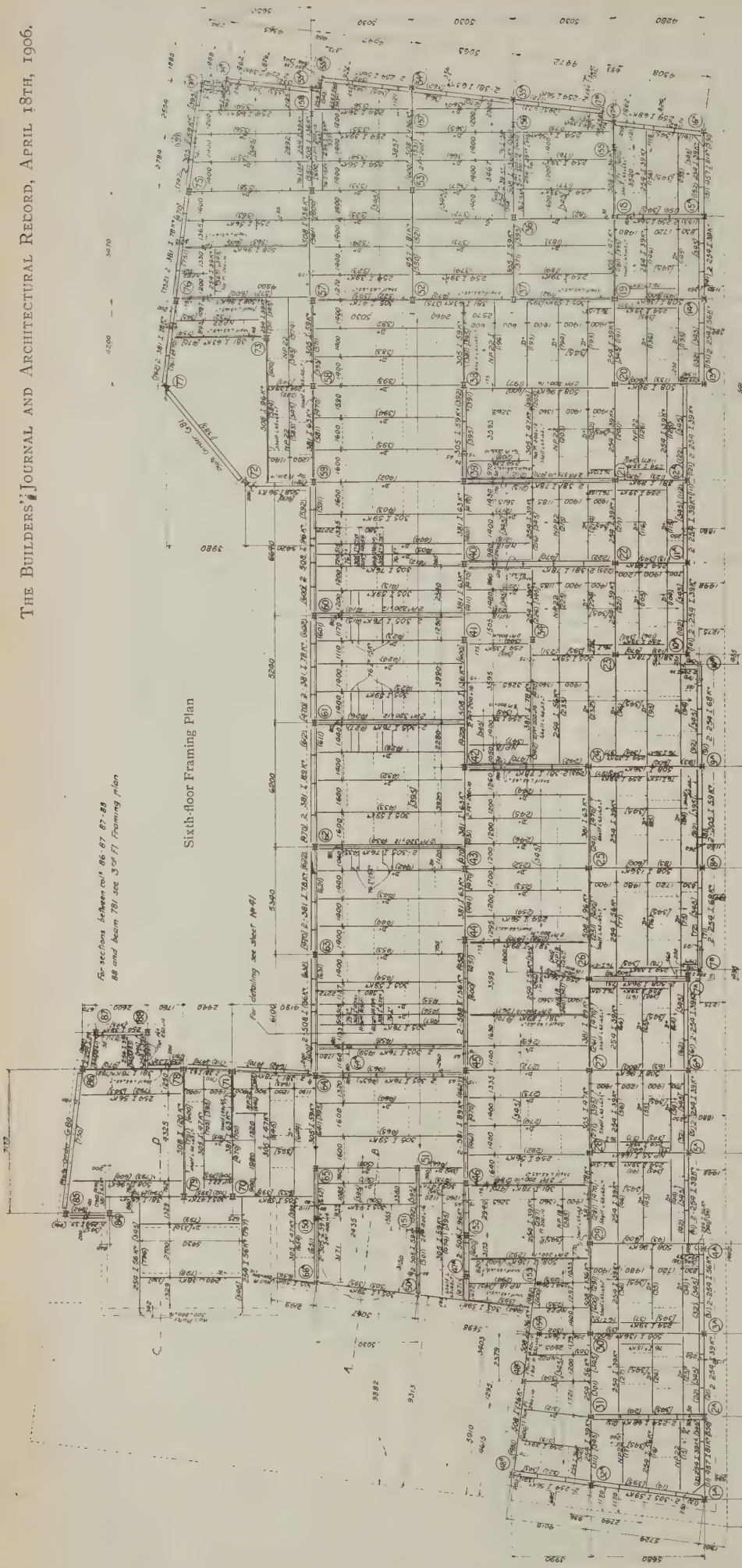
There are several Nonconformist churches in the town which date from about 1820 to 1850. Some of these are quiet and reserved, and others more pretentious, but all conform to the Renaissance character of the town. Several of the mills and granaries at the river head and on the banks of the canal and the River Lud are of some architectural interest, although of a plain character.

As regards modern work in the town, t only other buildings of particular interest are the grammar school and the hospital, both which are in the Elizabethan style. The grammar school, which has educated several well-known men as Sir John Franklin and Tennyson, stands in Schoolhouse Lane, and was erected from the designs of Mr. Jam Fowler. The original school was founded by Edward VI., together with a hospital to accommodate "twelve poor people." The hospital now takes the form of twelve almshouses, the occupants of which have a weekly allowance.

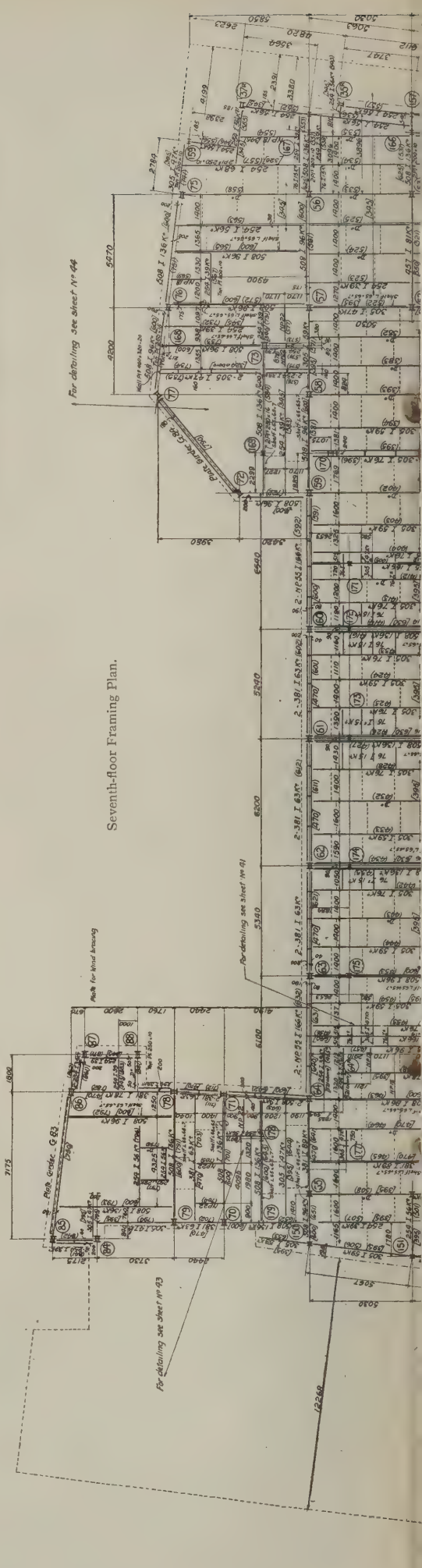


HALL AND STAIRCASE TO HOUSE IN WESTGATE.

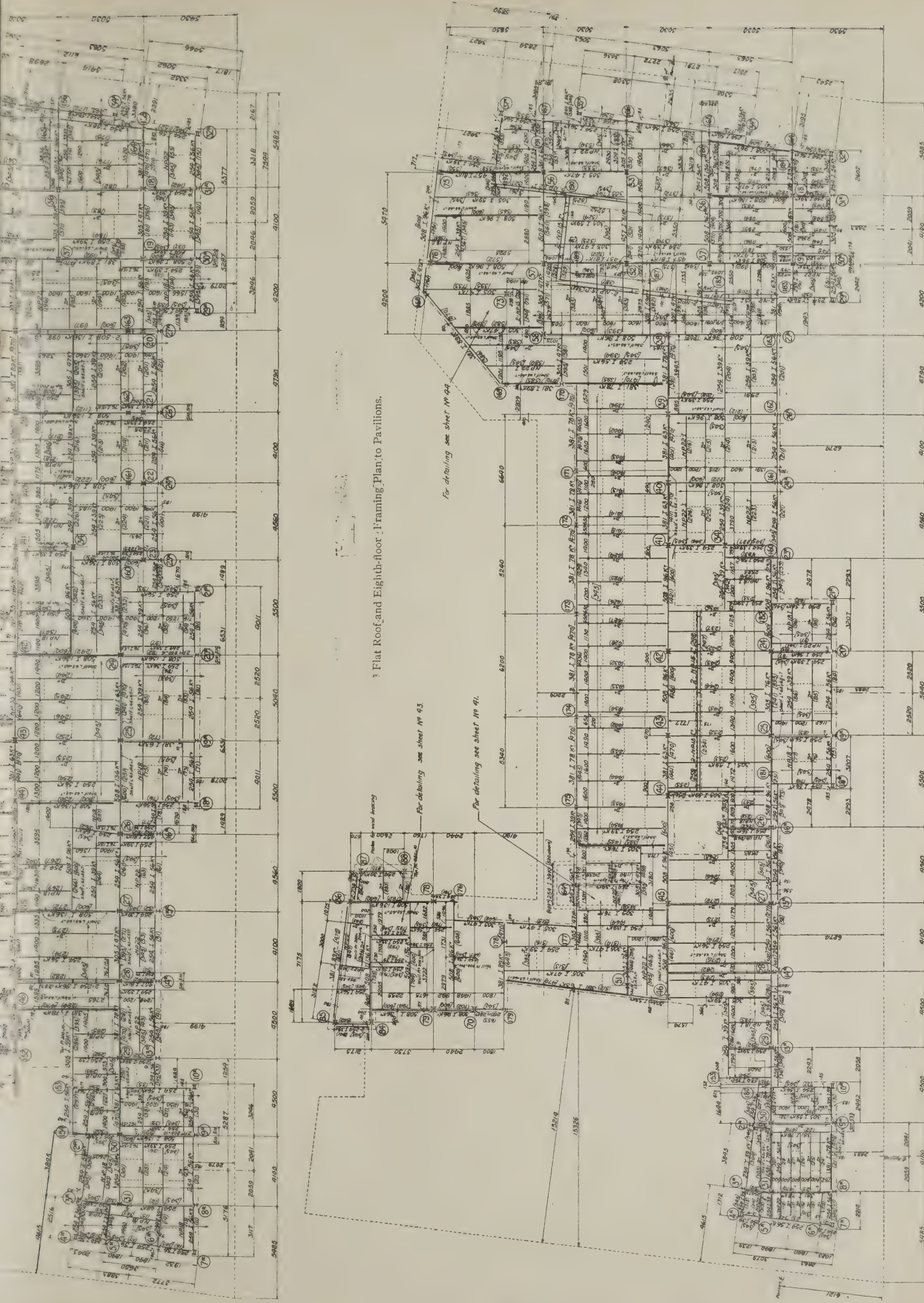




Sixth-floor Framing Plan



Seventh-floor Framing Plan



Figures in brackets thus [] denote the distance from finished floor level to bottom flange of beam. Figures in circles thus () denote numbers of columns. Figures in circles thus O denote numbers of columns.

THE RITZ HOTEL.

IN continuation of the series of steelwork plans of the Ritz Hotel (now approaching completion in Piccadilly, London) which we have published in previous issues, we now give the fifth, sixth, seventh and eighth-floor framing plans. The steelwork framing plan for the fourth floor was published in our issue for January 10th last, while that of the third floor was published in our issue for September 13th, 1905. The general principles and indications on the drawings have been explained in connection with other framing plans of the hotel published in our pages (see our issue for March 22nd, 1905).

The Fifth-floor Plan.

As regards the fifth-floor framing plan on p. 207 of this issue, the connections and dimensions are the same as on the lower floors. The exterior walls are set back at the fifth-floor level to Piccadilly, Arlington Street and Hyde Park, necessitating heavy cross girders at this floor, particularly at the corners. The problem of carrying the set-back wall was rather difficult, as no girders were allowed to project below the ceiling, and beams not more than 10 in. deep could be used, except beams which were placed in walls; for instance, the girder between columns 2 and 31 consists of three 10 in. beams with plates on top and bottom. The portion of the building next to Arlington Street is set back more than for the Piccadilly side. The girder between columns 32 and 48A has previously been described, and the arrangement for bracing the said girders laterally and forming the connection between the column and the girder was then described. It should be noticed that the strut 48B carrying the pavilion above rests on two 22 in. beams with two plates on top and bottom. These two plates are connected with the side connection angles to the plate girder G75, and there is also provided an angle with stiffeners. The setting-back of the wall is illustrated on the spandrel section on the upper left-hand corner marked "section between columns 5 and 6."

The Sixth-floor Plan.

On the sixth floor two beams are provided all around the front in order to carry the sloping roof. All the exterior struts stop at this level.

The Seventh-floor Plan.

The seventh floor starts at intersections of the sloping roof of the seventh-floor plan, and the different dimensions on this plan are given to the intersection points at the seventh-floors level. At the corner of each pavilion sloping hip rafters were used; for the centre pavilion they are marked 18R and 21R. The loads of the seventh, eighth and ninth floors are partly carried on these hip struts or hip rafters; and in order to take up the horizontal component, diagonal bracing was introduced between the columns and the rafters. At the back of the building, to the area, the roof starts at the seventh-floor level, and struts are placed on the cross-girders to carry the eighth floor and part of the roof.

The Eighth-floor Plan.

Portion of the eighth floor constitutes a flat roof. In the pavilion between Arlington Street and Piccadilly a water tank is placed; the beams in this floor served to carry that water tank. The same is the case with the pavilion between Green Park and Piccadilly.

Obituary.

Mr. W. H. Hopkinson, A.M.I.C.E., engineer, surveyor of highways, and inspector of buildings to the Keighley Corporation, died last week. He was about 50 years of age. His principal works under the Keighley Corporation were the construction

of the Marley sewage-disposal works at a cost of about £30,000; filter-beds in connection with the waterworks at Oldfield at a cost of about £20,000; and latterly the laying of the permanent way for the electric tramways.

Mr. John Caton, builder and joiner, of Blackburn, died recently, aged 66.

Mr. John Hammond, senior partner in the firm of J. Hammond & Sons, joiners, builders and contractors, of Bradford, died last week, aged 67.

Mr. V. D. de Michele, died at Rochester recently, in his fifty-eighth year. He was a well-known authority on cement.

Notes and News.

A Big Job.—The work of erecting a new station at Pontypridd has been commenced by the Taff Vale Railway Co. It is estimated that the new buildings and extensions will cost about £150,000.

Change of Address.—Mr. William F. May, architect and surveyor, has changed his address from 4, Featherstone Buildings, High Holborn, to 20, Newington Green, London, N. His new telephone number will be 2,279 Dalston.

Cardiff Town Hall.—At a recent meeting of the Cardiff Town Hall Committee it was stated that up to date the following payments had been made:—Contractors, £230,000; architects' commission, £11,438, and out-of-pocket expenses, £404; salary of clerk of works, £2,255.

Another Cottage Exhibition.—Newcastle is to have a model cottage exhibition in 1907, somewhat on the lines of the one at Letchworth (Garden City); but "freak" cottages and those which are not suitable for the Northern district will be strictly excluded.

The French Chamber of Deputies is to be altered under the direction of M. Nenot. According to his design the whole of the present Chamber will be demolished, and in two years a new and much larger Chamber will be built. The cost will be about £420,000, including the expense of a temporary chamber. Although the existing Corinthian columns will have to be taken down, it appears that they will be re-erected and will form part of a front not unlike that of the Grand Palais.

The new Vauxhall Bridge.—A model of a span of the new Vauxhall Bridge was exhibited at the London County Council meeting last week. The Improvements Committee recommended that granite pylons should be erected at both approaches to the bridge, and that an agreement should be made with Mr. Alfred Drury, A.R.A., for the modelling and casting, at a total cost of £2,800, of four groups of statuary, to be placed on the pylons, and that Mr. Bertram Pegram be associated with Mr. Drury in the case of two of the groups. The matter was postponed.

The Teak Trade.—Messrs. Denny, Mott & Dickson, Ltd., report that the landings of teak in the London docks during March consisted of 203 loads of logs and 279 loads of planks and scantlings, or a total of 482 loads, as against 474 loads for the corresponding month of last year. The deliveries into consumption were 480 loads of logs and 505 loads of planks and scantlings, together 985 loads, as against 1,140 loads for March, 1905. The figures sufficiently indicate the "dragging" condition of the market. In face of the difficulties in securing sufficient supplies holders have no reason to force sales, whilst consumers hold on tenaciously to the last moment before paying prices which they reasonably deem to be unnaturally high.

Glasgow Technical College Architectural Craftsmen's Society.—Mr. George Herbertson has been elected president for the current year, Mr. A. L. Currie and Mr. J. C. Reid vice-presidents, Mr. John Wilson and Mr. James Flett secretaries, Mr. A. Scott treasurer, and a committee of fifteen members.

Building Trade Bad in South Africa.—The April circular of the Emigrants' Information Office, 31, Broadway, Westminster, states that there is no improvement in the building trade in Cape Colony. Building trade employees are specially warned not to go to the Cape at the present time in search of work; and the same warning applies to Natal, the Transvaal and the Orange River Colony.

A Deputation from the Further Strand Improvement Committee in support of their memorial is to be received by the Improvements Committee of the London County Council on May 2nd. Until its presentation on that date the memorial may be signed at the Royal Academy of Arts, Burlington House; the Surveyors' Institution, 12, Great George Street; the Society of Architects, Staple Inn Buildings; or at the office of the honorary secretary, 7, Pall Mall. The Surveyors' Institution have subscribed £5 5s. towards the expenses of the committee.

York Architectural Society.—At the last meeting of this Society, held on April 5th, a paper on "English Architecture in Later Stuart Times" was read by Mr. C. F. Innocent, A.R.I.B.A., of Sheffield. The period under consideration was from the restoration of the monarchy in 1660 to the death of Queen Anne in 1714, a period lasting little more than half a century, but one of the greatest interest to the student of English architecture, for not only was an immense amount of building done but during this time the designers emancipated architecture from the crudity of Jacobean design. The architecture was marked by great restraint in design, a restraint which remained in the smaller buildings throughout the eighteenth century, but in the larger buildings was swept away by the exaggerated Palladianism of the Earl of Burlington and his followers. The sanity and practical common-sense which mark so many of the designs of the time was largely due to the influence of Wren, who continued in the practice of his art until the eighty-eighth year of his age.

Fatal Crane Accident at the Piccadilly Hotel.—Mr. John Troutbeck recently held an inquest at Westminster on the body of a ganger named William Smith, who died as the result of injuries received while working on the Piccadilly Hotel, on the site of St. James's Hall. It appeared that in the course of excavation on the site on November 3rd last a loaded skip was being lifted by a crane when, owing to the wet state of the leather on the brake, it failed to grip, and the skip caught the deceased man on the shoulder, knocking him on to a strut and pinning him there. He was removed to hospital, where it was found that he had received an injury to the spine. Paralysis and other complications set in, and he died on April 4th. The foreman said it was left to the discretion of crane-drivers to place a covering over their brakes. The Coroner: What material is supplied to them for covering?—Witness: None, sir; they can find a bit of sacking.—The Coroner: Do you suggest sacking is waterproof?—Witness: Well, rain won't go through it in five minutes.—The Coroner: We have not yet got to a five minutes' working day.—Answering a Home Office inspector, the foreman said he had full control over the crane-driver, but did not instruct him previous to the accident to place a covering over the brake.—A verdict of "Accidental death" was returned, and the jury added a rider expressing the opinion that the contractors had shown gross neglect in the management of their cranes.

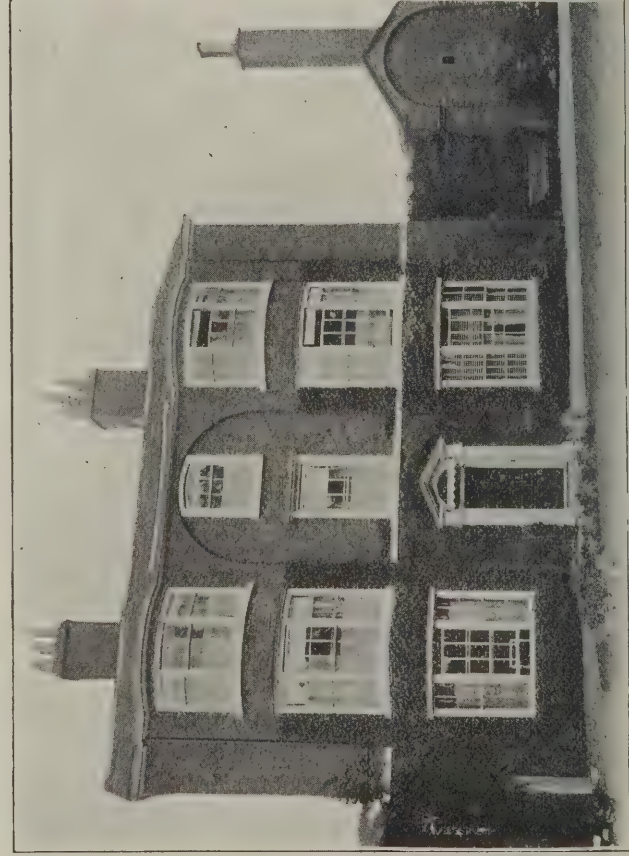
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Corner of Corn Market.



Shops in Corn Market.



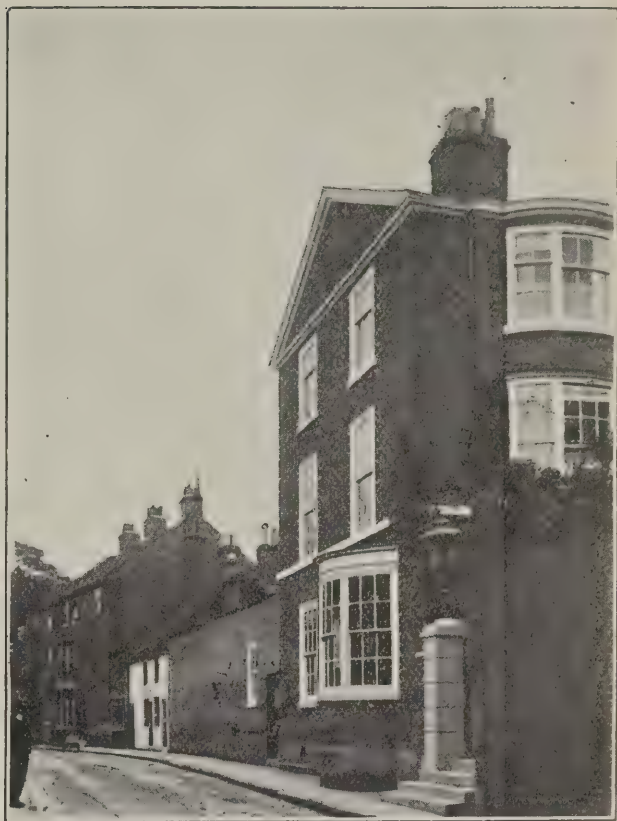
Garden Elevation of House in Westgate.



Houses in Uppgate.



Houses in Uppgate.



Street Elevation of House in Westgate.



House in Westgate.



Houses in Bridge Street.

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The querist's name and address must always be given, not necessarily for publication.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Correspondents are particularly requested to be as brief as possible.

Concrete Piers and Arches in Foundations.

KENSINGTON.—D. M. C. writes: "One wall of a proposed building is to come at the back of a tidal river wall. The subsoil is silt on gravel. It is proposed to carry the wall on concrete piers resting on the gravel, the piers getting practically no lateral support. The concrete would be composed of 1 part of Portland cement to 6 parts of ballast. Kindly give a convenient working formula for determining the section of a pier; the ratio of height to width being not more than 12 to 1. What would be a safe load to put on the gravel? To connect such piers a certain text-book on foundations mentions concrete arches. Are such 'arches' used in modern work? Is there any method of determining the necessary depth of such 'arches' in relation to the span? Which is the best way to connect such concrete piers?"

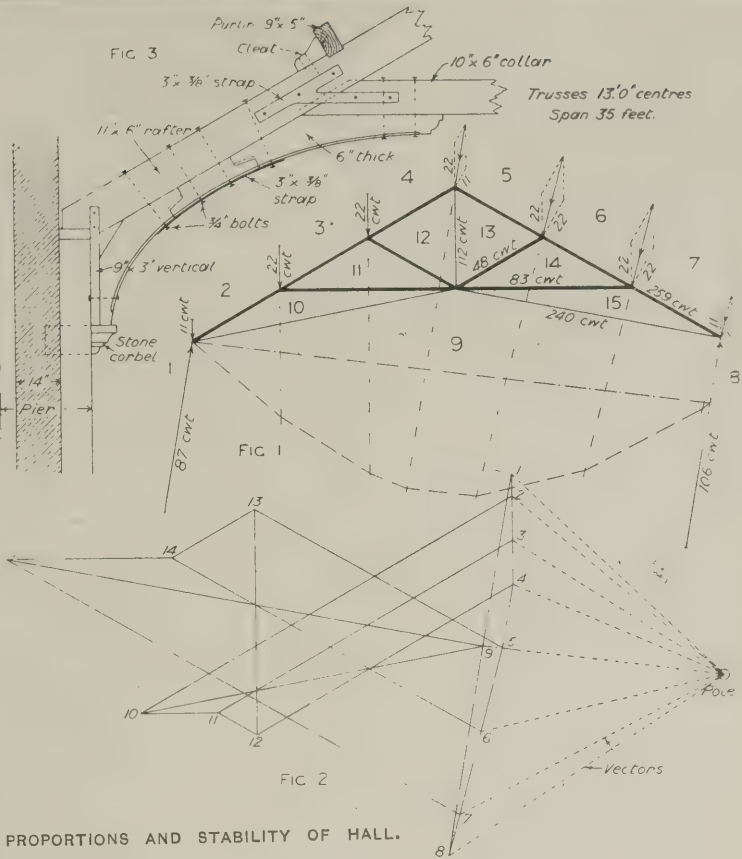
The crushing load on 6 to 1 concrete twelve months' old may be taken at 67 tons per sq. ft., and the safe working load at, say, 5 tons per sq. ft., as a maximum on a pier 12 diameters high, including its own weight. The safe load upon deep gravel is somewhat difficult to estimate without a knowledge of the site, but it is possible that it may withstand as much as the concrete above described. Concrete "arches" are a comparatively modern method of bridging from pier to pier in foundations. Although they do not act strictly as arches, the thickness at crown may be calculated as for an arch $T = \frac{WL}{8r}$,

where T = thrust in tons at crown of arch, W = total load in tons on foundations from pier to pier, L = span from pier to pier in feet, r = rise of arch in feet. The thickness of the arch at the crown must be such that the maximum intensity of stress does not exceed the safe load, say 6 tons per sq. ft. The so-called "arches" connect the concrete piers together, and the whole weight of the building, including the concrete, must be divided up over the piers in ascertaining the load upon them. HENRY ADAMS.

Building Lines.

MANCHESTER.—CONSTANT READER writes: "A building abuts on a street and is old property. B, next to it, is set back 6ft. and is modern property, being about seven years old. C, next to B, but divided from it by a street (cul-de-sac), is 18ft. back from the main street, and is old property. D, next to C, is set back 2½ft. from C, and is also old property. The owner of C desires to bring his building forward to the front main wall of B, and is willing to give a narrow strip at the front to the authorities free of cost. Have the authorities any power to prevent C from coming forward as proposed? Does not the modern building B constitute a new building line?"

The building line must have regard both to B's property and also that of D, and C cannot legally bring forward his building in advance of that of D. The Act says "on either side." F. S. I.



PROPORTIONS AND STABILITY OF HALL.

Proportions and Stability of Hall.

BIRMINGHAM.—SOUND writes: "Enclosed is a rough tracing (not reproduced) of proposed building. I should be greatly obliged if you would express your opinion upon the following three points:—(1) Acoustic properties of hall—is it sufficiently lofty? (2) Stability of piers 1, 2, 3 and A—could these be reduced? (3) Would it be safe to put angle blocks in roof trusses B, and remove the tie rods which will be unsightly?"

Without particulars of the materials to be used for the bounding surfaces of the hall we cannot determine the acoustical properties exactly. The height of the hall appears to be rather small for the length and width, especially as the girders carrying the floor above project nearly a foot below the ceiling. It would probably improve both the acoustic properties of the hall and the appearance if the height were increased to 20ft. The girders carrying the weight of floors over hall and having spans of 35ft appear from the rough sketch to be either 17ins. or 18ins. deep; they should be British Standard Beam No. 30 (B.S.B. 30) 24in. by 7½in. by 100 lb. rolled joist section. The piers as shown will each have a sectional area of about 6 sq. ft., and as the load on each at level of hall floor will be about 30 tons, or say 5 tons per sq. ft., they will be sufficient to carry the load, but not sufficient to withstand the bending moment due to the wind and the spreading of roof at foot of principal rafters, and at least another gin. projection on each would be desirable. This addition would be essential if the tie rods in roof were dispensed with. The roof truss shown by querist is incomplete, and should be arranged with struts as in accompanying frame diagram Fig. 1. Fig. 2 shows the corresponding stress diagram allowing a vertical dead load of 28 lbs. per ft. super, and a wind-pressure on one side normal to the slope of roof of 28 lbs. per ft. super. The maximum stresses have been scaled and are marked on frame diagram. The proposed 17ins. by 4½ins. principal rafters will not be sufficient. If the sloping tie rods are put in the principal rafter should not be less than 11ins. by 6ins.,

and the whole truss should then be made 6ins. thick. An angle block as suggested would not be sufficient, but curved ribs as in Fig. 3 may be put in instead of the tie rods. HENRY ADAMS.

Red Ants in Basement.

TUNBRIDGE WELLS.—ADON writes: "A house in this town is infested with red ants in the basement. How can they be destroyed; or, if this is not possible, what is the best way to protect food and stores from them?" See p. 183 of our issue for October 25th, 1899.

Books.

MANCHESTER.—ANXIOUS writes: "I am preparing for the City and Guilds brickwork examination and the Board of Education building construction examination. Kindly name two good books on the above subjects to assist me a little. Also, is it possible to obtain last year's examination papers on these subjects, and from whom?" "Bricklaying and Brickcutting," by H. W. Richards (price 3s. 6d.) and Professor Adams's and Mitchell's books on "Building Construction" (price 8s. and 8s. 6d. respectively). The prices stated are post free from our offices. The City and Guilds Examination papers are given in the report on the work of the Department of Technology published each year by Mr. John Murray, of Albemarle Street, W., price 9s. nett. The South Kensington examination papers are published by Messrs. Eyre and Spottiswoode, East Harding Street, E.C.

COLWYN BAY.—SEASIDE writes: "Is there any book that deals with the planning and internal accommodation of a biscuit factory? Also, please name a book upon salt-water swimming-baths (with details if possible)." We do not know of a book dealing with biscuit factories. As regards books, we can only suggest R. O. Allsop's "Public Baths and Washhouses" (price 6s. post free from our offices).

Warehouses and Rights of Light.

TRISKELE writes: "The accompanying drawing (not reproduced) shows two old warehouses adjacent to each other, one a building of several floors and the other of one-storey with a roof light on the side facing the tall building; also a new one-storey building adjoining the old one-storey building, with a similar roof light. (1) Will the roof light of the new building be considered an ancient light in twenty years' time, and so prevent my client from building his smaller warehouse higher? (2) In regard to my client's two old buildings only, if the smaller building were sold without any agreement being made about light, how high could the new owner build the smaller warehouse in relation to the larger (both being more than twenty years' old)?"

(1) Yes; the fact that it is in a sloping and not in an upright position makes no difference (save, of course, in degree). (2) I do not think the smaller building could be raised at all. Would not even a slight rise cause a considerable diminution of light to the lowest windows of the larger building? Your drawing has no measurements given, nor any scale marked upon it. F. S. I.

Chimney Construction.

BRADFORD.—J. B. writes: I am contemplating building a circular brick chimney between 60ft. and 80ft. high, to take the smoke from a foundry cupola. The flue will be about 2ft. 6ins. in diameter, and will enter the chimney about 20ft. from the ground-level. The foundation is on good level rock. Kindly give me a sketch of this. I should also be glad to have your advice in regard to making a flue-opening so high from the base of the chimney. Is a square base necessary for this?"

See an article on "Chimney Construction," by Mr. J. Kennedy, in "Specification No. 9," price 2s. 6d. (or 3s. 3d. post free from our offices). There is nothing against one flue entering higher up in the shaft. A square base is not at all necessary. See the working drawing of the chimneys at the Chelsea Generating Station, published in our issue for February 15th, 1905.

White Patches on Wallpaper.

LIVERPOOL.—H. writes: "Which is the best way to prevent white patches appearing on wallpaper? They are on inner walls, and cannot be through any damp. The house is comparatively new, having only been built about two years. When I entered I had all the papering stripped off the walls, and where I noticed white patches I had pitch paper put on the walls, but this has in most cases been ineffectual. Is there anything the walls could be coated with before re-papering?"

The trouble is evidently due to the lime in the new plaster affecting the colours in the paper. We suggest painting the walls before papering with "Rubberose," a damp-resisting paint supplied by Messrs. John Line & Sons, of Alfred Place, Tottenham Court Road, London.

Architectural Draughtsmen at the War Office and Admiralty.

EALING.—ENQUIRER writes: "Kindly inform me as to vacancies for architectural draughtsmen at the Admiralty or War Office. I have an uncle who is an admiral in the Navy. Would his recommendation give me an entrance as draughtsman? The Office of Works is, I believe, also difficult to enter. I suppose I should have to compete with others, in the usual way, for an entry into the Admiralty?"

Examinations are held for posts on the regular staff. Applications for positions on the temporary staff should be made to the Director of Works, H.M. Admiralty,

Northumberland Avenue, London, W.C. Recommendations from relatives are useless; competency is the only essential.

Fee for Valuation.

LIVERPOOL.—DILAPIDATIONS writes: "A client let some property on lease, with power to make structural alterations conditional upon restoring to original condition upon the expiry of the said lease. The same has now expired, a question of cost has arisen, and I have been called in to make a valuation, which I set at about £600. What is a reasonable fee for this?"

This entirely depends on circumstances. The usual fee for a complete survey of dilapidations—when made by a properly-qualified person—is 5 per cent. upon the first £500 and 2½ per cent. on the remainder. This includes the survey of premises, measuring work, making estimate of cost, preparing schedule, negotiating for the settlement, and final settlement for lump sum. For merely measuring and estimating, including full bill of particulars, 2½ per cent. will be ample. (See "Specification" No. 6, p. 14.)

F. S. I.

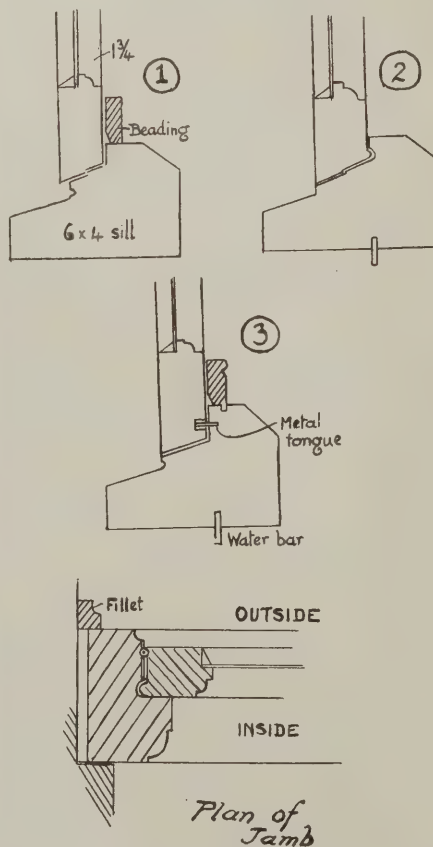
Radius of Gyration.

EASTBOURNE.—C. D. H. writes: "What is the meaning of 'radius of gyration' as to strength of steel columns and stanchions? In a table I find the following: Steel column: 6in. diameter, 98 lbs.-ft., sectional area 28.27 sq. ins., will carry a safe dead load of 85 tons 10ft. high (flat ends) and giving 'radius of gyration' at 1.5ins. Would 'radius of gyration' also apply to cast-iron columns?"

See p. 331 of our issue for July 15th, 1903.

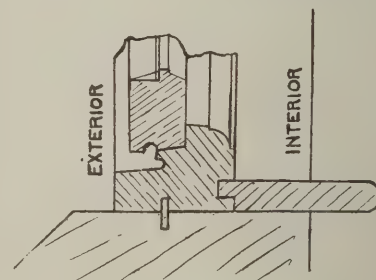
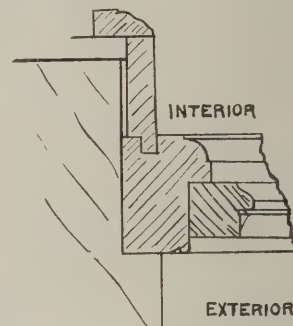
Casement Windows.

KINGSBRIDGE.—LOTUS writes: "Kindly give a satisfactory section for the sill and jamb of a casement window opening out-



addition of a beading as for No. 1 and No. 3 be of use to stop this? No. 3 is an imaginary section with metal tongue fitting close into the lower rail of the casement sash and with a high beading on top of the sill. Would this section be in any way preferable to the others?"

It is extremely difficult to ensure that a casement window shall be watertight in an exposed position, but the cross-section with which I have been most successful is shown in the sections below. The difficulty in all



such cases is to prevent the ingress of water by suction when a high wind blows rain-water closely against the joints. The beading you show would not prove successful in this respect. F. S. I.

Diversion of Sewer.

BURNHAM.—W. J. P. writes: "My client has purchased a piece of land situated in the centre of a town and recently used as a builder's yard. He proposes to build on the cleared site, plans for which have been submitted to the urban district council, who have approved and passed them subject to the diversion of a main public sewer which passes through the property in a diagonal line. My client is anxious to know if he is legally liable to comply with the Council's requirements, which are to be carried out at his expense.

Under the Public Health Act, 1875, s. 26, it is forbidden to build over any sewer of the urban authority. You do not state on what terms the Council obtained their right of easement across this land, or if the site was acquired by the owner with this easement existing. Take legal advice.

Wooden Houses in Gardens.

B. S. J. writes: "I have to erect a wood building on some leasehold property, and propose bolting the sill down to a new dwarf brick wall. Can the lessees (my clients) legally remove this building on the expiration of their tenancy, or would the fact of the woodwork being secured to the brickwork, which will be started on concrete below the ground-level, prevent them doing so?"

You will be perfectly safe in bolting down your wooden building, as you suggest, and before the termination of their lease your clients may remove the building as an ordinary fixture. You should, however, enquire whether the lease allows of the erection of such a building as you propose—there may be some prohibitive clause in that document. F. S. I.

wards on a very exposed position. I have not come across a really satisfactory one. Section No. 2 on the accompanying drawing has proved leaky in actual work, water bubbling up in a high wind. Would the

Tenders.

Barnard Castle.—Accepted for the erection of new business premises, for the Co-operative Society. Mr. T. Farrow, architect, 7, Market Place, Barnard Castle. Quantities by architect:—

Excavator, bricklayer and mason—R. Wilson.
Carpenter and joiner—G. P. Robinson.
Slater—J. Lancaster.
Plumber and glazier—C. E. Raine.
Plasterer—F. Welford.
Painter—G. P. Robinson.
[Twenty-five tenders received.] [All of Barnard Castle.] Contract about £1,100, which does not include shop fronts or interior fittings.

Bexley.—For the erection of a new Council school at Bexley, East Wickham, for the Kent Education Committee. Mr. Wilfrid H. Robinson, surveyor to the committee:—

F. Spencer & Sons	£4,223	10	0
H. Kent	4,145	0	0
Enness Brothers	4,090	0	0
J. Ellingham & Sons	3,963	2	10
West Brothers	3,949	0	0
E. J. Strange	3,848	0	0
G. W. Gunning & Sons	3,830	0	0
W. Pollock	3,800	0	0
F. & G. Foster	3,782	0	0
R. Avard	3,697	0	0
G. H. Denre & Son	3,688	0	0
J. S. Fenn & Co.	3,677	4	6
J. Lonsdale	3,634	0	0
W. M. Patrick	3,591	0	0
J. N. White	3,562	7	6
W. Blay	3,549	0	0
Thomas & Edge	3,500	0	0
Martin, Wells & Co.	3,490	0	0
W. A. Stratton	3,469	0	0
G. E. Willis & Sons	3,364	0	0
Friday & Ling	3,355	0	0
E. Streather, Ltd.	3,302	0	0
E. J. Garlick & Welling	3,259	0	0
Gann & Co.	3,047	0	0
E. Streather, Ltd.	3,047	0	0

* Recommended for acceptance.

Bradford.—Accepted for the second instalment of the work required in the extension of the Town Hall.—Carpenter and joiner—T. Obank & Sons, Ltd., £4,720; plumber & glazier—Atkinson & Smith, £5,300; slater—Hillam Brothers, £503; painter—Hartley & Southward, £234; concreter, bricklayer and mason—Michael Booth & Sons, £32,898; steelwork—Skipworth, Jones & Lomax, Ltd., Manchester, £5,154; plasterer and concreter—C. Marsden & Son, £5,359. Total, £50,029 ris. [Rest of Bradford.]

Bromley.—For the erection of four shops, for Ainslie Brothers. Mr. A. L. Guy, architect:—

J. A. Renwick	£3,680
Perry Brothers	3,196
Hughes & Co.	3,050
Marrables	3,000
Knight	2,929
Ellis & Co.	2,890
Watt	2,773
Kennard Brothers,* Lewisham	2,741

* Accepted.

Chippenham.—For alterations and additions to the Westhead schools, Wood Lane, and for the erection of a new infants' school, for the Wilts County Council. Messrs. Silcock & Reay, architects, 47, Milsom Street, Bath:—

Alterations.	New school.
W. R. Moody	£2,900 0 0
Forse & Son	£3,740 0 0
Light & Co.	2,498 0 0
J. G. Norman	2,331 0 0
Downey & Rudman	2,153 11 0
E. Linzey	2,107 0 0
W. Webb	2,080 0 0
	2,015 0 0

F. Amery	£1,995 0 0	£2,456 0 0
Mould Brothers	1,990 0 0	2,700 0 0
A. J. Colbourne	1,797 8 0	2,194 14 0
Long & Sons	1,777 0 0	2,187 0 0

Chipping Ongar.—For the erection of school buildings at the children's homes at Chipping Ongar, for the Guardians of Hackney Union:—

A. F. Canler, Clacton-on-Sea	£10,200
H. Wilcock & Co., Wolverhampton	8,961
Garrett & Son, London, S.W.	8,847
F. & T. Thorne, London, E.	8,400
Kirk & Randall, Woolwich	8,395
C. Wall, Ltd., London, E.C.	8,271
Leslie & Co., London, W.C.	8,122
W. Pattinson & Sons, London, S.W.	8,120
A. Suckling, Halstead	7,975
H. Lovatt, Ltd., West Kensington, W.	7,964
Patman & Fotheringham, London, W.C.	7,894
A. Monk, Lower Edmonton	7,849
C. Foster & Son, Loughton, Essex	7,831
C. Miskin & Sons, St. Albans	7,830
E. Lawrence & Sons, London, N.	7,829
W. Lawrence & Son, Waltham Cross	7,744
W. Wallace, London, S.W.	7,705
W. Johnson & Co., Wandsworth Common	7,617
J. & M. Patrick, London, S.W.	7,600
E. Johnson & Son, London, S.W.	7,589
Coulson & Lofts, Cambridge	7,555
J. Lonsdale, Swanley Junction	7,525
A. E. Symes, London, E.	7,524
F. & G. Foster, Norwood Junction	7,475
Kerridge & Shaw, Cambridge	7,474
S. E. Moss & Co., Southend-on-Sea	7,450
J. S. Hammond & Son, Romford	7,437
Stapleton & Sons, London, N.	7,398
Staines & Son, London, E.C.	7,200
Rowley Brothers, London, N.	7,198
F. & E. Davey, Southend-on-Sea	6,987

Chelmsford.—For the erection of a new girls' school. Messrs. F. Chancellor & Wykeham Chancellor, architects, Chelmsford:—

F. Johnson	£7,874
McCormick & Son	7,623
Thomas & Edge	7,542
H. J. Carter	7,531
Holliday & Greenwood	7,431
Hammond & Son	7,422
Coulson & Lofts	7,372
Bartley, Sons & Co.	7,352
Moss & Co.	7,290
J. Gowers	7,160
J. Jerram	7,029
Shepherd & Son	7,011
Parrell & Son	6,979
W. T. Maddison	6,974
G. Hodges	6,965
Rowley Brothers	6,929
J. McKay	6,878
Everett & Son	6,875
F. & E. Davey	6,827
Potter & Son	6,800
Grimwood & Sons	6,784
Scales & Robins	6,715
Parren & Sons	6,623
J. Rayner	6,587
Young & Son,* Norwich	6,472

* Accepted.

Hereford.—For the erection of two semi-detached villas on the Highfield Estate, Hereford, for Mr. F. H. Jones. Mr. Herbert Skyrme, architect, 138, Widemarsh Street:—

W. Preece	£945
E. Davies	822
R. L. Friend	885
C. Cooke	885
T. Hills	845

[All of Hereford.]

Langley Park.—Accepted for the erection of sixteen houses, for Annfield Plain Industrial Co-operative Society. Mr. G. T. Wilson, architect, 22, Durham Road, Blackhill, co. Durham:—

R. Thompson, Gateshead	£2,348
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Leyton.—For alterations to existing U.M.F. school and church. Messrs. George Baines & Son, architects, 5, Clement's Inn, Strand, W.C.:—

C. J. Sherwood	£1,731 0 0
C. North	1,492 7 0
W. Manders	1,450 0 0
Sands & Burley	1,345 14 6
Battley, Sons & Holness	1,337 0 0
J. Coxhead,* Bulwer Road, Leytonstone, E.	1,172 18 0

* Accepted with modifications.

London.—For heating apparatus for the Ackmore Road School, Fulham, for the London County Council Education Committee:—

Bolton, Fane & Co.	£910
G. Davis	815
Stevens & Sons	775
Wenham & Waters, Croydon	716
J. Yetton & Co.	711
J. & F. May	710
G. & E. Bradley	679
C. Kite & Co.	650
T. S. Knight & Sons	610
Beeson & Sons,* Church Street, Rickmansworth	535

* Recommended for acceptance. [Rest of London.]

London.—For heating apparatus for Sellincourt Road School, for the London County Council Education Committee:—

R. H. & J. Pearson	£975 0 0
Paragon Heating Co., Birmingham	974 0 0
Strode & Co.	955 0 0
J. Jeffreys & Co.	919 0 0
G. N. Haden & Sons, Trowbridge	940 0 0
J. F. May	931 0 0
Korting Brothers	925 0 0
Brightside Foundry and Engineering Co.	905 0 0
J. Grundy	897 0 0
W. Richardson & Co., Darlington	866 0 0
J. Boyd & Sons	894 0 0
H. J. Cash & Co.	818 0 0
J. Richmond & Co.	814 10 0
J. Gray,* Danvers Street, London	813 0 0

* Recommended for acceptance. [Rest of London.]

London, E.—For the erection of a block of artisans dwellings at Shadwell. Mr. W. G. Drew, architect:—

Clark & Bracey	£3,851
Holloway Brothers	3,730
S. J. Scott	3,713
Jarvis & Son	3,674
H. L. Holloway	3,590
W. Shurmur & Sons	3,393

London.—For the erection of Mildmay Park substation, for the London County Council:—

A. Hudson & Co.	£7,214 18 0
F. & G. Foster	7,138 8 10
F. & F. H. Higgs	6,996 0 0
F. & T. Thorne	6,995 0 0
C. Wall, Ltd.	6,829 8 7
H. Lovatt, Ltd.	6,700 0 0
Holloway Brothers	6,650 0 0
Kirk & Randall	6,629 0 0
Holliday & Greenwood	6,160 0 0
G. Munday & Sons*	5,916 0 0

* Recommended for acceptance.

London, N.E.—For the erection of new timber sheds at Kingsland, for Messrs. Kennedy Brothers. Mr. W. Stone, architect:—

J. McManus	£3,631
Turner & Hudson	3,613
J. Haydon & Son	3,440
Jarvis & Son	3,438
Hill & Smith	3,355
W. Shurmur & Sons	3,339

(Continued on p. xv.)

£100

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Business

Address

Firm's Name
and Address
(If Employee)

School (If Teacher or Student)..... Date

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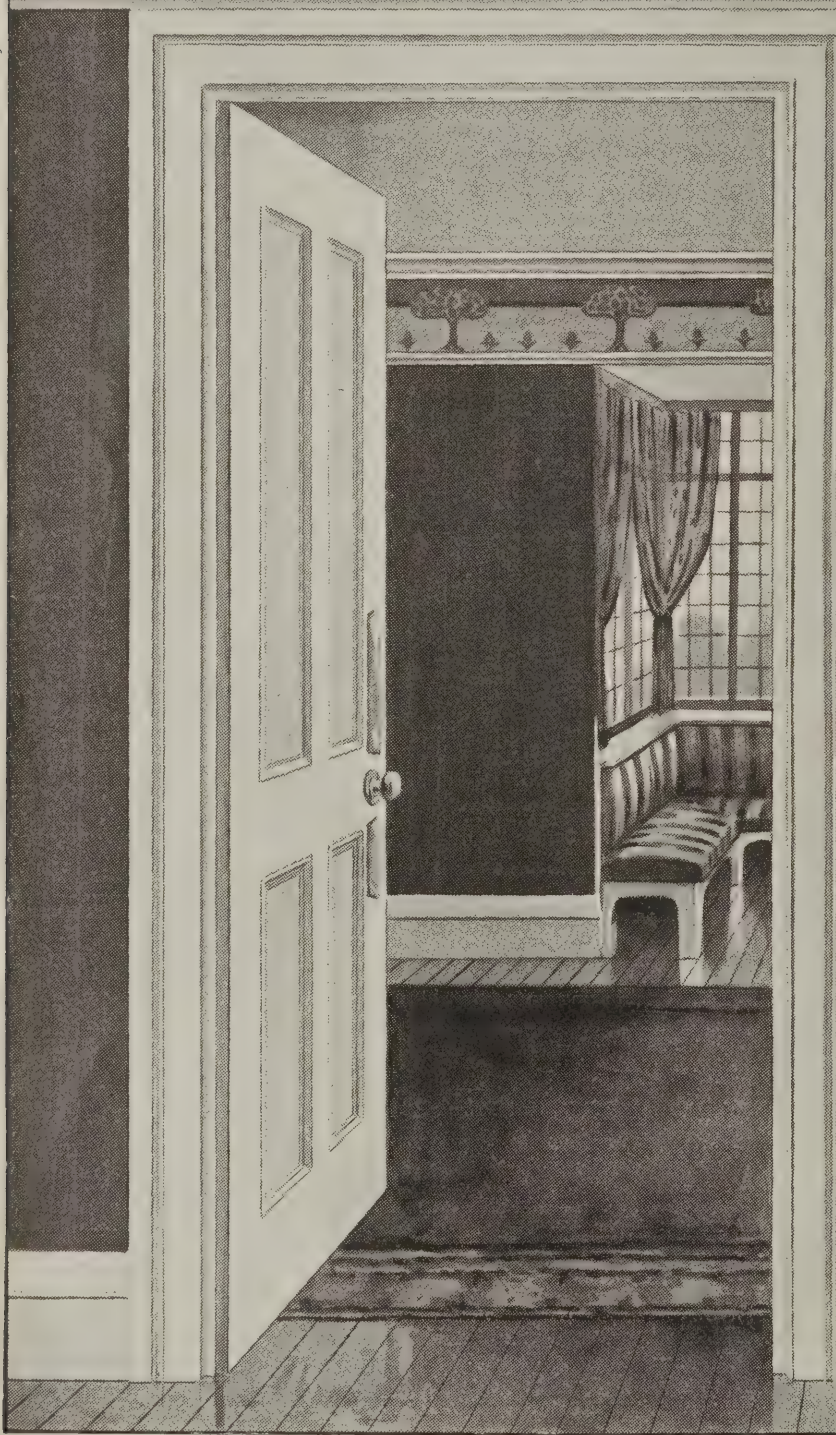
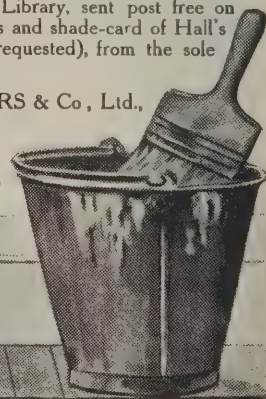
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NOTES ON COMPETITIONS.

Bolton Council School.

A somewhat similar state of affairs has transpired at Bolton to that which befell Colchester a few weeks ago as commented upon in *THE BUILDERS' JOURNAL* of March 23rd. In this instance, as in the former, the services of a professional assessor were dispensed with and letters were received from unsuccessful competitors protesting that the selected design did not comply with the conditions and that all the plans should be submitted to a professional assessor. The Town Council had advertised a competition for a school at a cost of £10 per scholar, and had stipulated in clause 3 of the conditions as follows: "The cost of the building will be an important element in determining the competition, and if, after the working drawings and specification are prepared for the selected designs, no tender can be obtained from a responsible builder to complete the work within 5 per cent. of £10 per head—the committee shall be at liberty to discard any such design, and return it to the author, to employ any other architect that they may think proper, and they shall not be bound to remunerate the author of the discarded design in any way. The committee reserve to themselves the right, before deciding on the designs, to require any architect to obtain a provisional tender from some respectable firm of builders in support of the estimated cost submitted by such architect." This is a most unsatisfactory condition, especially as regards the last clause, but one, unfortunately, which too often finds a place in particulars of competitions. The only way to obtain a reliable estimate from a builder is to supply him with complete bills of quantities; to expect him to prepare an estimate in any other way is to expect something which could be better done by the architect alone or in consultation with his quantity surveyor. If the committee have availed themselves of this clause the fallacy of the proceeding has been proved by the result, for the lowest tender has come out at £11,418, or about 50 per cent. in excess of the stipulated sum. Had an assessor, one skilled in designing and erecting schools, been employed, the dilemma which the Town Council now finds itself in would have been avoided, for it has been decided in council to rescind the confirmation of the minutes of a previous meeting in so far as they refer to the acceptance of the tender and to the adoption of the selected design. It was admitted by the mayor, who, by the bye, supported the minutes, that the Council were "liable for something," and the inference is that that something is fees for the work entailed before tenders could be obtained. On the usual basis the amount of such fees would have paid an assessor and left a considerable sum over, so the ratepayers, as usual, will have to bear the brunt of the shortsightedness of their representatives. As regards the proposed cost of the schools, £10 per head is little enough, although that sum has sufficed in instances on record: £15 per head is most excessive unless the requirements were extraordinary, in which case the assistance of an assessor upon the conditions before they were issued would have been invaluable, as it always should be at this stage in any case. What the Council now propose to do is not clear. Their best course would be to submit all the plans received in competition to an expert, in order that he might select the best scheme which complies nearest with the conditions and advise how the cost might be reduced if he considers that the requirements as stated in the conditions are in excess of the value of £10 per scholar. Should the assessor's selection ratify the Council's action in throwing over the scheme chosen by their

Education Committee, then the authors of that scheme must be adequately compensated for the trouble they have been put to. It is nearly always inadvisable to take part in a competition where the estimated cost is inadequate, but having decided to do so it would surely be as well if competitors frankly stated the fact in their reports and offered such suggestions as might be expedient towards the simplifying of the requirements.

Elementary School, Barnsley.

In the competition for a new elementary school to be erected in Racecommon Road, Barnsley, the assessor, Mr. Braithwaite, of Leeds, has awarded first place to the design of Mr. E. W. Dyson, C.E., of Barnsley, whose design has been accepted. The building will cost from £10,000 to £11,000.

An American Competition.

The designs of Messrs. Barnett, Haynes & Barnett, of St. Louis, have been selected, in competition, for the new Roman Catholic cathedral to be built at St. Louis, Miss.

A South African Competition.

The town council of Krugersdorp have under consideration the erection of a town hall and municipal offices, and the Works Committee suggest that local architects be asked to submit designs for a building costing £10,000, premiums of £50 and £25 being offered.

The following is a list of competitions open:—

DATE OF DELIVERY.		COMPETITION.
May	5	BRANCH LIBRARY AT SUNDERLAND.—Limited to local architects. Premiums of £20 and £10. Particulars from Mr. John W. Moncur Borough Engineer, Town Hall, Sunderland.
"	31	NATIONAL CONGRESS HALL FOR BRAZIL.—Premiums of 15,000, 10,000 and 5,000 milreis (equivalent to about £1,685, £1,125 and £562 respectively). 5,000 milreis also for designs not premiated but desirable to be acquired. The conditions of the competition can be seen at the offices of the Commercial Intelligence Branch of the Board of Trade at 73, Basinghall Street, E.C.
No date		DETACHED AND SEMI-DETACHED HOUSES AT CLIFTONVILLE, BELFAST.—Premiums £700. Particulars from R. J. McCunnell & Co., 51, Royal Avenue, Belfast.

Views and Reviews.

Modern Sewage-disposal.

The publication of a handbook on sewage-disposal for the use of the layman is a matter of congratulation. If the aspiring councillor can be made to realize the limitations of his intelligence in questions like these, which exercise even the trained intellects whose duty it is to deal with them, municipal engineers will have reason to bless Mr. Lemmoin-Cannon many times a day. The author sets forth the various modern methods and processes of dealing with sewage, without bias in favour of any particular system, and the book should have a wide sale.

"Modern Sewage-disposal." A popular handbook. By H. Lemmoin-Cannon. London: Henry J. Drane, Salisbury House, Salisbury Square, E.C., price 1s. nett.

Modern School Buildings.

The value of Mr. Clay's great work is more than borne out by the speedy appearance of a second edition. The first part of the book, dealing with secondary schools, has been little altered beyond the excision of a certain amount of "somewhat irrelevant matter" and the insertion in its place of a chapter on fire-protection and rather fuller treatment of training colleges, pupil teachers' centres, cost of school buildings, &c. The second part, on elementary schools, has been practically re-written, particular attention being given to the subject of planning small and medium-sized country schools. Special

chapters have also been added upon infant schools, manual training and cooking centres, temporary buildings, the alteration and adaptation of old buildings, as well as a comparative survey, fully illustrated, of the systems of school planning on the Continent and in America. There is also an addition to the plans, &c., of recently-erected schools. The question of school architecture is a very pressing one, and the preparation of such an exhaustive work must have been trying in the extreme. Mr. Clay's book remains the text book on this important subject.

"Modern School Buildings," by Felix Clay, B.A., 2nd edition, revised and enlarged. London: B. T. Batsford, 94, High Holborn, W.C., price 25s. nett.

THE PRACTICAL EXEMPLAR OF ARCHITECTURE.

UNDER this title a new permanent feature commences in the current issue of "The Architectural Review" which should prove of great interest and utility to architects who desire to study fine examples of architectural detail. Each month a number of details will be illustrated by photographs and measured drawings, so that all the essential features can be readily grasped. The series will embrace details of every description—doors, windows, ceilings, chimney-pieces, gates, railings, roofs, staircases, balustrades, chimney stacks, cornices, dormers, gable ends, &c. Each instalment will deal with one kind of detail only. The first article is devoted to gate piers, the celebrated piers at Hampstead Marshall being the examples given. The details will be of both old and new work, and are selected by the Editor, Mr. Mervyn E. Macartney, F.R.I.B.A. Architects who have photographs or measured drawings of good details might communicate, to their advantage, with the Editorial Secretary. The details must be of buildings in the United Kingdom.

Trade and Craft.

A Useful Prize Competition.

We are glad to note that another attempt is being made to solve the great difficulty of a fixed standard of colour. Every practising architect must at some time or other have experienced the difficulty of describing the precise shades of colour required in a scheme of decoration. Attempts have been made before, but not on such practical lines as the present. Messrs. Pinchin, Johnson & Co., of Billiter Street, the well-known manufacturers of "Satinette Enamel," have determined to seek the assistance of the general body of architects, surveyors, &c., to fix a standard of colour which shall be at the disposal of the whole trade. In order to encourage everyone to assist in this work, Messrs. Pinchin, Johnson have instituted a competition in which they are offering £100 in prizes to the competitors who succeed in making the nearest forecast of the standard fixed upon by the majority. This competition is open to practically all our readers, and all that intending competitors have to do is to cut out the coupon which appears on the advertisement page xi and send it to Messrs. Pinchin, Johnson, who will then forward the necessary colour slips and general instructions for this competition, which deserves to be a success, for the scheme shows much enterprise and public spirit on the part of the firm in question.

The Devon and Exeter Architectural Society held its nineteenth annual meeting at Tiverton on April 7th, when the retiring president, Mr. B. Priestley Shires, F.R.I.B.A., delivered an address. The new president is Mr. Harbottle Reed, while Mr. M. A. Bazeley is vice-president, and Mr. Allan J. Pinn, A.R.I.B.A., hon. secretary.

Complete List of Contracts Open.

With a few exceptions, news of Contracts Open are not repeated after they have been published once in these columns, so that readers will find particulars in our previous issue of other contracts that still remain open.

Unless expressly stated to the contrary all deposits required for bills of quantities, &c., are returned on receipt of bona-fide tenders.

The words "Fair Wages Clause" inserted in certain paragraphs signify that persons tendering must conform to a fair-wages clause in the contract, which requires them to pay the rates of wages current in the district.

BUILDING.

April 18. London, S.E.—Supply of Fletton bricks for the year ending Mar. 31, 1907, the estimated quantity being 80,000. Forms of tender and other particulars can be obtained on application to the Town Clerk. Tenders, addressed to the Town Clerk and endorsed "Tender for Bricks," must be delivered to the Town Hall, Spa Road, not later than 4 p.m. on April 18.

April 19. Marlow.—Alterations and additions to the music-room, for the Marlow Public Hall, Ltd. Plans and specification may be seen at the office of R. Wellcome, 5, High Street, Marlow. Tenders (endorsed) to be delivered at the office of the Company, 5, High Street, Marlow, not later than 5 p.m. on April 19.

April 19. Blaydon.—Enlargement of the Galvanized Iron Isolation Hospital at Normans Riding, comprising the erection of administrative, laundry and discharging blocks and two pavilions, for the Blaydon, Ryton and Whickham Joint Hospital Committee. Plans and specifications may be seen and form of tender obtained on application to J. B. Renton, Council Offices, Whickham, R.S.O. (who will attend at the Council Offices, Whickham, by appointment, to supply all particulars) upon payment of £1. Sealed tenders, endorsed "Tender for Hospital," must be delivered to Henry Dalton, clerk, Blaydon-on-Tyne, by noon on April 19.

April 20. Cross Keys.—Twenty-five (more or less) houses near Nine Mile Point Collieries, Sirhowy Valley. Plans and specifications may be seen with T. Thomas, Nine Mile Point Collieries, near Cross Keys, Mon., or at the office of R. L. Roberts, M.S.A., Abercarn. Sealed tenders, endorsed "Tenders for Houses," by April 20.

April 20. Drogheda.—Erection of an hospital, for the Drogheda Cottage Hospital Committee. Drawings and specifications may be inspected with the Hon. Secretaries, Greenhills, Drogheda, and copies obtained from Frederick Shaw, M.R.I.A.I., architect, St. Laurence Street, Drogheda. Sealed tenders to be sent to Sidney Smith, Rosa Smith, hon. secs., Greenhills, Drogheda, not later than April 20.

April 20. Swansea.—New administrative block at the Isolation Hospital, Garragech, near Forestfach, for the R.D.C. Plans, specifications and conditions of contract may be inspected on application to T. Trevor Williams, surveyor, at the Council Offices, Alexandra Road, Swansea. Bills of quantities and forms of tender may be obtained from the surveyor on payment of the sum of £3 3s. Tenders, sealed and endorsed "Administrative Block," to be sent to Edward Harris, clerk, the Council Offices, Alexandra Road, Swansea, on or before April 20.

April 20. Swansea.—Laying and construction of foundations for intended Small Pox Hospital at Garragech, near Forestfach, for the R.D.C. Plans, specifications and conditions of contract may be inspected on application to T. Trevor Williams, surveyor, at the Council Offices, Alexandra Road, Swansea. Tenders, endorsed "Foundations for Small Pox Hospital," to be sent to Edward Harris, clerk, the Council Offices, Alexandra Road, Swansea, on or before April 20.

April 20. Cothal.—Mason, carpenter, slater, and plasterer works of new dwelling-house and shop to be erected at Cothal; also for the mason and carpenter works of repairs and concrete floor at the old mill, Cothal. Plans and specifications may be seen in the hands of Alexander Stronach, junr., & Son, advocates, 29, Belmont Street, Aberdeen. Contractors will meet at Cothal on April 14 current, at 2 p.m., when the works will be pointed out by Mr. Stewart, architect, and offers must be lodged with A. Stronach, junr., & Son on or before April 20.

April 20. Wells-next-Sea.—Enlargement of school for the Norfolk Education Committee. Builders desirous of tendering can inspect plans and specification and obtain copies of quantities at the office of A. F. Scott, architect, Castle Meadow, Norwich, on and after April 5. A deposit of £1 is. will be required. Tenders must be delivered by noon on April 20, addressed to "The Secretary, Norfolk Education Committee, 57, London Street, Norwich," and endorsed "Tender for Wells-next-Sea School."

April 20. Tonbridge.—New Council school, to accommodate 420 children, at Tonbridge, Kent. The drawings and specification may be inspected at the office of the architect, C. H. Strange, A.R.I.B.A., 20, Dudley Road, Tunbridge Wells. Any person desiring to tender must send in his name to the architect, accompanied with a deposit of £1, not later than noon on April 5. The tenders, on the form supplied, to be delivered to N. R. Stone, 23, Church Road, Tunbridge Wells, not later than noon on April 20.

April 20. Hawkinge.—Enlargement to the Council school, at Hawkinge, near Folkestone, Kent. Drawings and specification may be inspected at the office of the architect, Andrew Brimley, Radnor Chambers, Folkestone. Any person desiring to tender, must send in his name to the architect, accompanied by a deposit of £1, not later than noon on April 5. Tenders, on the form supplied, to be delivered to W. Thomas, 66, Broadmead Road, Folkestone, not later than noon on April 20.

April 21. Kimbolton.—Erection of a laboratory at the Grammar School, at Kimbolton, St. Neots. For particulars apply to Wade, Gery & Brackenbury, St. Neots. Tenders to be in by April 21.

April 21. Hayle.—Erection and completion of house, for W. J. Easterbrook, according to plans and specification which may be seen at the residence of the Proprietor, Foundry Hill, Hayle, or at the office of Sampson Hill, architect, Green Lane, Redruth, from whom all particulars relating to the work may be obtained. Sealed endorsed tenders are to be sent to the Proprietor, on or before April 21.

April 21. Truro.—Erection and completion of farm buildings at Polmennor Farm, near Gwinear Road Station, according to plans and specification, copies of which may be seen at the Farm; also at the office of Sampson Hill, architect, Green Lane, Redruth, from whom all particulars relating to the work may be obtained. Sealed endorsed tenders are to be sent to F. E. Hamilton, the Estate Office, 53, Lemon Street, Truro, on or before April 21.

April 21. Llwynypia.—Alterations to Salem Chapel. Plans and specification to be seen with Jacob Rees, architect, Pentre, and tenders to be addressed to D. Jones, assistant overseer, Llwynypia, on or before noon, on April 21.

April 21. Forres.—Erection of a residence at Trafalgar Park. For the mason, carpenter, slater, plaster, plumber, painter and glazier, bell-hanger and blacksmith work. Plans and specifications may be seen with R. & R. Urquhart, solicitors, Forres, till April 20. Schedules of quantities may be obtained from Ross & Macbeth, architects, Inverness. Tenders to be lodged with R. & R. Urquhart on or before April 21.

April 21. Manchester.—Supply of terra-cotta for the Queen Street Municipal School. Plans may be seen and a copy of the bill of quantities (including specification) may be obtained at the Education Offices in Deansgate, Manchester, on a deposit of £1 is. Tenders, on the forms and in the envelopes provided, must be delivered at the Deansgate offices of the Education Committee not later than April 21.

April 21. Mold.—Alterations and extensions to the County School, Mold, Flintshire, North Wales. Plans and specifications may be seen at the offices of the architect, Samuel Evans, N. & S.W. Bank Buildings, High Street, Mold, from whom bills of quantities may be obtained on payment of a sum of £2 2s. Tenders to be made out on forms to be supplied, and sent in to W. R. Howard Evans, solicitor, Mold, clerk to the Governors, by April 21.

April 21. Swindon.—Alterations and additions to Sanford Street Council School, according to plans prepared by R. J. Beswick, 10, Victoria Road, Swindon, where the plans, general conditions and specification may be inspected. A copy of the bill of quantities and form of tender can be obtained from the Architect on payment of £1 is. Fair wages clause. Sealed tenders, on the prescribed form, endorsed "Alterations, Sanford Street Council School," and accompanied by priced (detail) bill of quantities under separate cover, to be delivered to Robert Hilton, town clerk, Town Hall, Swindon, by April 21.

April 22. Cork.—Extension of the chancel of the Church of the Holy Trinity, Father Matthew quay, in accordance with plans and specifications, which have been prepared by Ashlin & Coleman, architects, Dawson Street, Dublin, and which may be inspected at the office of James F. M. Mullen, M.R.I.A.I., architect, 30, South Mall, Cork. Sealed tenders to be lodged with the hon. secretaries, the Convent, Father Matthew quay, Cork, on or before April 22. Bills of quantities for the work are being issued by S. W. Morris, 68, Harcourt Street, Dublin, from whom they may be had, and intending contractors are requested to examine same before sending in their tenders, as the committee will not be responsible for their accuracy.

April 23. Coventry.—Nurses' home, for the Coventry and Warwickshire Hospital Committee, in accordance with plans and specifications prepared by the architects, A. Hessel Tiltman, F.R.I.B.A., 1, Raymond Buildings, Gray's Inn, London, W.C., and Herbert W. Chattaway, Trinity Churchyard, Coventry. Plans and specifications may be seen at the Architect's Office, Trinity Churchyard, Coventry, and bills of quantities and forms of tender can be obtained upon depositing the sum of £3 3s. Tenders, sealed and endorsed "Nurses' Home," to be sent to Ellis E. Crisp, secy., Coventry and Warwickshire Hospital, Stoney Stanton Road, Coventry, not later than 10 a.m. on April 23.

April 23. Eastbourne.—Additions to the Motor Omnibus House at Roselands. Plans and general conditions may be seen, and specification, bill of quantities, and form of tender obtained at the Borough Surveyor's Office, Town Hall, on payment of a deposit of £1 is. Tenders endorsed "Motor Omnibus House" to be sent to A. Ernest Prescott, borough surveyor, Town Hall, Eastbourne, not later than noon on April 23.

April 23. Truro.—Detached residence at Short Lanes End, Truro, for Thomas Powell, according to plans and specification which may be seen at the office of A. J. Cornelius, architect, Truro. Sealed tenders, endorsed, to be sent to Thomas Powell, Treyew Road, Truro, on or before April 23.

April 23. Truro.—Alterations and additions to "Trevaunance." Truro (now known as Comprigney House), for E. L. Carlyon, according to plans and specification, which may be seen at the office of A. J. Cornelius, architect, Truro. Sealed endorsed tenders to be sent to E. L. Carlyon, Truro, on or before April 23.

April 23. Sheffield.—Erection of a new sorting office at Attercliffe, Sheffield. Drawings, specifications and a copy of the conditions and form of contract may be seen on application to the Postmaster, at the Head Post Office, Sheffield, between the hours of 10 and 4. Bills of quantities and forms of tender may be obtained at H.M. Office of Works, Storey's Gate, London, S.W., on payment of £1 is. Tenders must be delivered before noon on April 23, addressed to the Secretary, H.M. Office of Works, &c., Storey's Gate, London, S.W., and endorsed "Tender for Sorting Office, Attercliffe, Sheffield."

April 23. Abertillery.—Erection of new Wesleyan church and alterations to present chapel. Plans and specifications may be inspected at 1, Commercial Street, Abertillery, and at the offices of the Architects, 41, High Street, Newport, from whom also copies of the quantities may be obtained on application. Tenders are to be sent to the secretary, Mr. G. D. Cattee, 1, Commercial Street, Abertillery, on or before April 23.

April 23. Cork.—Building and completing a gentleman's residence on the College Road, in accordance with plans and specification prepared by W. H. Hill & Son, architects, 28, South Mall, Cork, with whom tenders are to be lodged on or before April 23.

April 24. Dovercourt.—Two blocks of semi-detached residences. For particulars apply to H. S. Watling, architect, Kingsway House. Tenders to be in by April 24.

April 24. Manchester.—Excavation, &c., for marshalling sidings between Newton Heath and Moston, for the Lancashire and Yorkshire Railway. Plans can be seen and form of tender and specification obtained on application at the Engineer's Office, Hunt's Bank, Manchester. Tenders, endorsed "Tender for Excavation, &c., for marshalling sidings between Newton Heath and Moston," to be in the hands of R. C. Irwin, secy., Hunt's Bank, Manchester, by 10 a.m. on April 24.

April 24. Newton Abbot.—Erection of a drying closet adjoining the laundry at the workhouse, in accordance with plans and specifications, which may be seen at the office of Samuel Segar, F.I.A.S., Newton Abbot. Tenders to be marked "Tender," and sent to F. Horner, clerk to the Guardians, Newton Abbot, not later than April 24.

April 24. Ilford.—Erection of a junior mixed and infants' school for 630 children, together with latrines, playsheds, fencing, &c., on the Water Lane site, Ilford, Essex. Plans and specifications can be seen, and bills of quantities and forms of tender can be obtained at the office of the architect, Charles J. Dawson, 11, Cranbrook Road, Ilford, between the hours of 10 a.m. and 5 p.m., upon depositing £5 5s. Fair wages clause. Sealed tenders, endorsed "Tender for Water Lane Schools," are to be addressed and delivered to John W. Benton, Clerk to the Council, Town Hall, Ilford, Essex, by noon on April 24.

April 24. Boston.—New post office at Boston. Drawings, specifications and a copy of the conditions and form of contract may be seen on application to the Postmaster between 11 and 4. Bills of quantities and forms of tender may be obtained at H.M. Office of Works, Storey's Gate, S.W., on payment of £1 is. Tenders must be delivered before noon on April 24, addressed to the Secretary, H.M. Office of Works, &c., Storey's Gate, London, S.W., and endorsed "Tender for Boston Post Office."

April 25. Brimington.—Alterations and additions to the Central Schools, Brimington, near Chesterfield. Plans, &c., can be seen and bills of quantities and all information obtained at the offices of W. C. Jackson, M.S.A., architect and surveyor, 29, Knifesmith Gate, Chesterfield, upon payment of £1 is. Sealed tenders, endorsed "Brimington Schools," to be sent to C. J. Kerslake, clerk, Education Offices, Foljambe Road, Chesterfield, not later than April 25.

April 25. Abbeyleix.—Additions to the Brigidine Convent, Abbeyleix. The plans and specification relating thereto can be seen at the Convent, Abbeyleix, or at the office of William H. Byrne & Son, architects 20, Suffolk Street, Dublin, to whom tenders must be sent by April 25.

April 27. Nelson.—Erection of twenty (more or less) houses. Plans and specifications may be seen at the office of Osborne & Rees, Nelson. Sealed tenders, endorsed "Tender for Houses," to be sent to T. H. Dowdeswell, Fairfield, Nelson, on or before April 27.

April 27. Chelmsford.—Widening a small brick bridge in the parish of Waltham Holy Cross, known as Broomstick Hall Bridge, for the County Council. Plans and specifications may be seen at the Surveyor's Offices at Chelmsford on any day. Tenders must be delivered to the County Offices, Chelmsford, not later than April 27.

April 27. Chelmsford.—Brick and concrete abutments, &c., for a small bridge at Radwinter, near Saffron Walden, for the County Council. Plans and specifications may be seen at the Surveyor's Offices at Chelmsford. Tenders must be delivered to the County Offices, Chelmsford, not later than April 27.

April 27. Waterloo.—Erection of public library and museum buildings adjoining the Town Hall, Waterloo, near Liverpool, for the U.D.C. Bills of quantities may be obtained from the clerk, upon payment of a deposit of £2 2s. Drawings and specifications may be seen at the office of O. D. Black & A. F. Milligan, architects, Central Chambers, South Castle Street, Liverpool. Sealed tenders, endorsed "Tender for Public Library and Museum," must be delivered to John I. Thompson, clerk to the

Council, Town Hall, Waterloo, near Liverpool, not later than noon on April 27.

April 30. Tywardreath.—*Renovation and alteration of the Wesleyan Church, Tywardreath, Par Station.* Plans and specifications may be seen at the residence of Caleb Thomas, Tywardreath, Par Station, to whom tenders, sealed and endorsed "Church Tenders," must be sent on or before April 30. All further particulars may be obtained at the office of the architect, F. C. Jury, No. 1, Alma Villas, Tregonissey Road, St. Austell.

May 1. North Walsham.—*Erection of a classroom, art-room and offices at Paston Grammar School.* Builders desirous of tendering are requested to send in their names on or before April 19 to the architects, Olley & Hayward, Queen Street, Great Yarmouth, together with a postal order for £1 for a copy of the bill of quantities, which will be forwarded in due course. Endorsed tenders to be delivered at the office of Fairfax Davies, clerk to the Governors, North Walsham, by noon on May 1.

May 1. Leek.—*Extensions to the rectory-house at the Gasworks, Newcastle Road, Leek.* Plans, sections, stipulations and specification may be seen, and bill of quantities and form of tender obtained, at the office of the Surveyor, upon payment of the sum of £1 rs. Fair wages clause. Sealed tenders (upon the form supplied only) and priced quantities and schedule to be forwarded under separate covers, endorsed "Rectory-house Extension," and addressed to the Chairman of the Gas Committee, to be delivered to W. E. Beacham, C.E., surveyor to the Council, Town Hall, Leek, before noon on May 1.

May 2. London, N.—*Erection of a public library at the corner of High Road and Station Road, Wood Green, for the U.D.C.* Builders desirous of tendering should forward their names and addresses to C. J. Gunyon, A.M.I.C.E., the architect, at the Town Hall, Wood Green, not later than 5 p.m. on April 18, accompanied by a deposit of £2 2s. Form of tender and bills of quantities will then be forwarded. Tenders, upon the form supplied only, to be delivered to W. P. Harding, clerk of the Council, Town Hall, Wood Green, N., not later than 5 p.m. on May 2.

May 3. Glasgow.—*Works to be executed in the construction of a potato shed and warehouse on the site of the old City Poor-house to the east of Buchanan Street Goods Station, and of a portion of a bridge to carry Dobbie's Loan for the Caledonian Railway Co.* Drawings may be seen at the office of the Company's Engineer, Buchanan Street Station, Glasgow, where copies of the specification and schedule may be obtained on payment of £2 2s. Sealed tenders, endorsed "Tender for Buchanan Street Station Potatoe Shed, Warehouse and Relative Works," to be lodged with J. Blackburn, secy., Caledonian Railway Co.'s Offices, 302, Buchanan Street, Glasgow, by May 3.

May 3. Sunderland.—*Erection of caretaker's house in connection with Harrison Buildings, in Silver Street.* Drawings and conditions of contract may be seen, and specification, schedule of quantities and form of tender obtained at the Borough Surveyor's Office, Town Hall. Sealed tenders, addressed "To the Chairman of the Health Committee," and endorsed "Tender for Caretaker's House, Harrison Buildings," must be delivered at the Town Clerk's Office, Town Hall, before noon on May 3.

May 5. Rainham.—*Erection of a new Council school to accommodate 250 children at Rainham, Kent.* The drawings and specifications may be inspected at the office of the architect, G. E. Bond, High Street, Rochester. Any person desiring to tender must send in his name to the Architect, accompanied by a deposit of £1, not later than noon on April 20. Tenders, on the form supplied, to be delivered to Ernest C. Harris, 76, High Street, Sittingbourne, not later than noon on May 5.

No date. Anderton.—*Erection of a farmhouse and buildings in Anderton.* Drawings may be seen and quantities obtained at the office of Jolly & Buckley, architects, High Street, Chorley, to whom sealed and endorsed tenders must be sent.

No date. Salisbury.—*Erection of a house.* For particulars apply to J. Harding & Son, architects, 58, High Street, Salisbury.

No date. Southend-on-Sea.—*Erection of a new school for 820 children in Bournemouth Park Road.* Bills of quantities may be obtained and the plans inspected at the offices of the Architects, Greenhalgh & Brockbank, Bank Chambers, Southend-on-Sea, on payment of a deposit of £2 2s.

ENGINEERING.

April 19. Blairgowrie.—*Excavator, mason and plumber work of a new water supply for Persie House, Blairgowrie.* Schedules of quantities can be obtained from Lake Falconer, architect, Blairgowrie, with whom estimates are to be lodged on or before April 19.

April 19. Ystradlyfodwg.—*Driving a tunnel (mining only) 2,100 yds. or thereabouts in length through the Blaenrhondia Mountain, sinking shafts and constructing works in connection therewith, in the parish of Ystradlyfodwg, in the county of Glamorgan, for the U.D.C.* Drawings may be inspected and copies of the specification, schedule of prices and forms of tender obtained upon application to J. E. Hughes, M.I.C.E., engineer, Tynwydd, Treherbert, Glamorgan, upon depositing the sum of £5. Fair wages clause. An assistant engineer will accompany intending contractors along the site of the works on Wednesdays, April 4 and 11, starting from the Engineer's Office at Tynwydd at 11 a.m. Sealed tenders, enclosed in the printed envelopes provided, and addressed to the Chairman of the Gas and Water Committee, endorsed "Tender for Tunnel," must be delivered at the Council Offices, Pentre, Glam., not later than 10 a.m. on April 19.

April 20. Halifax.—*Construction and completion of a single line of railway, about 4½ miles in length, from Holmfild Station to Southowram, in the borough of Halifax, in the West Riding of the county of York, together with certain station works connected therewith,*

according to plans, specifications and conditions prepared by Myers-Beswick & Partners, of Leeds, engineers. Specification and bill of quantities can be obtained on application to Land & Foster, solicitors, 13, Ward's End, Halifax, to whom tenders must be delivered not later than April 20.

April 21. Bandon.—*Laying of additional water mains in the town of Bandon, in accordance with plan and specification, which may be seen and inspected at the R.D.C. room at the workhouse.* Intending contractors should have experience in laying and jointing water pipes, and a detailed estimate and schedule of prices must accompany each tender. The works must be completed within three months from the date of acceptance of tender under a penalty of £2 per week, or portion of a week beyond the time allowed. Tenders, containing the names of two solvent sureties willing to become bound with the contractor in a bond for double the amount of the contract, for the due performance of the contract, to be lodged with A. Haynes, clerk of District Council, Council Room, Workhouse, Bandon, before noon on April 21.

April 23. Littlehampton.—*Steel bridge over the River Arun at Littlehampton, to consist of a swing span and a fixed span, for the U.D.C.* Tenders are also invited for the construction of the approaches and abutments in connection with the bridge. Tenders must be sealed and endorsed either "Tender for Bridge" or "Tender for Approaches," and must be delivered to A. Shelley, clerk, not later than 9 a.m. on April 23. For the bridge only those tenders from firms who have erected similar bridges will be considered, and the tenderers must give the names of the swingbridges they have erected. On a deposit of £5 5s. drawings may be seen and copies of the specification, general conditions, bill of quantities and forms of tender obtained on application to the engineer, Major Hector Tulloch, C.B., R.E. (retired), 28, Victoria Street, Westminster, London, S.W., or to Arthur Shelley, clerk, Town Offices, Littlehampton.

April 23. Southampton.—*For the reconstruction of the tramway in the Avenue.* Specification, conditions and form of tender can be obtained upon application to the general manager and engineer, H. F. Street, at the Tramway Office, Above Bar Street. Sealed tenders, endorsed "Tender, Tramways Avenue," must be delivered at the Town Clerk's Office, before 2 p.m. on April 23.

April 23. Bamford.—*Construction of the Bamford filters and the Derwent to Grindleford section of the Derwent aqueduct, in the county of Derby, for the Derwent Valley Water Board.* The work will comprise:—Roughing filters, 3,500 sq. yds.; sand filters, 21,000 sq. yds.; cut and cover, ½ mile; 45 in. pipelaying, 7½ miles; with valve-houses, stream crossings, &c. The specification and schedule of prices and copies of the drawings may be obtained on application to Edward Sandeman, M.I.C.E., engineer to the Board, on payment of £5 5s. Sealed tenders, enclosed in the printed envelope supplied with the documents, to be delivered to O. B. Steward, clerk to the Board, Bamford, near Sheffield, not later than 9 a.m. on April 23.

April 24. London, S.W.—*Reconstruction of Victory Bridge over the Regent's Canal, in the borough of Stepney and the administrative county of London, for the County Council.* Persons desiring to submit tenders may obtain the drawings, specification, bills of quantities, form of tender and other particulars, upon application to the chief engineer, Maurice Fitzmaurice, C.M.G., at the County Hall, Spring Gardens, S.W., upon payment to the cashier of the Council of the sum of £3. Tenders must be upon the official forms, and the printed instructions contained therein must be strictly complied with. Fair wages clause. Each tender is to be delivered at the County Hall, in a sealed cover, addressed to the Clerk of the London County Council, Spring Gardens, S.W., and marked "Tender for the Reconstruction of Victory Bridge." No tender will be received after 10 a.m. on April 24.

April 24. Basford.—*Providing and laying about two miles of 3 in. and 2 in. cast-iron water mains, with all necessary valves, &c., in the parish of Strelley, near Nottingham, for the R.D.C.* Plans and specifications may be seen by appointment, and bills of quantities and tender forms obtained from S. Maylan, surveyor, Public Offices, Basford, Nottingham, on deposit of £2 2s. Sealed tenders, endorsed "Tender for Strelley Water," addressed to the Clerk to the R.D.C., must be delivered free at the Public Offices, Basford, Nottingham, not later than 9 a.m. on April 24.

April 24. Manchester.—*Reconstruction of Dawson Street Bridge over the River Medlock, and Carruthers Street Bridge over the Ashton Canal.* Drawings may be seen, and specification, bill of quantities and form of tender obtained on application at the City Surveyor's Office, Town Hall, Manchester, on payment to the City Treasurer of £2 2s. All cheques or postal orders are to be made payable to the order of "The Corporation of Manchester." Tenders, enclosed in the official envelope and addressed to the Chairman of the Improvement, &c., Committee, to be delivered at the City Surveyor's Office not later than 10 a.m. on April 24.

April 25. London, E.C.—*Deck spans (from 6 ft. to 33 ft. in the clear), as per specification, for the East Indian Railway Co.* Specification, for which £1 rs. (not returnable) will be charged, can be obtained at the Company's Offices. Tenders to be marked "Tender for Deck Spans," and sent in to C. W. Young, secretary, Nicholas Lane, London, E.C., by noon on April 25.

April 25. Brussels.—*Railway plant.* For the construction of the Erezée to Hottot section of the local railway from Comblain la Tour to Manhay and Melreux. Estimated cost 168,000 fr. (£6,720). A deposit of 16,000 fr. (£640) will be required. A copy of the specification may be obtained, price 1 fr., from M. l'Hoir, rue Edouard-Wacken, 10, Liège. Tenders in sealed envelopes should be addressed to the General Manager, Société Nationale des Chemins de Fer Vicinaux, 14, rue de la Science, Brussels, by April 25.

April 27. Sofia.—*Bridge-work.* For the construction of a bridge over the Wladajuss, at an estimated cost of 50,000 frs. (£2,000), for the Town Council, Sofia, by whom tenders will be received up to April 27.

April 30. Darlington.—*Supply, delivery and erection of a counter current jet condensing plant complete with piping and cooling tower.* Plans, specification and form of tender may be obtained from the Borough Electrical Engineer, Electricity Works, Haughton Road, Darlington, on payment of a deposit of £1 rs. Sealed tenders, endorsed "Condensing Plant," to be delivered at the office of H. G. Stevenson, town clerk, Houndgate, Darlington, on or before April 30.

May 1. London, N.—*Hot-water heating apparatus for Pavilion No. 1 at the Northern (Convalescent) Fever Hospital, Winchmore Hill, N., for the Metropolitan Asylums Board, in accordance with drawings and specification prepared by W. T. Hatch, M.I.C.E., M.I.M.E., engineer-in-chief.* Drawings, specification, conditions of contract and form of tender may be inspected at the Office of the Board, Embankment, London, E.C., and obtained upon payment of a deposit of £1. Tenders, addressed as noted on the form, must be delivered at the Office of the Board not later than 10 a.m. on May 1.

May 2. London, E.C.—*Extension of Parkeston Quay and construction of a shed and sidings in connection therewith, for the Great Eastern Railway Co.* Persons desirous of tendering can, on application to the Engineer, obtain copies of the specifications and quantities, and the drawings can be inspected at his office at Liverpool Street on and after April 17 between 10 and 4. Sealed tenders, endorsed, "Tender for Extension of Parkeston Quay," Contract No. 1, should be addressed to W. H. Pepper, come, and must be delivered at the Secretary's Office, Liverpool Street Station, not later than 10 a.m. on May 2. Tenders to be sent through the "General Post Office." Any sent otherwise will not be considered. The sum of £10 rs. will be charged to each applicant for the specification and quantities, schedules and form of tender.

May 5. Guernsey.—*Quay wall, with low-level landing, on the southern side of St. Julian's Emplacement, Harbour of St. Peter-Port, Guernsey.* Drawings of the proposed works may be inspected, and the general conditions, specifications and forms of tender and other particulars obtained, upon application at the States Offices, Guernsey, on payment of £5. Tenders, enclosed in sealed envelopes, endorsed "Tender for Quay, St. Julian's," and addressed to John N. Brouard, supervisor of the harbour, &c. &c., must be delivered so as to reach the States Office, Guernsey, on or before 3 p.m. on May 5.

May 8. Deptford.—*Construction of a footbridge for the Borough Council, according to the drawings and specification which may be seen at the Borough Surveyor's Office at the Town Hall after April 23, during the ordinary office hours.* It will be a condition of the contract that the steelwork must not be sublet. Fair wages clause. Bills of quantities prepared by W. T. Farthing & Son, together with the conditions of contract, may be obtained from the Town Clerk, Town Hall, Deptford, upon payment of a deposit of £1 rs. Persons desirous of tendering must send their names to the Town Clerk on or before April 27, to whom sealed tenders, in accordance with the Council's regulations printed on the form of tender, must be sent not later than 4 p.m. on May 8.

May 11. Flamborough.—*For the construction of waterworks at Flamborough, Yorkshire, including supplying and laying 2½ miles of 3 in. cast-iron pipes with all appurtenances, the construction of brick reservoir (capacity 50,000 gallons), and the erection of an engine-room.* Plans can be seen at the offices of the engineers, Elliott & Brown, Burton Buildings, Parliament Street, Nottingham, from whom copies of the specification and bills of quantities and form of tender can be obtained on deposit of £2 2s. Sealed and endorsed tenders to be delivered to George Hankinson, clerk to the Bridlington R.D.C., Long Lane, Bridlington, on or before May 11.

May 12. Brussels.—*Railway plant.* For the construction of the section from S. Cécile to the French frontier, of the railway from Bertrix to the frontier via Munro. Estimated cost, 3,500,000 francs (£140,000); deposit, 190,000 francs (£7,600). Specifications ("cahier des charges," special No. 27) may be obtained at the Bourse, Brussels (price 4 francs 70 cents), where tenders will be received up to May 12.

May 12. King's Lynn.—*Waterworks extension.* Contract No. 1: Supplying and fixing slow-speed steam engine (surface condensing, differential, or cross-compound horizontal), pumps, condensers and the necessary alterations to existing steam pipes, delivery mains, &c. Contract No. 2: Sinking and lining an 8 ft. diameter well. Contract No. 3: Supplying and fixing one 24 ft. by 6 ft. 6 in. Lancashire boiler, and a 48-tube economizer, with all the necessary sealings, chambers and alterations to existing flues. Contract No. 4: Supplying and fixing a cast-iron tank 13 ft. by 6 ft. 6 in. Contract No. 5: Extensions to engine-house and mechanics' shop. General conditions, stipulations, specifications, bills of quantities and forms of tender may be obtained from and drawings inspected on application to J. H. Webb, waterworks engineer, Town Hall, King's Lynn, on and after April 17, upon receipt of a deposit of £3 3s. for contract No. 1 and £1 rs. each for contracts Nos. 2, 3, 4 and 5. Sealed tenders, endorsed "Tender for Waterworks," to be delivered to J. W. Woolstencroft, town clerk, Town Hall King's Lynn, by May 12.

May 16. Brussels.—*Railway plant.* For the construction of the Jodoigne to Esmel section of the local railway from Jodoigne to Tirlemont and St. Trond, and of buildings and roads in connection therewith. The estimated cost is 401,000 fr. (£16,040), and a deposit of 40,000 fr. (£1,600) is required. A copy of the specification may be obtained on payment of 1 fr. from M. Darteville, rue de Turquie, No. 18, Saint Gilles, Brussels. Tenders, in sealed envelopes, should be addressed to the General Manager, Société Nationale des Chemins de Fer Vicinaux, 14, rue de la Science, Brussels.

May 23. Brussels.—*Railway plant.* For the construction of the Gembe to Graide section of the local railway from Rochefort to Wellin and Graide. The estimated cost is 205,000 frs. (£8,200), and a deposit of 20,000 frs. (£800) will be required. A copy of the specifications may be obtained for 1 fr. from M. Rigot, rue Lucien-Nameche, 39, Namur. Tenders, in sealed envelopes, should be addressed to the General Manager of the Société Nationale des Chemins de Fer Vicinaux, 14, rue de la Science, Brussels.

May 23. Bristol.—Electrically-driven hydraulic pressure pumps. Erecting in the existing engine-house, Under fall Yard, testing and maintenance for twelve months after completion, of three sets of electrically-driven hydraulic pressure pumps. Each set is to be capable of delivering 150 gallons of water per minute against an accumulator pressure of 750 lbs. per sq. in. The contract includes the pumping machinery, and also the electro motors and accessories, and gearing for driving the pumps. On and after Thursday, April 12, copies of the specification, form of tender, form of contract and copies of contract drawings can be obtained from W. W. Squire, Engineer's Office, Cumberland Road, Bristol, on production of a receipt from the secretary of the Docks Committee showing that £5 has been paid as deposit. Tenders must be enclosed in a sealed envelope, endorsed "Tender for Electrically-driven Hydraulic Pressure Pumps," and addressed to the Secretary of the Docks Committee, 19, Queen Square, Bristol, and must be delivered to him, accompanied by the prescribed documents, before 10 a.m. on May 23.

June 2. London, N.—Supply and erection of a refuse destructor complete in all respects, for the Southgate U.D.C. Copies of the specification and full particulars may be obtained from C. G. Lawson, C.E., surveyor to the Council, on depositing a Bank of England note for £5 with him. Sealed tenders, endorsed "Tenders for Refuse Destructor," must reach W. M. Ellenor, clerk to the Council, Council Offices, Palmer's Green, London, N., not later than June 2.

IRON AND STEEL.

April 23. Sofia.—Steel nails, switching apparatus, bolts, &c., for the State Railway Directorate, Sofia, by whom tenders will be received up till April 23.

April 24. London, S.W.—Supply bearing springs, for the Secretary of State for India. The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W., and tenders are to be delivered at that office by 2 p.m. on April 24.

May 3. London, E.C.—Wrought-iron hinges for the Great Indian Peninsular Railway Co. Specifications and forms of tender may be obtained at the office on payment of the fee for the specification, which payment will not be returned. Tenders must be delivered in sealed envelopes, marked "Tender for Wrought-iron Hinges," and delivered to J. I. Berry, secy., Company's Offices, 48, Cophall Avenue, E.C., not later than 11 a.m. on May 3.

PAINTING AND PLUMBING.

April 19. London, N.—Whitewashing, &c., at the infirmary, Highgate Hill, N., in accordance with specification and conditions of contract, copies of which may be obtained on application to the Steward there between 8.30 a.m. and 5 p.m., up to April 15. Tenders must be sealed up, addressed to the Guardians, and delivered at the Guardians' Offices, St. John's Road, Upper Holloway, N., not later than 4 p.m. on April 19, endorsed "Whitewashing."

April 21. Blaydon.—Painting and colouring the following schools during the Midsummer recess:—Dunston Council, Swolwell Council, Martey Hill Colliery Council, Blaydon Council (Boys' and Girls' Department) High Spen Council. Specifications and forms of tender, to be returned not later than April 21, may be obtained from I. George Maguire, 7, Wallace Terrace, Ryton-on-Tyne.

April 21. York.—Painting, &c., of the schools in various districts. Apply to the Secretary, Education Offices, Clifford Street, York. Tenders to be in by April 21.

April 23. Preston.—Painting fifteen iron outside staircases at Whittingham Asylum, near Preston. Particulars and specification may be obtained at the Asylum. Tenders to be in before 10 a.m. on April 23.

April 24. Conway.—Cleaning, scraping and painting Conway suspension bridge, according to the specification, &c., of the engineer and surveyor, F. A. Delamotte, Town Hall, Conway, at whose office form of tender and all information may be obtained on payment of £1. Tenders, endorsed "Bridge Painting," to be forwarded to T. E. Parry, town clerk, Conway, on or before April 24.

April 30. London, W.—Painting, colouring, cleaning, repairs and alterations at the schools at Southall, 9 miles from London, on the Great Western Railway, for the St. Marylebone Guardians. Persons desiring to tender may obtain specifications and forms of tender upon application to the Superintendent of the Schools, any day from April 18 to April 27, between 10 and 12. Tenders to be sealed and endorsed, "Tender for Painting, &c., Schools," and delivered at the Guardians' Offices, at Northumberland Street, W., at or before 10 a.m. on April 30.

ROADS AND CARTAGE.

April 20. Tulchan Moors.—Surface drains, and make footpaths through the Tulchan Moors. Offers will be received by John Cruickshank, Tulchan Lodge, who will show intending offerers over the ground, upon receiving two clear days' notice (except Saturdays), up to and including April 20.

April 21. Peabworth.—Hauling materials from the respective railway stations, quarries and pits to the highways, for the R.D.C. Printed forms of tender and specification of the quantities to be hauled to the respective roads, and full particulars can be obtained on application to Edward Wadams, clerk to the Council, Union Offices, Evesham, to whom tenders must be sent not later than April 21.

April 21. Jersey.—Laying about 2,300 yds. of creosote deal wood paving and granite setts in Halkett Place and York Street. Plans and specification can be obtained from the Town Surveyor, Town Hall, Jersey, on payment of £1 1s. Tenders, sealed and enclosed in

envelopes, are to be delivered at the Town Hall before 5 p.m. on April 21.

April 23. Chorley.—Moss Lane widening, Whittle-woods, for the R.D.C., plans and specifications of which may be seen by appointment with Edward Lawrence, highway surveyor, Shaw Green, Euxton. Sealed tenders, endorsed "Tender for Moss Lane Improvement," to be delivered to John Whitfield, clerk, 10, High Street, Chorley, not later than April 23.

April 23. London, N.W.—For the following works, for the Hendon U.D.C.:—About 400 yds. lineal 12-in. pipe sewer and surface-water drain in Finchley Road Golders Hill, &c.; about 925 yds. lineal gin. pipe sewer, together with man-holes, flushing-chamber, ventilators and other works in connection therewith; also for sewerage, levelling, kerbing, channelling and paving and other works in connection with the making-up of Ebenezer Road and Mews, Child's Hill. The drawings and specifications may be seen and form of tender obtained of S. Slater Grimley (engineer to the Council), at the Council Offices, Hendon, on deposit of £10. Sealed tenders, endorsed "Finchley Road Sewerage, &c.," addressed to the Chairman of the Council, to be sent to Henry Humphris, clerk to the Council, Council Offices, The Burroughs, Hendon, N.W., not later than 5 p.m. on April 23.

April 24. West Hartlepool.—Construction of Baltic Street footpath, west side (between Oxford Street and Casebourne Road), and 12-in. pipe sewer at Stranton Green (between Burbank Street and Back Green Street). Plans, sections and specifications can be seen, and approximate quantities obtained, upon application at the Borough Engineer's Office. Tenders, endorsed "Construction of Streets," addressed to the Chairman of the Works Committee, are to be delivered at the office of the Town Clerk, 78, Church Street, not later than 4 p.m. on April 24.

April 26. Newport (Salop).—Hauling of materials on to the district roads for the R.D.C. Forms of tender can be obtained from the Clerk to the Council, to whom tenders marked "Tender for Hauling" must be forwarded not later than April 26.

April 26. London, S.E.—Tar-paving work at the Infirmary, East Dulwich Grove, S.E., for the Guardians. The specification and conditions can be seen and all information obtained at the offices of the Steward, at the Infirmary, between 10 a.m. and 4 p.m. Tenders, endorsed "Tar-paving Work," should be addressed to the Guardians and delivered to Howard C. Jones, clerk, Union Offices, John Street West, Blackfriars Road, S.E., by 4 p.m. on April 26. Fair wages clause.

SANITARY.

April 23. Blackburn.—Erection of a sewage pumping station at Witton Eyes, within the borough of Blackburn. Specification, bill of quantities and form of tender may be obtained at the Engineer's Office. Sealed tenders, properly endorsed, to be delivered to William Stubbs, A.M.I.C.E., borough and water engineer, Municipal Offices, Blackburn, not later than noon on April 23.

April 23. Macroom.—Construction of sewerage works in accordance with plans and specification prepared by A. W. Barnard, C.E., to be seen at the Clerk's Office. Sealed tenders, addressed to the presiding chairman, and containing the names of two solvent sureties willing to enter into a bond with the contractor for double the amount, of the contract for the due and faithful fulfilment of same, to be lodged in the tender box in the Council Office up to 4 p.m. on April 23. A sum of £10 in cash to be lodged with each tender, which will be returned on completion of the bond.

April 23. London.—Destroying and filling-in disused sewer in Finsbury Pavement (between London Wall and West Street) according to specification and plan to be seen at the office of the Engineer to the Corporation, Guildhall, where forms of tender may be obtained. Tenders must be on the before-mentioned forms, and must be addressed Town Clerk, Public Health Department, and delivered at the office of the Hallkeeper, Guildhall, between 12.30 and 1.30 on April 23.

April 23. Lye.—Construction of a brick barrel sewer for the Upper Stour Valley Main Sewerage Board. Plans, sections and detail drawings may be seen and specifications and bills of quantities obtained at the offices of the engineers to the Board, E. B. Marten, M.I.C.E., and W. Fiddian, F.S.I., Stourbridge, on payment of £1 1s. Sealed tenders, endorsed "Tender for Sewer at Lye," are to be delivered to George Green, clerk to the Board, Cradley Heath, by noon on April 23.

April 24. Bristol.—Construction of five public conveniences in various parts of the city. Drawings and specifications can be seen at Engineer's Office, and bills of quantities obtained, on deposit of a cheque value £2. Tenders must be made out on the form provided, and all blanks must be filled in, otherwise the tender will not be considered. Sealed tenders, enclosed in the envelope provided, to be delivered before 5 p.m. on April 24, addressed to T. M. Yabbicom, M.I.C.E., city engineer, 63, Queen Square, Bristol.

April 24. West Hartlepool.—Construction of wooden outlet extension at the Stell, south of Carr House, on the foreshore, in accordance with the plans and specifications to be seen upon application at the Borough Engineer's Office. Tenders, endorsed "Outlet at Stell," and addressed to the Chairman of the Works Committee, are to be delivered at the office of the Town Clerk, 78, Church Street, not later than 4 p.m. on April 24.

April 25. St. Columb Minor.—Construction of sewers, from 7 ins. to 6 ins. in diameter, with manholes, lamp-holes and other appurtenances, and for certain works in connection with the preparation of lands for sewage irrigation, for the R.D.C. The total length of sewer is intended to be about 2,500 yds. General and detail drawings may be seen, the specification examined, and bills of quantities obtained at the office of the engineer, R. Hansford Worth, 42, George Street, Plymouth. All tenders must be delivered in sealed envelopes, endorsed

"Tenders for St. Columb Minor Sewerage," accompanied by fully priced out and totalled bills of quantities, and addressed to Charles E. Whitford, clerk, Fore Street, St. Columb Major, Cornwall, by April 25.

April 30. Carlisle.—Sewage-disposal works, Contract No. 1: The erection and construction of pumping station, sedimentation tanks, filters, &c. Contract No. 2: Centrifugal pumps, motors, switchboards, &c. Contract No. 3: Sewage screens, elevators with motors. Parties desiring to submit tenders may inspect the drawings and conditions of contract and obtain specification, bills of quantities and forms of tender and other particulars upon application to H. C. Marks, city engineer, on deposit of the sum of £5 in the case of Contract No. 1 and £2 2s. in the case of each of the Contracts Nos. 2 and 3. Tenders must be on the official forms, and the printed instructions contained therein must be strictly complied with. Each tender, in a sealed envelope, together with the filled-up bill of quantities, must be endorsed "Tender for Sewage Works," and delivered to Henry C. Marks, M.I.C.E., city engineer and surveyor, 36, Fisher Street, Carlisle, not later than 10 a.m. on April 30.

April 30. Middleton.—Construction of three circular tanks, catchpits, conduits, &c., at the Sewage Outfall Works at Rhodes. Plans may be seen and specifications, quantities and form of tender (which includes a fair wages clause) obtained on and after April 5 by applying to W. Welburn, borough surveyor, Town Hall, between 9.30 and 10.30 a.m., on depositing £1 1s. Tenders, endorsed "Tender for Tanks," are to be addressed to the Chairman of the Surveyor's Committee, and delivered at the Town Clerk's Office on or before April 30.

April 30. Havant.—Constructing and maintaining stoneware and iron pipe sewers, manholes, ventilating shafts, pump wells, pumps and machinery, septic tanks, filter beds, outfall sewer, and other work, in accordance with plans, specifications and general conditions of contract prepared by A. E. Stallard, F.S.I., Havant, Hants (engineer to the Council), and Lemon & Blizard, M.M.I.C.E., Lansdowne House, Castle Lane, Southampton, and 11, Victoria Street, Westminster (consulting engineers). Contractors may inspect the plans and specifications at the offices of the District Council, West Street, Havant, and obtain copies of bills of quantities, specification of works, and form of tender, on payment of the sum of £5. The successful contractor will be required to enter into a bond with two sureties in the sum of £1,000 for the due performance of the contract. Sealed tenders, on printed forms supplied, are to be delivered to E. R. Longcroft, clerk to the Council, West Street, Havant, on or before noon on April 30.

May 4. Penrith.—Construction of about 2,500 yds. of 21-in. stoneware main outfall sewer and contingent works, for the U.D.C. General conditions, specifications, bills of quantities and forms of tender may be obtained, and drawings inspected, at the Town Hall, Penrith, upon receipt of a deposit of £2 2s. Full information may be obtained from the engineers, Brierley, Holt & Co., of Blackburn and Blackpool, or from the resident engineer, J. J. Knewstubb, Town Hall, Penrith. Sealed tenders, endorsed "Penrith Sewerage—Contract No. 1," must be delivered to George Wainwright, clerk of the Council, Town Hall, Penrith, not later than May 4.

MISCELLANEOUS.

April 21. Perth.—Supply of the following materials, for the Town Council:—Whinstone causeway, kerb, channel, &c.; freelay drain pipes, traps, &c.; cast-iron street gulleys, manway covers; sand and gravel; cement; carting; lime and bricks. Specifications and forms of tender may be had at the Burgh Surveyor's Office, 16, Tay Street, Perth. Tenders, endorsed "Supplies for Burgh Surveyor's Department," to be lodged with John Begg, town clerk, on or before April 21.

April 23. Dublin.—Supply of the following stores, for the Dublin, Wicklow and Wexford Railway, for twelve months from 1st May. Specifications, with form of tender, price 6d. each, can be had on application to the Secretary:—Iron; tin; iron castings; varnishes; steel files; paints, oils, &c.; brushes; carriage bolts; ironmongery; glass; native timber; foreign timber; slates, tiles, &c.; cement; permanent way fastenings; plumbing and gasfitting. Tenders, sealed, marked "Tender for Stores," and addressed to the Secretary, Dublin, Wicklow and Wexford Railway, Westland Row Station, Dublin, to be sent in so as to reach him not later than 10 a.m. on April 23.

April 24. Wallasey.—Supply of the following stores, for the Gas and Water Department of the U.D.C.:—Wrought-iron tube; stop cocks and main taps; lead pipe, &c.; wrought-iron bars and steel plates; cast-iron main pipes; valves and hydrants; oils, paints, brushes; gas and water meters; retorts and firebricks; block and sheet tin, &c. Further particulars, with form of tender, may be had, and samples inspected, on application to the Gas and Water Engineer's Office, Dock Road, Seacombe. Sealed tenders, which must be on the printed form, endorsed "Tenders for Gas and Water Stores," to be addressed and delivered (per post) to H. W. Cook, clerk and solicitor, Public Offices, Egremont, Cheshire, not later than the morning of April 24.

April 23. Teddington.—Supply of the following materials, for the U.D.C.:—1,000 yds. of broken granite and 2,000 yds. of flints, to be delivered as required, either by barge alongside the Teddington public landing wharf on the River Thames, or by rail at the London and South-Western Railway Station, Teddington. Also for the execution of all smith's work and team labour, the supply of tools and implements, pipes, gulleys, &c. Specifications and forms of tender, together with particulars, may be obtained on application to Marshall Hainsworth, surveyor, Council Offices, Teddington. Sealed tenders, endorsed "Tenders for Granite, Flints, Smith's Work, Team Labour, Tools and implements, Pipes, Gulleys, &c.," as the case may be, to be delivered to G. H. Salmon, clerk, Council Offices, Teddington, not later than April 28.

TENDERS cont. from p. xi.

London.—For heating apparatus for Senrab Street School, Stepney, for the London County Council Education Committee:—

J. Wontner-Smith, Gray & Co., London	£879 0 0
G. Davis, London	870 0 0
B. Dawson & Co., Stalybridge	848 0 0
Paragon Heating Co., Birmingham	820 0 0
Wippell Brothers & Row, Exeter	805 0 0
J. Yettton & Co., London	798 15 0
Stevens & Sons, London	770 0 0
R. H. & J. Pearson, London	770 0 0
Brightside Foundry and Engineering Co., London	763 0 0
W. Richardson & Co., Darlington	755 10 0
J. & F. May, London	743 0 0
J. C. Christie, London	717 16 0
Wenham & Waters,* Paragon Works, Croydon	689 0 0

* Recommended for acceptance.

[Architect's (education) estimate, £695.]

London.—For heating apparatus for Hugon Road School, Fulham, for the London County Council Education Committee:—

J. Fraser & Son, London	£437 0 0
Ashwell & Nesbitt, Leicester	418 0 0
Wright Brothers, Sheffield	378 10 0
Brightside Foundry and Engineering Co., London	369 0 0
C. Kite & Co., London	365 0 0
Strode & Co., London	353 0 0
J. Yettton & Co., London	355 10 0
J. Gray, Danvers Street, London	340 0 0
Lancashire Heating Co., Manchester	345 0 0
J. Richmond & Co., London	295 0 0

* Recommended for acceptance.

London, S.E.—For the erection of Plumstead sub-station, for the London County Council:—

C. Wall, Ltd., London, E.C.	£8,990
E. Lawrence & Sons, London, N.	8,676
F. G. Minter Putney	8,564
Kirk & Randall, Woolwich	8,338
Spencer, Santo & Co., Westminster	8,328
H. Lovatt, Ltd., Wolverhampton	8,237
H. L. Holloway, Deptford	8,203
Kerridge & Shaw, Cambridge	8,189
Leslie & Co., London, S.W.	8,150
Holloway Brothers, Lambeth	7,930
F. & H. F. Higgs,* Station Works, Loughborough Junction	7,894

* Recommended for acceptance.

Lytham.—Accepted for the erection of a new public elementary school at Common Side Lane, Ansdell, Lytham, for the Lancashire Education Committee:—

J. Cronshaw, Lynwood Road, Blackburn	£2,150
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Nuneaton.—For additions to works at Attleboro', Nuneaton, for H. Slingsby & Son. Mr. Ernest E. Shepherd, architect, New Bridge Street, Nuneaton:—

T. Smith, Coton	£585 0 0
T. Smith, Nuneaton	561 0 0
T. Wincott,* Nuneaton	542 7 0

* Accepted.

Okehampton.—For the erection of a semi-detached residence in Station Road, for Mr. E. Murrin. Mr. Francis J. Worden, architect:—

M. J. Harris	£1,730
J. Petherick	1,680
H. Harris & Co.	1,470
W. Harris & Son	1,456
Sleeman & Son	1,445
Kerslake & Son	1,420
Blatchford & Avery	1,420
Geen & Avery	1,297
S. T. Geen, Son & Co.*	1,290

* Recommended for acceptance.

Okehampton.—For the erection of a residence for Mr. T. J. Miller. Mr. Francis J. Worden, architect:—

J. M. Harris	£1,721
S. T. Geen & Harris	1,319
W. Harris	1,316
Kerslake & Son	1,300
G. K. Blatchford	1,215
J. Sleeman & Son	1,195
S. T. Geen, Son & Co.	1,070
W. Chapman*	1,000

* Recommended for acceptance.

Old Trafford.—For the erection of a public elementary school, Northumberland Road, for Salford Education Authority. Mr. E. Woodhouse, architect, 88, Mosley Street, Manchester:—

S. Warburton	£14,100
R. Holland	13,561
O. Normanton & Son	13,000
J. Gerrard & Son	12,970
Young, Tinker & Young	12,899
J. Ramsbottom	12,795
J. H. Billings & Co.	12,789
W. A. Peter & Son	12,763
S. Megarity & Co.	12,697
Clayton Brothers	12,660
E. Hayes	12,660
W. Thorpe	12,585
A. Hookinson	12,429
Burgess & Galt	12,144
R. Carlyle,* Manchester	11,915

* Accepted.

Penarth.—For the erection of All Saints' new parish room. Mr. J. C. Carter, architect, Penarth:—

D. G. Price	£1,410 0 0
W. Braley	1,300 2 6
J. Jones	1,276 0 0
F. Bond, Cardiff	1,235 0 0
Knox & Wells, Cardiff	1,205 0 0
J. S. Shepton	1,193 17 0
J. Humphries	1,181 0 0
F. Speed	1,176 4 3
W. H. Gay, Cardiff	1,169 0 0
E. R. Evans, Cardiff	1,165 0 0
J. Haines & Co., Cardiff	1,123 16 0
W. Jones	1,072 0 0
E. T. Bevan	1,028 0 0
J. H. Maggs & Co., Cardiff	1,018 0 0

* Accepted.

[Rest of Penarth.]

Penarth.—For the erection of the Paget Rooms. Mr. J. Coates Carter, architect, Bank Buildings, Cardiff:—

W. H. Gay, Cardiff	£4,975 0 0
J. H. Maggs & Co., Cardiff	4,850 0 0
W. Bowers & Co., Hereford	4,710 0 0
F. Speed	4,674 0 0
Knox & Wells, Cardiff	4,488 17 4
J. S. Shepton	4,493 0 0
E. R. Evans, Cardiff	4,440 0 0
T. Bevan	4,417 8 0
W. Symonds & Co., Cardiff	4,400 0 0
E. Turner & Sons,* Cardiff	4,388 0 0
E. T. Bevan	4,346 0 0
J. Jones	4,340 0 0
F. Bond,* Cardiff	3,900 0 0

* Accepted.

† Withdrawn.

[Rest of Penarth.]

Pontycymmer.—For the erection of a new vestry for Tabernacle Church:—

Jones & Samuel, Blaengarw	£1,331 0 0
W. J. H. Greed	1,215 10 0
T. W. Jones	1,205 0 0
P. Gaylard, Station Road, Bridgend	1,180 0 0
T. Roberts	1,172 0 0
G. Jones*	—

[Rest of Pontycymmer.]

* Accepted, but amount not stated.

St. Albans.—Accepted for the erection of new Council schools in Priory Park, for the Hertfordshire Education Committee:—

Cuthbert & Sons, Nottingham	£1,242
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St. Albans.—Accepted for the enlargement of the school in Garden Fields, for the Herts Education Committee:—

W. Hyde, Norwood Junction, S.E.	£2,038
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Scarborough.—Accepted for the erection of tollhouses on the Marine Drive, for the Corporation:—

Hunter & Smith, Scarborough	£1,633
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Ravenstone.—For the erection of a Council school, together with out-offices, drainage, and other works connected therewith, for the Leicestershire County Council Education Committee. Messrs. Keites & Fosbrooke, architects, Market Street, Leicester:—

H. Herbert & Sons, Leicester	£2,998 10 0
J. Biddle, Leicester	2,794 10 6
F. Elliott, Leicester	2,790 0 0
E. Orton, Coalville	2,659 0 0
T. Hatter, Hugglescote	2,620 0 0
Griffin Brothers, Hugglescote	2,450 0 0
G. H. & J. Hewes, Coalville	2,429 9 0
W. Moss,* Coalville	2,400 0 0

* Accepted.

Shipston-on-Stour.—For the erection of a new Baptist Manse in Stratford Road, Shipston-on-Stour. Mr. A. Edward Allen, architect, 31A, Bridge Street, Banbury:—

T. Hartwell	£750 0 0
T. & C. Panter	749 3 6
W. J. Bloxham	718 0 0
J. G. Fincher & Co.	715 0 0
J. Grant & Sons	700 0 0
J. F. Booth	700 0 0
F. G. Watson	639 0 0
B. Ward	621 10 0
R. Turner & Son	600 0 0
G. E. Adams,* Shipston-on-Stour	515 16 0

* Accepted.

Solihull.—For the erection of a new laundry for the Guardians of Solihull Union. Mr. W. H. Ward, architect, Paradise Street, Birmingham:—

J. Dodd, Birmingham	£2 6 17 0 0
Grove & Sons, Dorridge	2,121 0 0
D. Roberts, Handsworth	1,970 0 0
J. T. Beech, Langley	1,965 0 0
H. Gregory, Orton	1,900 0 0
Sapcote & Sons, Birmingham	1,858 0 0
Oakley & Coulson, Dudley	1,813 0 0
G. Robinson, Birmingham	1,794 0 0
Bragg Brothers, Solihull	1,770 0 0
H. J. Pitts, Birmingham	1,734 0 0
H. Gibbs, King's Heath	1,718 0 0
T. & W. Thompson, Solihull	1,693 10 0
W. Hopkins,* Birmingham	1,659 0 0

* Accepted.

Watford.—Accepted for the erection of Council schools in London Road, for the Education Committee of the Herts County Council:—

Hooper, Nearey & Co., Greenwich	£9,939
---------------------------------	--------

Walthamstow.—For the erection of six dwelling-houses, Chingford Road, for Mr. Thomas Welham. Mr. J. W. Dunford, architect, 100c, Queen Victoria Street:—

Fuller & Son	£2,148
F. Wilson	1,960
Wills & Sons	1,862
Sands & Burley	1,863
F. J. Smith & Son	1,575
G. W. Barker,* Walthamstow	1,530

* Accepted.

Walthamstow. For the reinstatement of a factory after fire, for the British Xylonite Co. Messrs. Searle & Hayes, architects:—

Brown & Son	£1,270
W. Johnson & Co.	1,198
G. Dobson & Son	1,197
W. Shurmer & Sons	1,143
G. Wagstaff & Son	1,092
A. G. Barton	1,064

Woodford.—For the erection of a new Moravian church at Woodford Halse. Mr. A. Edward Allen, architect, 31, Bridge Street, Banbury:—

S. Orchard & Son	£1,656 0 0
W. J. Bloxham	1,566 0 0
R. Cleaver	1,523 0 0
J. S. Kimberley	1,516 0 0
J. F. Booth	1,480 0 0
J. Parnell & Son	1,468 0 0
T. Kench	1,460 0 0
J. Grant & Sons	1,407 6 0
F. G. Watson,* Southam, Rugby	1,296 0 0

* Accepted.

Coming Events.

Wednesday, April 18.
EDINBURGH ARCHITECTURAL ASSOCIATION. — Annual Business Meeting and President's Address.

Friday, April 20.
JUNIOR INSTITUTION OF ENGINEERS. — Mr. William Tooke on "Recent Development in the Construction of Suction Producer Gas Plants," at 8 p.m.

Saturday, April 21.
EDINBURGH ARCHITECTURAL ASSOCIATION. — Visits to Pinkie House, Musselburgh, and Church and Presbytery of our Lady of Loretto, Musselburgh.

Monday, April 23.
ROYAL INSTITUTE OF BRITISH ARCHITECTS. — Messrs. G. P. Bankart and Lawrence A. W. Turner on "Plasterwork," at 8 p.m.
SURVEYORS' INSTITUTION. — Mr. J. W. Willis Bund on "The Effect of the Education Act, 1902, on Rural Districts," at 4 p.m.

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Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

F. PHIPPS, Oxford. R.O. April 5th.
S. HOLBROOK, plumber, Ilkeston. Adj. April 6th.
J. ROWDEN, builder, Hammersmith. R.O. March 29th.
J. KNIGHT, builder, Beeston. R.O. April 5th.
S. LENNARD, builder, Bexhill. Adj. April 2nd.
W. DUNCAN, builder, [Manchester. P.E., Manchester C.C., May 11th, at 10.
J. LUNT & Co., paint, oil and colour dealers, Liverpool. Adj. April 5th.
S. L. GRIST, builder, Enfield. P.E., Edmonton C.C., April 23rd, at 11.30.
H. VULLIAMY, builder, Sutton Heston, near Hounslow. P.E., Brentford Town Hall, May 8th, at 11.
C. H. FLACK, architect and surveyor, Wandsworth. Adj. April 2nd.
T. BATES & Co., joiners and builders, Droylsden. R.O. April 7th.
BELL & TROUGHTON, builders and contractors, Lancaster. R.O. April 6th.
J. B. PATERSON, builder, Cowdenheath. Deficiency £588.
BARNETT, SON & DAVIS, builders and contractors, Dorchester. Deficiency £1,165.
G. CLACY, carpenter and builder, Reading. R.O. March 31st.

W. T. LANE, builder, Walthamstow (late Cambridge Heath). First meeting, London Bankruptcy Court, April 20th, at 12. P.E., same, May 18th, at 12.

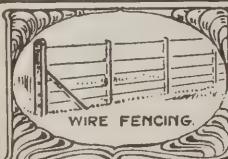
W. PENFOLD, builder, Marden. First meeting, 9, King Street, Maidstone, April 25th, at 11. P.E., Sessions House, Maidstone, April 25th, at 11.30.

F. FRY, builder, Streatham Hill (late Mortlake). First meeting, 132, York Road, S.E., April 20th, at 12.30. P.E., Wandsworth C.C., April 26th, at 12.


J. VAUGHAN, builder, Colwyn. First meeting, Imperial Hotel, Colwyn Bay, April 18th, at 4. P.E., Magistrates' Room, Bangor, May 3rd, at 12.30.

J. D. DENNY, architect and surveyor, Llangollen. First meeting, Crypt Chambers, Chester, April 18th, at 12. P.E., Wrexham County Hall, May 8th, at 12.


Burghill Parish Church, Hereford.—An oak reredos with panelling round the chancel walls has been erected in this church. The central opening of the reredos forms a niche for the altar cross, with a projecting canopy above and two recessed niches on either side, finished with octagonal-shaped buttresses at the ends, on which buttresses will be placed figures of angels holding trumpets; the side niches will also have carved figures introduced at a later date. The work has been carried out in character with the old rood screen by Mr. F. Dredge, from designs by Mr. H. Skyrme, architect, of Hereford.



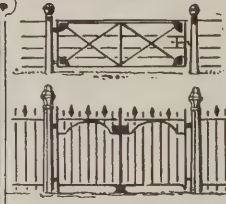
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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

April 25, 1906. Vol. 23, No. 585.

6, Great New Street, Fetter Lane, E.C.

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Buildings and Earthquakes. THE appalling disaster at San Francisco has drawn attention to the design of buildings in districts liable to earthquake shocks. The reports which have appeared in the daily press are not quite definite enough to enable us to criticize the construction adopted for many of the important buildings in the wrecked city, but it would appear from a telegram dated April 22nd through Reuter's agency, which is usually well informed, that the modern steel-frame buildings have stood remarkably well, and that the solid masonry construction of the older kind, although employed for buildings of much less height than the modern office structures, has proved unsound. It is said that while the interiors of the tall buildings were ruined the walls stood steady and true, a notable example being the "Call" building, twenty storeys

high, the tallest building in San Francisco, which still has every floor intact. It has always been admitted, from experience, that the only way to guard against earthquake shocks is to tie a building in every way possible, and to secure a strong foundation. We published in our issue for September 19th, 1900, a report of the Japanese Earthquake Investigation Committee, together with illustrations showing a type of timber construction advocated. Here the system of tying the structure together was employed in every direction. The principles which apply to timber structures are also those of a steel frame, and where timber is not possible of adoption for very large buildings steel naturally and adequately serves the necessary function. The structure needs to be calculated vertically to resist flexure when inclined and subjected to the vibration of earth tremour. Independent foundations are inadvisable for such situations, but naturally on a site of large area it would be impossible to calculate the foundation to float as a raft on top of the earth waves that occur in an earthquake. We think that the better way would be to frame the base of the building with steel in the form of a sill braced at the corners. With a frame structure there is usually not very much bond between the brick facing and the steel, and when a building is inclined and vibrating the walls would have a tendency to peel away; this, in fact, is stated to have been the case in some of the buildings at San Francisco. In America they erect a frame first and then apply the walls at different heights, supporting each floor independently on flanges riveted to the steel. With this system, however, there is not, as a rule, sufficient bond between the brickwork and the steel, and we are of opinion that where earthquake shocks have to be met the walls should be tied in at every point by hangers riveted to the steel. Better still would be to employ reinforced concrete. There is some nonsensical talk about the desirability of framing these buildings so as to give a certain amount of "play." Anyone, however, acquainted with the science of construction knows that this would be disastrous.

The Works at Winchester Cathedral.

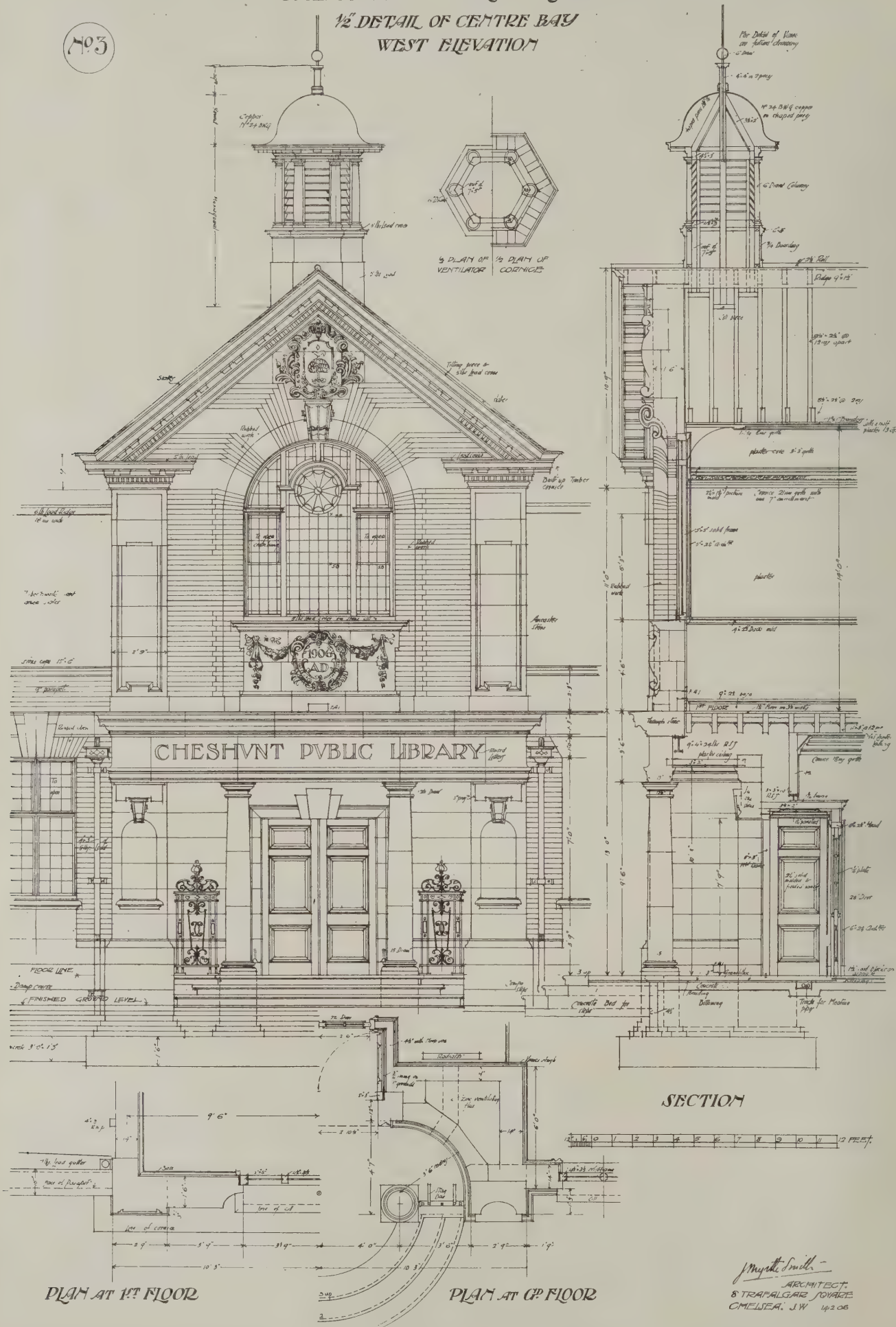
Mr. T. G. JACKSON reported to the Dean of Winchester on March 25th on the work done to the south and north sides of the east end of the south aisle of Bishop de Lucy's building. Mr. Jackson first shored up, in August last, the greater part of the south side, and bonded across the cracks in the wall with long blocks of hard Yorkshire stone, which were grouted with a Greathhead machine. The roof is now to have tie-rods fixed to take the strain, and this is expected to be completed about the end of this month, when the underpinning will be proceeded with. Mr. Jackson called attention to the fall, in February last, of an ashlar filling-in stone

in the north aisle vault of the Waynfleet Chantry, and he says that the scaffolding which has since been erected has enabled an inspection to be made, which shows that it is seriously affected. The underpinning, which is the chief difficulty, was started in the crypt of the Lady chapel. The mischief was found to be due to the sinking of the central pillar, a large square stone on which the column stood being broken and tilted up at the corners. Below was a 15in. timber pile, which was so rotten that it could be cut with a spade, like cheese. The new foundation, of cement-concrete and brick, has been put in resting on the gravel, and the second column is being treated like the first. When the underpinning of the main walls was proceeded with it was found that these had been erected on two layers of trees laid across one another in a mass of loose chalk. Some were decayed, while others were still sound. The builders, Mr. Jackson thinks, seem to have gone down with their foundation to the water level, and not knowing how to deal with the difficulty, used timber. Had this timber foundation been a good deal wider than the walls, so as to increase the supporting area, it might have been successful. As it is, it has been crushed down into the soft ground overlying the peat, resulting in the settlement that is causing the trouble. Towards the east, there seems to have been a bog, for there is a layer of peat 5ft. thick above the gravel bed. In consequence, the building has slipped eastward, parting at the great cracks which are now exposed. In November last the underpinning at the east end, *i.e.*, the east wall of Bishop Langton's chapel, was begun, Mr. Jackson's proposal being to put in a foundation on the gravel bed to arrest the slipping tendency. When the layer of peat was pierced, however, the water sealed down by this impervious layer was tapped, and it rushed up from the gravel bed. The attempt to dredge out the peat from under the water was unsuccessful. Pumping was found not to remove the gravel, so that has been resorted to, the peat scooped out, and cement-concrete in bags laid on the gravel, upon which the final underpinning with brickwork in cement was done. The next piece of underpinning, Mr. Jackson states in a supplementary report, dated April 7th, presented fresh difficulties, as a thin layer of chalky matter was found to overlies the gravel, and as this would have been drawn out by the pumping, the only thing to be done was to act on a suggestion made by Mr. Francis Fox and employ divers. These divers have now taken out the peat and laid down the first stratum of the new foundation, so as to seal down the spring, leaving only the surface water to be dealt with by the pump. Mr. Jackson states that he thinks now they will be able to make more rapid progress. The results will be watched with interest.

CHESTNUT PUBLIC LIBRARY

1/2 DETAIL OF CENTRE BAY WEST ELEVATION

103



J. Myer Smith -
ARCHITECT,
8 TRAPALGAR SQUARE
CHELSEA, S.W. 1906

CHESHUNT PUBLIC LIBRARY.

THE detail drawings of the Cheshunt public library which we publish this week are self-explanatory, all dimensions and particulars of the work being given on them. Mr. J. Myrtle Smith, it will be remembered, was the successful architect in the competition for the building, which was decided last November, his first-premiated design having been published in our issue for November 15th, 1905. The library is estimated to cost nearly £3,000. In publishing these detail drawings of it we would mention how very infrequently we are able to obtain such from architects in this country. We wish we could more often get them, as they are most instructive and interesting from a technical point of view.

AMERICAN IDEAS ON COMPETITIONS.

A GOOD deal of attention to architectural competitions has lately been given in the American journals in connection with the report of the committee of the American Institute of Architects, which committee, while not considering that competition was the best method of securing an architect, still recognized that in a large number of cases it was apparently the only feasible method to adopt.

Before the thirty-ninth annual convention of the American Institute a paper was read by Mr. Robert D. Andrews on

THE LIMITED COMPETITION.

Mr. Andrews said:—

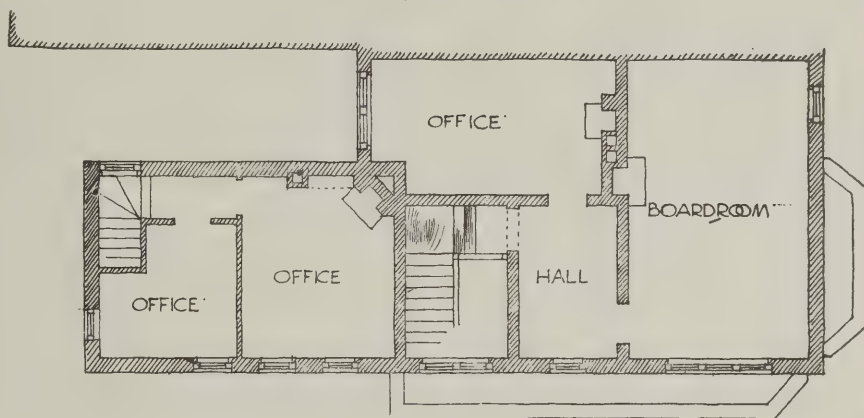
I should like to have it understood at the outset that I am not arguing for or against limited competitions, or any other form of competitions, in the abstract. They exist like any fact of nature. All we may do is to decide how we shall conduct ourselves in reference to them, as we would in reference to sea-bathing or cigarette-smoking or the use of postum.

Abstractly considered, competitions can be neither good nor bad. It is only when we come to particular instances and classes that these terms have any real significance. Things are accounted good or bad according as they accomplish what they are intended to accomplish. Competitions are failures when the purpose of the competition is defeated. A competition is a failure in which the winner of the competition does not become the architect of the building. It is a failure when, as a result of a competition, an unworthy selection is made. Anything that breaks down the competition and prevents its harmonious fulfilment tends to mark the competition a failure.

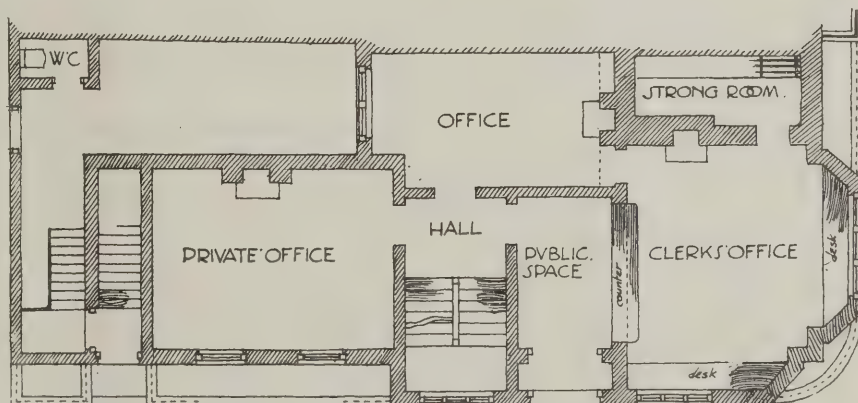
Causes of Failure.

The causes which lead to the failure of competitions are numerous. Among them may be mentioned the lack of authorization on the part of those instituting the competition to carry out what they imply. Committees who have special powers delegated to them cannot delegate those powers to others, and this has often proved a stumbling-block. Another familiar cause of failure is a contradiction in the terms of competition, as in the matter of cost and accommodation. Everyone probably has had the experience of a competition in which all the drawings were rejected because none of the designs presented could be executed for the cost stated.

Another defect in competitions, which is recognized particularly by architects, is their failure to adequately compensate the services of competing architects. This feature results in the frequent refusal of the best men to compete and the failure of the competition from an ideal point of view.



First-floor Plan.



Ground-floor Plan.

These premises have recently been erected at a cost of about £1,350. The building is faced with local red bricks, the stone dressings being of Denwick stone and the roof covered with grey Welsh slates. The basement provides spacious store-room and good lavatory accommodation. The contractors were Messrs. Summerbell & Son, and the architect was Mr. H. Chapman, A.R.I.B.A., of 12, Grey Street, Newcastle-on-Tyne.

It must be granted, I think, that the majority of competitions are entered upon by promoters in a spirit which merits approbation, their intention being good. The promoter as a rule wants to get what is best for his purpose, and it seems to him that by competition he will have certain advantages for judging what is best that do not present themselves if he employs an architect outright.

Co-operation.

Anyone of experience who views the question impartially will, I think, arrive at

the conclusion that many of the features which have rendered competitions useless, or worse than useless, were due to a lack of sympathetic co-operation between the architects employed and the employer before the terms of competition were decided upon. The most successful competitions in which I have been concerned have been those in which the competing architects have had an opportunity to talk over with the owner (generally a committee) the terms and conditions of competition before these were definitely put into shape.

All the architects concerned in a limited competition have an equal right to assist in the determination of the terms and conditions of competition. They constitute a group to whom a certain specific proposition is made, and as a group it is their privilege and their duty to consider and arrange these terms.

Need for a Definite Contract.

It would be a great advantage, owing to the complex relations of competitions, to have a contract habitually signed by the group of architects on the one hand and the employer on the other. If the signing of such a contract were an habitual thing, the promoter would be obliged to consider whether he were authorized to do the things which the arrangement implies that he will do, and the architects would have a right to demand that he have such authorization. At the same time it would be necessary for the architects to recognize the rights of their fellows in the competition as to the terms, the amount of compensation, and the technical provisions of the programme. In a word, the employment of a contract between the promoter and the architects in cases of competition would make it necessary for all parties to think out with greater clearness the nature of the obligations which they were incurring.

What the Architect strives for.

The opportunity to erect an important building, with all the advantages of money and distinction coming from it, is what an architect strives for in competition. This chance is worth a great deal, and the owner avails himself of the value that architects attach to it by proposing to them that they shall make sketches for this work, with a chance of obtaining it, at a lower rate of payment than is usual and customary in non-competitive practice. In other words, the owner pays the competing architects in part with a chance of getting an important commission. Because he pays them in part with this chance, they agree to lessen the amount of their specific individual payment. It is interesting to observe the value which architects place upon this chance. Let us take as

An Example

an instance in which a 1,000,000 dollars (£200,000) building is to be erected. Nothing is more firmly established than the justice of a 5 per cent. commission to architects for their full services. These services are classed under three heads: first, the preparing of preliminary sketches; second, the making of working drawings and specifications; third, the making of detail drawings, supervision and the care of accounts. For preliminary sketches the charge of 1 per cent. is established, for working drawings and specifications 2 per cent., and for the balance of the work 2 per cent., making the total of 5 per cent. While the amount of draughting involved in the preparation of preliminary sketches is proportionately much less in evidence than in the preparation of working drawings, this fact is due to the rejection by the architect of innumerable studies made by him as a preliminary to the final and presented sketches. It is further to be borne in mind that the sketch of a building, as here considered, contains the germ of the entire structure. It includes what is most significant and original and vital in the architect's work. A fifth part of the whole commission is none too large a charge for this creative work. The main idea of the building is there.

The Justice of this Sub-division of Charges

is generally recognized, an instance of its official recognition being that of the city of Boston, whose Schoolhouse Department specifies as follows in its agreement with architects: "When preliminary studies are completed the value of the architect's services to date shall be reckoned one-fifth of the estimated total commission. When working

drawings and specifications are ready for contract the value of his services to date shall be reckoned as three-fifths of said commission. If the Board discontinues the services of the architect at any intermediate stage, the value of his services shall be reckoned proportionately."

The Argument and its Effect.

Assuming, then, that this subdivision of the commission is justifiable and officially recognized, it would appear that the value of preliminary sketches for a 1,000,000 dollars building is 10,000 dollars. Now suppose a competition were to be instituted for a 1,000,000 dollars building, and the proposal were to ask five architects to compete, and to give the four rejected competitors 1,000 dollars apiece for their drawings, and the successful competitor the award of the work. In any large city of the country five of the best men of the profession would stand ready to accept this offer. In other words, the discount which each makes for the chance of getting the 1,000,000 dollars commission is a discount of 9,000 dollars from a service whose value is 10,000 dollars. As there are four men in the competition who make this discount from their services, it is apparent that the persons instituting the competition receive 36,000 dollars worth of services in exchange for the business chances they control.

Now 36,000 dollars is a pretty large sum, and no business man or group of business men would be content to give out services or goods of that amount without some pretty definite assurance that payment was to be made in return. But architects have never safeguarded the award of a commission for a building in this way, because the interest at stake is a common and mutual stake, and we are as yet too individualistic and uncivilized as a profession to have learned the advantages of professional comity.

My contention is that the present attitude of architects in regard to competitions of this sort is greatly lacking in dignity and self-respect. More than this, I hold that architects by their failure to co-operate and to work together on occasions of this sort are doing a great injury to the interests of the community in which they live. My objection is not based upon the loss of dollars but upon the loss of efficiency.

The upshot of my thinking upon this subject is that we have never adequately realized what I might call the social obligations of competition—obligations which we owe to each other, to the owner, and to the world at large. As we come to realize these fully we come to see that it is not sufficient for us to simply hold these ideals as ethical ideals—ideals which the good will follow and the bad will depart from as they choose; we must go further and insist that the ethical standards be given legal recognition and enforcement.

My proposal would be that the architects in each Chapter of the American Institute agree with each other that they will not enter any limited competition, to which any of the subscribers to that agreement are invited, without first conferring with such invited subscribers as to the propriety of the terms and conditions of competition. This achieved, they will then and there decide upon the form of contract which shall be made between themselves and the parties inviting the competition. But inasmuch as the principles involved in a limited competition are the same wherever the competition is held, however the details are varied, I would suggest that the Institute itself, as representing all the Chapters, secure the advice of counsel upon a typical form of contract to be employed in cases of limited competitions.

There are several things about competitions says the "American Architect," that archi-

itects would do well to remember constantly. First, no one is constrained to take part in a competition: the action is purely elective; but having elected to take part in one, it is foolish to whimper over the manner in which it has been carried out. Secondly, every competition is a success—to the winner and generally to the promoter. Thirdly, there is no single solution, no supreme excellence. There are innumerable solutions of every problem, and the selection of one of them is a mere matter of personal preference either on the part of the promoter or his adviser. It follows, then, that different advisers would be fairly certain to make varying decisions, and hence the storm of abuse that disappointed competitors visit upon the adviser is thoroughly unreasonable. Fourthly, the decision of a competition ought to, and must in certain cases, rest absolutely with the promoter and not with the adviser. This must always be so in the case where the promoter is represented by a committee or commission, since, being merely a delegate body itself, it is powerless to delegate its own powers to anyone else. Hence it is that complaints made against an adviser because in his report he recognizes this fact and so merely "recommends" the adoption of one or another or a combination of one and another design are merely a proof of ignorance on the part of the complainants.

NOTES ON COMPETITIONS.

Holborn's new Council Offices.

The Holborn Borough Council, at its last meeting, had under consideration the objections of several of the six architects who have been selected to compete for the Council's new offices to the clause in the conditions referring to the appointment of the successful competitor. This clause is to the effect that the Council does not undertake to select any one of the architects submitting drawings as the future architect for the work. Some of the objectors very properly pointed out that a mere honorarium was not sufficient inducement to compete, and requested that some undertaking should be given by the Council that the author of the scheme adjudged to be the best submitted would be appointed to carry out the work. The Council, acting upon a recommendation of the Buildings Committee, has agreed to accede to this request subject to the acceptance of any of the plans submitted. This is not satisfactory, and appears to have been so regarded by all the competitors, who sent a joint letter asking for a more definite statement of the Council's position and intention. The reply was to the effect that the Council wished to reserve the power of acceptance; that modifications of the schemes submitted might be required, and the possible, though improbable, contingency might arise of the competitors refusing to make them, in which case, if the Council was bound to make a selection, it would find itself in possession of a scheme which would be undesirable if carried out. Thus the agreement to select an architect from amongst the authors of any plans accepted is practically the same thing as the original condition, where no undertaking is given to select any one of the architects submitting drawings, for the Council does not at this later stage of affairs agree to accept any of the designs. It is a most unreasonable thing to ask competitors to modify their designs after they have been submitted, and it is astonishing that Councillors Doll and Ridge, who apparently are to undertake the responsibility of assessing, did not advise the Council of the obvious and usual course of accepting all the designs as submitted, and judging them upon their

merits and in accordance with the requirements set forth in the conditions. If any modifications were then required they could be made upon the selected design by its author. The successful competitor who objected to modify his scheme would be as rare indeed as a building carried out in strict accordance with a competition design. Further information as to how the majority of the competitors regard the present position of affairs is not at present forthcoming.

Wallsend Municipal Buildings.

The danger of entering a competition where no assurance is given that the author of the design placed first by the assessor will be appointed to carry out the work has been again exemplified by the recent decision of the Wallsend Town Council to adhere to its resolution to appoint the authors of the design placed third as architects for the building. This matter was referred to in these columns on March 21st last, and it was then pointed out that the Corporation, in the conditions of competition, did not bind themselves to carry out any of the designs sent in, or to adopt one of the designs which may have been awarded a premium; only two premiums were offered. Hopes were entertained that Mr. J. H. Morton, the author of the first-premiated design, would succeed in persuading the Council to act fairly towards him, but the Council appears to have been led by the nose by one Thomson, a member, formerly a joiner in a shipyard, now a speculative builder. This gentleman has expressed himself freely upon the artistic merits of Mr. Morton's elevations, which he likened to a Presbyterian chapel built in the middle of a warehouse. And so the layman's opinion has outweighed that of the professional assessor, and another injustice has to be recorded in the black book of competitions that failed. It may be mere coincidence that the favoured architect is a neighbour of the afore-mentioned Councillor with advanced views on design, but the fact does not mitigate the bad impression which has been made upon the minds of all who love fair play.

A Greenock School.

In the competition for Carlsburn School, Greenock, the first place has been awarded to Messrs. Salmon, Son & Gillespie, of 53, Bothwell Street, Glasgow, who have been appointed architects for the work. The premium of 40 guineas is awarded to Messrs. Gall & Anderson, of Aberdeen, and the premium of 30 guineas to Messrs. Cowan & Knox, of Glasgow.

Bangor Library.

Mr. A. E. Dixon, A.R.I.B.A., of Messrs. Dixon & Potter, 65, King Street, Manchester, has been awarded the first premium of £25 in the competition for the proposed free library for Bangor, and Mr. Vernon Hodge, of Teddington, the second premium of £15: 17 designs were submitted. The library is to cost £3,000. Mr. P. C. Thicknesse, F.R.I.B.A., of Liverpool, was the assessor.

Church and School at Wolstanton.

In a competition held recently for a new Congregational church and Sunday school at Wolstanton, Stoke-on-Trent, the design sent in under the *nom de plume* of "Ready" was selected by the architect to the Congregational Union, to whom the designs were submitted for adjudication. The author of this design is Mr. Reginald T. Longden, of Moorland Road, Burslem. The scheme includes a church to seat between 500 and 600, with vestries, organ-chamber, &c., and Sunday schools in distinct departments for kindergarten, primary, junior, intermediate and senior scholars respectively, with twelve classrooms, superintendent's room and library, church parlour and kitchens, &c. The buildings will be of local bricks with cherry-

coloured sand-faced stock facings with wide joints and stone dressings, broadly handled panels of rough-cast being introduced. The roof will be of red tiles. All rooms will have wood-panelled dadoes and plastered wall-surface over, open roofs and green-stained woodwork.

New Schools at Plymouth.

At a meeting of the Plymouth Education Committee held last Thursday the report of Mr. H. Dare Bryan, F.R.I.B.A., the assessor in the competition for new schools at Prince Rock, was submitted. Of the sixteen designs sent in Mr. Bryan placed Nos. 10, 4, 11 and 6 as the four best, awarding the first premium to No. 10 and bracketing Nos. 4 and 11 as equal for the second premium (to be divided). As regards cost, the average estimate of fifteen designs was £15,100, and the estimate of the successful competitor £15,910, for which sum Mr. Bryan considered the buildings could be erected in a substantial manner. In reply to an enquiry addressed to him by the sub-committee Mr. Bryan said: "The estimates of schemes Nos. 4, 10 and 11 are in my judgment practically correct, although that of No. 4 is low for good work. The difference in cost of these schemes is doubtless accounted for by the fact that the author of scheme No. 4 has left the interior exceedingly bare (this is shown by the sections when compared with schemes Nos. 10 and 11) and you would have to be content with inferior finishings. I think it possible that schemes Nos. 10 and 11 might be reduced, say, £500, if strict economy is exercised, but I do not think you would be wise in cutting down below £15,000, and I would point out that the estimates of schemes Nos. 6, 15, 8, 16 and 7 all amount to £16,000 and over."

It was decided to recommend that the design numbered 10 be awarded the first place and premium of £50 (to be merged in commission), and that the plans be adopted for the new schools, subject (1) to the authors reducing the estimated cost to £15,000 and (2) to the approval of the Board of Education; and that the premium of £30 be equally divided between the authors of designs numbered 4 and 11.

The letters containing the names of the competitors were then opened. The authors of the successful design, to which the £50 premium is awarded, are Messrs. Thornely & Rooke, of The Crescent, Plymouth; the same firm of architects being the authors of design No. 11, bracketed with No. 4, sent in by Mr. A. S. Parker, of Plymouth. No. 6 is by Mr. B. Priestley Shires, of Plymouth.

Competitions Open.

The following is a list of competitions open:—

DATE OF DELIVERY.	COMPETITION.
May 5	BRANCH LIBRARY AT SUNDERLAND.—Limited to local architects. Premiums of £20 and £10. Particulars from Mr. John W. Moncur borough engineer, Town Hall, Sunderland.
" 31	NATIONAL CONGRESS HALL FOR BRAZIL.—Premiums of 15,000, 10,000 and 5,000 milreis (equivalent to about £1,685, £1,125 and £562 respectively). 5,000 milreis also for designs not premiated but desirable to be acquired. The conditions of the competition can be seen at the offices of the Commercial Intelligence Branch of the Board of Trade at 73, Basinghall Street, E.C.
No date	DETACHED AND SEMI-DETACHED HOUSES AT CLIFTONVILLE, BELFAST.—Premiums £700. Particulars from R. J. McConnell & Co., 51, Royal Avenue, Belfast.
"	SCHOOL AT BEDMINSTER, BRISTOL, for 1,030 children. Limited to Bristol architects. Particulars from W. Avery Adams, secretary to the Bristol Education Committee, Guildhall, Bristol.
"	ALMSHOUSES AT WAREHAM. Particulars from G. C. Filliter, North Street, Wareham, Dorset.

Views and Reviews.

Crematoria.

Mr. Freeman has written a great deal about crematoria recently, and in this publication he seems to have gathered together all the particulars which have appeared in various places. Doubtless there are many readers to whom a book like this will be welcome. The author deals with all the chief crematoria in this country and abroad, illustrating his remarks by a large number of plans and photographs.

"Crematoria," by Albert C. Freeman, M.S.A. London: St. Bride's Press, Ltd., 24, Bride Lane, E.C.

A new Portfolio of Measured Drawings.

This collection of measured drawings made by students in the School of Architecture at Liverpool University is the first of a new series which it is proposed to publish yearly, somewhat on the lines of the Architectural Association Sketch Book. The collection comprises drawings of four buildings at Liverpool, namely the Town Hall, the House of Providence in Dingle Lane (with its lodge), and two doorways under the colonnade at St. George's Hall. Also the following:—The Petit Trianon and Grand Trianon, Versailles, Dublin Customs House, the Orangery at Kensington Palace, the Senate House at Cambridge, and a Jacobean chimney-piece in Hall-i'-th'-Wood Museum. The majority of the drawings reproduced have, as Professor Reilly states in the preface, come into existence by reason of the requirements from students proceeding to the Bachelor degree of Arts in the Honours School of Architecture at Liverpool University. There is a description of each of the buildings illustrated and also some photographs which are very useful in conjunction with the measured drawings. With regard to these latter, they all seem to be careful enough work, but we certainly do not consider that the reproductions do justice to them. In a publication of this kind, with plates on such a large scale, we look for good reproduction as a *sine qua non*, but nearly every plate in this portfolio has lines broken and blurred, and quite lacking in that crispness which makes a good measured drawing so interesting. Judging from the reproductions, it would seem that the originals presented no difficulty whatever to the lithographers, and we are sorry that the collection should suffer so very much by being inefficiently printed. We understand that any profits made by the sale of the publication will go to a fund to assist students to travel or to undertake special pieces of work.

Portfolio of Measured Drawings. Liverpool University School of Architecture, price 15s. nett.

The Country Gentleman's Estate Book.

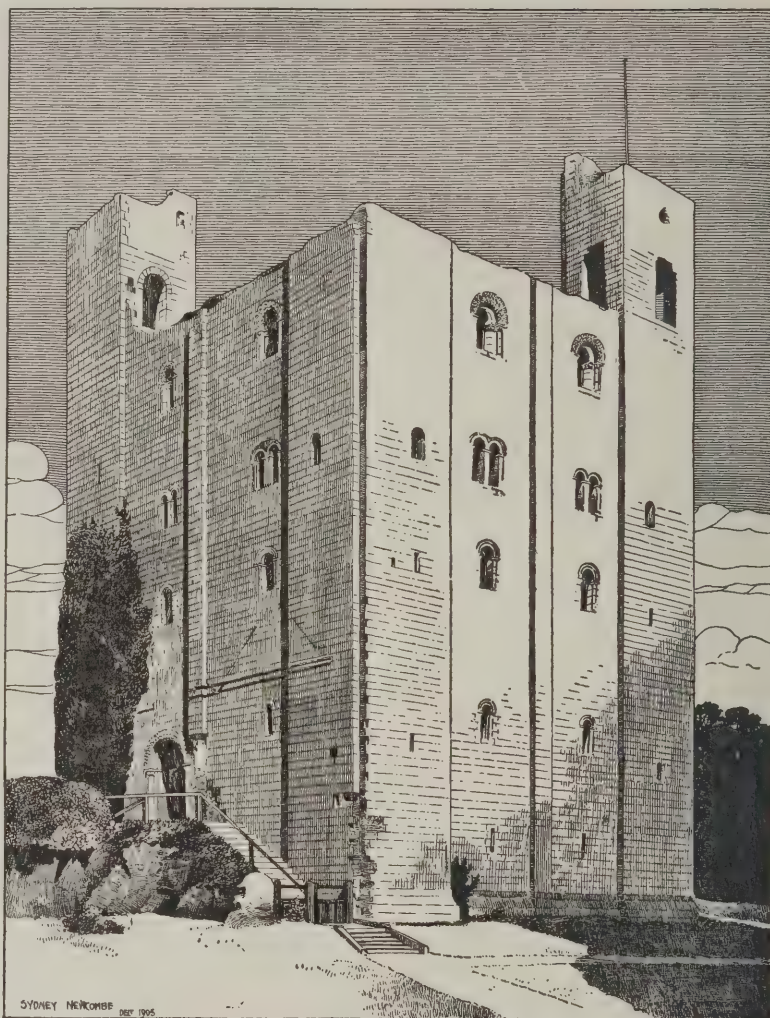
In this yearly publication there is always a good deal of information which will interest architects who have to deal with houses in the country. In the present issue there is a short article by Mr. W. G. Horseman on dairy buildings, illustrated with a very useful sheet of a dairy recently built in Hertfordshire; Mr. Charles Carter contributes an article on the ventilation of cottages and small houses, illustrated by several instructive drawings; Mr. Killingworth Hedges writes on the protection of agricultural buildings from lightning; while Mr. H. Munro Cautley, A.R.I.B.A., contributes an article on farm buildings, accompanied by some useful drawings. Other articles deal with a creosoting tank, waterworks for country houses, land drainage, old windmills, and estate workshops. We can recommend the volume to our readers as being well worthy of a place on their reference shelves.

"The Country Gentleman's Estate Book, 1906" Edited and compiled by William Broomhall. London: The County Gentleman's Association, 24 and 25, St. James', S.W.

Norman Architecture in Essex.

Some little time ago we reviewed a book on "Mediaeval Architecture in Essex." Since then this second volume of the same series, dealing with the Norman work in the county, has come into our hands, but in noticing it we are circumscribed by the fact that the author has lately died, and we do not know whether the set of six volumes he purposed to publish will be completed, though we trust someone will carry on this well-begun work. The first volume, which was introductory, merely contained the author's explanation of his *modus operandi*, and told us by what signs of grace the architecture of Essex can be distinguished from that of other counties. Its forest gave us churches of wood in great numbers, but not much use was made of its clay after the Romans left Britain, and for bricks of English make we must look to the thirteenth century. Where there is chalk there is flint of course, as in the neighbouring eastern counties; but since one is too soft and the other too hard, there could be little of ornamental work in either, and Essex depended for that in great measure on such stone as could be imported. (From Caen we had a great deal, conveyed entirely by water, or along the Roman roads from the points nearest France on the South.) This volume dealing with Norman work bears on the face of it signs of its own incompleteness, such as the want of an index, while the somewhat disjointed character of a treatise so brief that no single building (though some are important enough) can be awarded a page to itself, is sure to be noticed. The references we find in the text seem to be in some cases to illustrations belonging to the other unpublished volumes, while some of the illustrations here are left to explain themselves. The accompanying three examples show the character of the drawings given in the book.

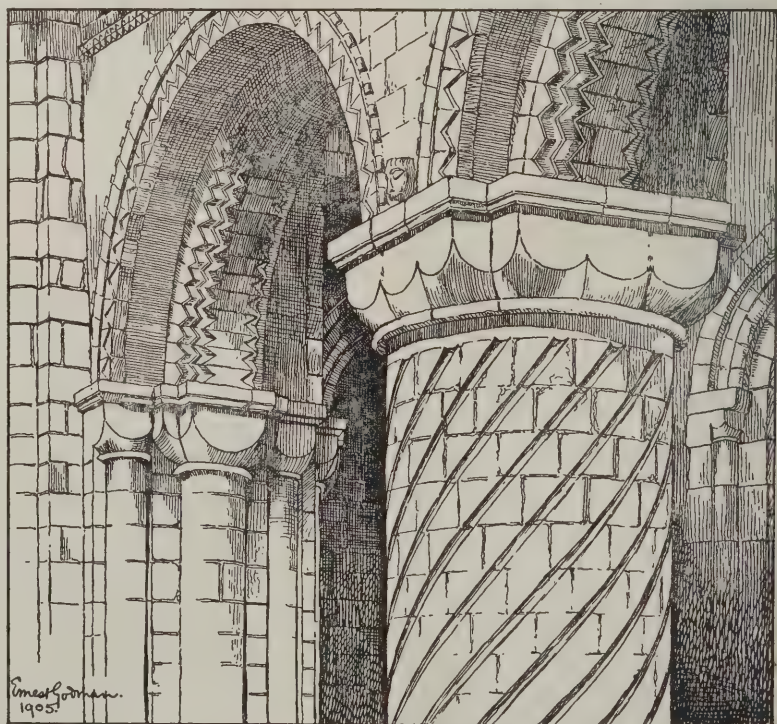
"Norman Architecture in Essex," by the late Ernest Godman, architect, Secretary of the Committee for the Survey of the Memorials of Greater London. Published by the author at Sunnyside, Banstead, Surrey.



HEDINGHAM CASTLE FROM THE SOUTH-WEST.



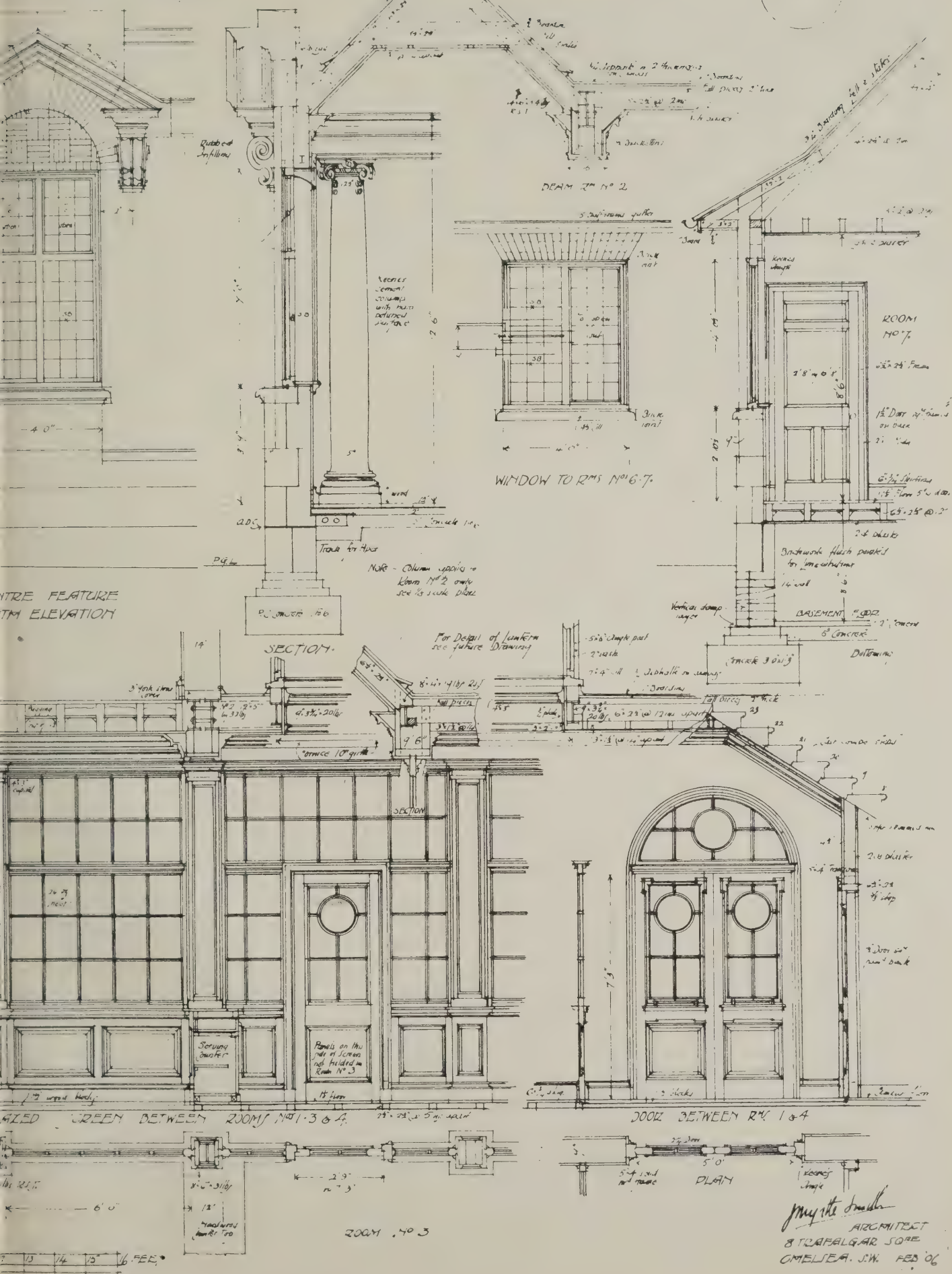
WENNINGTON CHURCH: EAST DOORWAY OF SOUTH AISLE.



WALTHAM ABBEY: DETAIL OF ARCHES AND PIERS.

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LIBRARY
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UNIVERSITY OF ILLINOIS

Notes and News.

In the Rebuilding of Baltimore after the great conflagration which occurred in February, 1904, reinforced concrete is being largely used.

At the Bangor Asylum, near Edinburgh, a recreation hall, to accommodate 720 patients, is to be built at a cost of between £5,000 and £6,000. The architect is Mr. Hippolyte J. Blanc, R.S.A., F.R.I.B.A.

Proposal for a new Exeter Hall.—A scheme is on foot to build as a memorial to the late Sir George Williams, the founder of the Young Men's Christian Association, a hall of considerable pretensions which shall supplant Exeter Hall as the headquarters of the association. The cost is put at £100,000.

New Municipal Buildings for Lancaster are to be erected from designs by Mr. E. W. Mountford, F.R.I.B.A., at the expense of Lord Ashton. The structure will cost about £80,000, and will have a clock tower rising 146ft. above the main entrance in Dalton Square. The dimensions of the building will be 238ft. by 132ft.

A Curious Case.—A penalty of fifteen guineas was recently imposed on Messrs. W. & R. Chambers, of Edinburgh, for building work done without a warrant from the Dean of Guild Court. The omission was occasioned by the death of the first architect and the preparing by the second architect of plans which differed from those of his predecessor.

Hopkinson House—a kind of Rowton house for ladies engaged in professional work—has been opened at 88, Vauxhall Bridge Road, S.W. It is the second of its kind, the first building—Brabazon House—having been opened, close by, in 1902. Accommodation is provided for 139 ladies. Mr. R. Stephen Ayling, F.R.I.B.A., of Westminster, was the architect, and Messrs. Wallis & Sons, of Maidstone, were the contractors.

Mr. Norman Shaw's Design for the Rebuilding of Regent Street Quadrant, in so far as relates to the Piccadilly Hotel front, will be exhibited at the Academy next month. The design is classic in treatment, to be carried out in Portland stone. Above the shops occupying the street level and carried on a series of arches is an imposing colonnade along the upper floors, recessed, with coupled columns. It is stated that the Quadrant on both sides of Regent Street is to come down and to be reconstructed from Piccadilly Circus to Vigo Street. The directors of the County Fire Office are ready to demolish their premises and put up a new block as soon as they can get permission, and Messrs. Swan & Edgar are eager to replace their existing premises by a new structure.

The Newman Memorial Church at the Oratory, Edgbaston, is nearing completion. The nave is now finished. The plan and main features of the church are based on those of the church of San Martino in Rome, chosen because Cardinal Newman had always intended that such a church should be erected at Edgbaston. Certain modifications, however, have been made to suit modern requirements, there being transepts and a spacious sanctuary, while a barrel-domed roof, in sweet chestnut, has been substituted for the flat roof of San Martino. One of the chief features of the interior is a series of six marble columns supporting the roof on each side of the nave. These monoliths have been brought from Carrara and are nearly 18ft. long, with a diameter at the base of rather more than 2ft. The architect of the building is Mr. Doran Webb, and the contractor Mr. Linzey, of Trowbridge. The cost of the work will be about £30,000.

A New Hotel at Aberdeen is to be built at the corner of Market Street and Guild Street at a cost of £6,000. Messrs. Sutherland & Pirie are the architects.

Restoration of Hexham Abbey.—A new nave to Hexham Abbey is proposed to be erected from designs by Mr. Temple Moore at an estimated cost of £20,000.

Messrs. Mellowes & Co., Ltd., of Corporation Street, Sheffield, have secured the order for glazing, on their "Eclipse" patent imperishable system, the roofs of the electric power station at Ilkeston, Lloyd's proving house at Cardiff, the Fairfield Biscuit Factory at Liverpool, and the Coventry Ordnance Works, Ltd., Coventry.

St. Mark's Campanile.—After about two years' work on the foundations, the new Campanile of St. Mark, at Venice, is now about 5ft. above ground. The repairs to the adjoining library of Sansovino are nearly complete and the scaffold is being removed. Repairs are being executed on the opposite side of the Piazza, arches and vaulting being shored up, whilst the whole is being thoroughly overhauled.

Reconstruction of Sheffield County Court.—The county-court buildings in Bank Street, Sheffield, are at present undergoing almost complete transformation. The scheme provides for a new public office on the ground floor, quarters for the high bailiff and his staff in the basement, and a commodious registrar's court on the first floor. The plans have been prepared by Mr. H. N. Hawks, of H.M. Office of Works, and the work has been entrusted to Messrs. Ash, Son & Biggin, contractors, of Sheffield.

A New Central Fire-station for Dublin is being erected in Brunswick Street, from designs by the City architect, Mr. C. J. McCarthy. Its most striking feature is the tower, 120ft. high. In the construction and equipment of the station Irish materials are being extensively used. The lower storey of the main building to a height of about 17ft. is built of limestone from the Milverton Quarries, near Skerries. The rest of the walls is of red brick from Portmarnock. The roofing is of Killaloe slate. The builders are Messrs. Donovan & Sons, of Dublin. The total cost will be about £22,000.

New Parcel Post Office, Glasgow.—All the stonework of this fine new building, now nearly completed, is being treated with a preservative solution to enable it to withstand the Glasgow atmosphere. It is a freestone from Northumberland. Steel case-ments are used in the windows, and stone and steel emergency stairways in case of fire are provided. Although the building is only of three storeys, it rises to a general height of 91ft. above the street level, this being accounted for by the sorting halls requiring a height to the ceiling of 25ft. The total cost is £80,000. The architect is Mr. Oldrieve, of H.M. Office of Works.

The new Bridge across the Thames at Vauxhall is to be opened next month. Its total length is 759ft. The central span is 149ft. 7ins., with a headway of 20ft. above high water, the two intermediate spans 144ft. 4½ins. wide, with a headway of 19ft., and the shore spans 130ft. 5½ins. wide, with a headway of 14ft. 11ins. The width between the parapets is 80ft., of which 50ft. is occupied by the carriageway and 15ft. on either side by the footways. Down the centre runs a double line of tramways. The bridge is the joint design of Mr. Maurice Fitzmaurice and Mr. W. E. Riley, F.R.I.B.A., respectively engineer and architect to the London County Council. It was illustrated in *THE BUILDERS' JOURNAL* for May 20th, 1903.

An Illuminated Fountain—"the largest and finest in the world"—has been constructed on the Schwarzenbergplatz, Vienna, one of the most beautiful spots in the city.

Crowland Abbey in Danger.—The buckling of the north wall of Crowland Abbey necessitates its immediate underpinning and the rebuilding of the north window.

Summer Palace for the Khedive.—M. Korber, a Geneva architect, has been commissioned by the Khedive to build a summer palace on the western shore of the Bosphorus, at a cost of about half a million.

Manchester Society of Architects.—The forty-second annual report of the council has just been issued, and will be presented to the annual general meeting to be held to-morrow (April 26th). The present membership is 223.

Change of Address.—Mr. Thomas Moody, F.S.I., has removed his offices from Cockspur Street to No. 2, Haymarket S.W., the premises Nos. 29 and 30, Cockspur Street having been acquired by the Cunard Steamship Co. for their new building site.

Subsides in the Temple.—Two large blocks of buildings in Essex Court and Plowden buildings, Temple, have recently shown signs of subsidence, and builders are now at work shoring them up and reconstructing the outer walls. The buildings were erected in 1667.

An Old French Dormer Window, dating from the time of Francis I. (1515-1547), is now to be seen in the North Court at the Victoria and Albert Museum, South Kensington. The gift of Mr. J. H. Fitzhenry, it is from the Château de Montal, a ruined manor-house situated on the high ground overlooking Saint Céré, in the Department of Lot. Next to this window is the upper part of another, evidently dating from the same period, as the crowned salamander in flames, which forms so striking a piece of ornament on this pediment, was a favourite device of Francis I. Below is placed a portion of an arch-soffit from the Château de Bonnavat.

Glasgow Institute of Architects.—The annual general meeting was held last week. Mr. John Keppie, F.R.I.B.A., the retiring president, in his valedictory address, stated that although the scheme for amalgamating the Glasgow Architectural Association with the Institute had not yet been formally carried out, he hoped the matter would be completed at an early date. The council for the ensuing year was elected as follows:—Messrs. A. N. Paterson, John Keppie, H. K. Bromhead, James Lindsay, T. L. Watson, James M. Monro, Alexander M'Gibbon, Andrew Balfour, Charles Gourlay, Thomas Baird, jun., R. D. Sandilands, George Bell, Alexander Skirving, Robert Miller, John B. Wilson and H. E. Clifford. Mr. James M. Munro was elected as the new president and Mr. George Bell as vice-president.

The new addition to the Glasgow Stock Exchange, which has been in process of erection for some time, was opened last week. Above the ground floor, which is fitted up as a post-office, is the first or principal floor, which comprises the new mining market, telephone corridor and smoking-room. The new market is about 52ft. by 42ft. by 22ft. in height, and is lighted by three large windows from St. George's Place. The telephone corridor gives ample accommodation for the large number of boxes required, and will eventually enter to the main staircase in the present building and be more than 100ft. in length. The second floor is principally occupied by the offices of the secretary, while the telegraph department has been placed on the third floor and the extensive clearing house on the fourth. Mr. John James Burnet, of Glasgow, was the architect.

Enquiries Answered.

The querist's name and address must always be given, not necessarily for publication.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Correspondents are particularly requested to be as brief as possible.

Chimney Construction.

Messrs. Heinrich Winby & Co., of 20, King William Street, London, E.C., write as follows: "We read your correspondent's enquiry on p. 212 of your issue for April 18th as to whether a flue can be introduced into a chimney at a height of 20ft. above the ground, and whether a large opening in the circular brickwork at such a height is not detrimental to the stability of the structure. As specialists in the construction of chimney shafts, may we say that this has been done without impairing the stability in many cases, though it would be wrong to answer the question in the affirmative in a general way. It is, of course, too much dependent upon the general circumstances of the case, of which we have no knowledge. The only way to solve the question would be by exact science, i.e., to tackle it from a statical standpoint, examining how much will be the pressure exerted on the remaining part of the brickwork at the juncture of the opening, and to design the thickness in accordance with the result. The calculations must, of course, consider the wind-pressure also, for which in this country 56 lbs. per sq. ft. of vertical projection should be allowed. It will be obvious that the quality of the bricks and the mortar is not without influence."

Thickness of Walls under L.B.A.

HAMPSTEAD.—H. W. S. writes: "Is there a formula for obtaining the thickness under the London Building Act of a wall of given height and length?"

There is no formula for obtaining the thickness of walls under the London Building Act. Some of the annotated editions give tables and diagrams, and this is the nearest approach that can be made to a formula.

HENRY ADAMS.

Extras on a Contract.

SOUTH WALES.—CONTRACTOR writes: "Kindly advise me as to the legal position of a builder who has exceeded his time in the completion of a contract, but in connection with which a certain amount of extra work has been done. The usual clause about the architect having the power to order these extra works was included, also the stipulated amount of damage for any delay, and that all questions relating to the contract were to be decided by the architect. I have been perusing the report of *Dodd v. Churton* in the Court of Appeal ('Law Times' Reports, March 19th, 1897). In that case it seems to be laid down clearly that where extra works are ordered and done the time clause is nullified. Is this so?"

If the additional works have been such that they constituted serious and considerable extra works the contractor will be entitled to some time allowance; but if the extras only constituted a small part of the whole, and such as might naturally and reasonably occur on such a contract, their addition will not form a valid basis for the waiving of the time-limit. I believe a court would probably decide such a question purely as a matter of reasonableness.

F. S. I.

Renaissance.

YORKS.—W. S. A. writes: "What is Renaissance style? Are the following buildings of this style:—(1) St Paul's Cathedral; (2) City of London School; (3) Natural History Museum, South Kensington; (4) Houses of Parliament; (5) Hatfield House; (6) Ingestre Hall, Staffs; (7) Kirby Hall, Northants?"

You evidently do not possess the most elementary knowledge of architectural history, and we therefore advise you to study any of the history books, such as Banister Fletcher's.

Rights of Adjoining Owners.

PERPLEXED writes: "A put down a pocket for a clothes-post in some vacant moorland at the side of his house. C and B, adjoining owners, pulled it up three times. The post was used about three hours on two days a week for hanging clothes, the lines being fastened from the post to the corner of A's property and being taken out of the ground when not in use. A and B have, presumably, acquired a right-of-way over the land, having used it for about forty years. Was B right in pulling up the pocket? Also, in the event of A buying a piece of the vacant land in front of B, could he erect a post and rail fence similar to and of the same height as B's boundary fence; or if not, could he buy and erect a fence, as shown by the accompanying plan (not reproduced), which would not then project over B's cottages, but would be in a line with the cartway? Do a clothes-post and two lines of clothes constitute an interference with right of light or way?"

A was undoubtedly committing a trespass when he placed the pocket on the "waste of the manor" as shown on the sketch. Whether B was entitled (as frontager) to remove it depends on circumstances, but if his access to his cottages was obstructed by the post or the clothes-lines, he was, I believe, justified in his action. Your sketch is not at all clear as to the means of approach to B's houses. The lord of the manor cannot sell any portion of the moor except subject to any rights, easements or privileges—public or private—that may attach to it, and if B possesses the right of passing over the vacant land in question the purchase of the freehold by A will not affect the matter in any way.

F. S. I.

Building on Made Ground.

WORKS writes: "In the accompanying rough sketch (not reproduced) it will be seen that the ground between the X's was recently made up, and when about to build on the plot it had to be overcome. I had this excavated 8ft. to a solid bottom, and at the positions marked X ran up cavity walls. In the positions where the 4½in. cross partitions come I put a bressummer from wall to wall, A to A and B to B, with stanchions under, fixed substantial joists at right angles to these and bearing on the cavity walls, and in place of 4½in. walls on these joists I erected a skeleton partition and filled it with brickwork. The chimney-breast I brought up from the bottom of cellar. My opponent says this is silly and wasteful construction, and his method would be to excavate the loose ground to the wall A A, battering back the remainder or shoring it up, building the cavity wall at that point, and allowing the loose ground to be put back or to remain behind it. At the opposite side he would excavate the loose and solid ground to the outside wall marked W and run his cavity wall up there, and I presume bring his breasts and other 4½in. wall up from the bottom of the cellar."

It appears from the description given that a depth of 8ft. of made ground was excavated and cavity walls carried up to ground-level, though why cavity walls does not appear. Then bressummers were put across

a span of 22ft. over the excavated area to carry two 4½in. brick-nogged partitions. No mention is made of the number of floors or what the partitions carry, nor what the scantlings of the bressummers were. Stanchions were put under the bressummers, but it is not stated how many there were nor their size and positions. In view of the meagre information given and ignorance of the nature of the premises it is impossible to say whether this was "silly and wasteful construction." The planning at any rate is peculiar.

HENRY ADAMS.

Bending Moments of Fixed Beams.

Referring to the enquiry on p. 178 of THE BUILDERS' JOURNAL for April 4th, a correspondent writes: "The bending moments of built-in beams can be obtained in many cases by a very simple process. In these beams there are generally two kinds of bending moments, namely, those producing compression in the upper part of the beam and those producing tension in the upper part. Now the sum of the bending moments producing the compression must equal the sum of those producing the tension, and, further, the sum of the maximum of both kinds (neglecting the algebraic sign) must equal the maximum bending moment, supposing the beam to be simply supported. Taking the case in question, the sum of the areas of the triangles with the close shading should equal the area with the more open shading. The bending moments at the fixed points are each 19'79ft.-tons, and the bending moment between the loads is 5'2ft.-tons."

Thickness of Walls for Underground Septic Tanks.

KENDAL.—STUDENT writes: "The accompanying drawing (not reproduced) shows the arrangement of five septic tanks 9ft. long by 32ft. wide built in concrete. The tanks are filled and emptied by the inlets and outlets, there being a continual flow through the tanks. The 24in. wall at the inlet end is proposed to be constructed to form part of a sludge well, and the other walls will be practically underground (sand and gravel). Kindly show me by an ordinary formulæ if the thickness of the walls as proposed is strong enough to withstand the pressure. If not, would arched buttresses placed at intervals between the two end walls be sufficient?"

The wall at the sludge well end of the tank is shown on querist's sketch as consisting of two 18in. concrete walls, with a space of 2ft. between, occupied by buttress arches at intervals. This will be sufficiently strong if the arches are not more than 8ft. apart. For the other two external walls supporting the pressure of the internal earth the thickness at the top should be 18ins. and at the bottom not less than 2ft. 6ins. the battering faces being on the inside of the tank. The fourth wall which separates the tanks should be made 18ins. thick at the top and 3ft. 6ins. thick at the bottom, with both faces battering. If one tank is likely at any time to be empty and the adjoining one full, then the division wall should be made 18ins. thick at the top and 4ft. 6ins. thick at the bottom.

HENRY ADAMS.

Reinforced Concrete.

CEMENTATION writes: "In constructing a building of this material on one of the many systems now in the market, does the architect or the patentee design the work? Who is responsible for the strength, the architect or patentee? If the patentee designs and is responsible for the building, where does the architect's fee come in?"

The design is generally prepared by the specialist firm engaged. The architect is the agent of the owner to plan the building and supervise its construction, for which he receives his fees.

Adjoining Owners and Eaves Gutters.

HEREFORD.—H. S. writes: "I have had a complaint from an adjoining neighbour about wet coming into his premises from my roof. My building has been erected thirty years or more. My neighbour erected his building against mine about nine years ago, and as he could not interfere with my ancient eaves gutter he built around it. Who is responsible for the damage caused, and had my neighbour a right to build in such a manner?"

Your neighbour cannot blame you for the dampness, as he has made it almost impossible to repair your gutter. The circumstances you mention he probably had no right to build in the peculiar manner he appears to have done, and you are in a legal position, even now, to make it exceedingly unpleasant for him. I advise you to tell him so, and to refer him at once to your solicitor should he press his complaint further.

F. S. I.

Constructing an Attic.

EAST HAM.—S. S. writes: "Is it possible for me to build a small attic in the roof loft of my own freehold house, the joists to run independent of the ceiling roof from parting wall to wall? Also, can I open the roof so as to allow of an attic window? Should I be breaking any by-laws by doing so?"

If your house is in a district having by-laws in force, it would be well that you should obtain a copy of them. Then, recollecting that an attic counts as an additional storey, you could easily ascertain whether or not your proposed additions were in accordance therewith—the points practically needing attention being "thickness of walls" and "air-space." Personally I fear that you will have considerable difficulty in conforming to by-laws under the conditions that subsist in your case.

F. S. I.

Flow of Sewage in Pipes.

WHITEHAVEN.—R. S. writes: "Kindly inform me whether the following formulæ are worked out correctly. They are for a sewer proposed to be laid with 6in. steel pipes. Total length of sewer 1,300ft., fall 13ft. The formulæ are calculated for running three-quarters full:— $v = c \sqrt{R \times 2H}$.

v = velocity in ft. per min. R = hyd. mean depth. H = fall in ft. per mile.
 c = an empirical constant value 55.
 $D = v \times A$. D = discharge. A = sec. area of pipe.

$v = 55 \sqrt{112 \times 105.6} = v 55 \sqrt{118272} = 55 \times 3.43 = 188.65$ ft. per minute.
 $D = v \times A = D = 188.65 \times .1964 = 37.0508$ cub. ft., or 231 gallons per minute."

The approximate flow in a circular pipe running partly full may be found by Eytelwein's formula $v = 55 \sqrt{H/2f}$, where v = velocity in ft. per min., H = hydraulic mean depth in ft. = sectional area of flow in sq. ft. divided by wetted perimeter in ft., f = fall in ft. per mile. The length of pipe does not come into the calculation as the friction is allowed for in the formula. In the case of a 6in. pipe running $\frac{3}{4}$ full, i.e., $\frac{3}{4}$ diameter of pipe, and falling 13ft. in 1,300ft., the first thing will be to find H from the area of the segment occupied by the water, and the wetted portion of the circumference, both very awkward calculations for so small a pipe; then the fall in ft. per mile, which will be $\frac{13 \times 5280}{1300} = 52.8$. It will be very

much simpler to take the pipe as running full (when $H = \frac{1}{4}d$) and then make any desired allowance off that. It will then be

$55 \sqrt{\frac{1}{4} \times 2 \times 52.8} = 200$ ft. per min. for the velocity and $0.5^2 \times 0.7854 \times 200 = 39.27$ cub. ft. for the quantity flowing per minute. The calculations submitted are correct, but the value of H is apparently taken from a table.

HENRY ADAMS.

Law Cases.

Chimneys.—At the Clerkenwell County Court recently the case of *Box v. Wallace* was heard. The claim was for £21 13s. 9d. as damages for alleged breach of contract. Plaintiff's case was that in the erection of a number of his houses defendant, instead of building the chimneys in swan-neck fashion, had allowed the masonry to project at right angles. The consequence was that the chimneys could not be swept, and the amount claimed was what had been expended by plaintiff in putting them in such a condition that they could be swept. Defendant said he built the chimneys according to the plans and specifications. The judge found for the plaintiff.

Contractor's Claim for £9,000 against the War Office.—Mr. A. R. Stenning sat at the Citadel, Plymouth, for several days last month as arbitrator in the dispute between Mr. Henry Kerswell, contractor, of Plymouth, and the Secretary of State for War in reference to the building of barracks and recreation block for the Royal Artillery at the Citadel. Upwards of £9,000 was claimed. The claimant's case was that he had been made to do a great deal of work not set out in the quantities or the plans, work which was in the plans and not in the bill of quantities, and other work which (said counsel for claimant) might, perhaps, by a stretch of imagination be said to be in the quantities but not fairly or properly and adequately described therein. The facts appear to have been as follows:—In 1896 plans for the buildings in question were prepared for the War Office by Mr. Kitsell, and contractors were invited to tender, but not Mr. Kerswell. None of the tenders sent in, however, were accepted, and in June, 1897, Mr. Kerswell was invited to tender for the work, and his tender, amounting to £22,844, was accepted. A greater part of the claim arose out of what claimant contended was extra work. Mr. Kerswell had placed before him twenty-one drawings on September 8th, 1897, which he was called upon to sign, and copies of which were handed to him as the drawings from which he had to execute the work. Although these drawings were placed before Mr. Kerswell as the drawings from which the bill of quantities had been prepared, he contended they were not such, but that in some way, which he was unable to explain, the drawings had either been altered or new ones had been prepared between the preparation of the dimensions and the bills of quantities, which were got out early in 1896. At the time of Mr. Kerswell's tender the ground was covered by old ramparts and buildings, and it was impossible to say whether the land was level or not. As soon as the old buildings were taken away it was discovered that the land was not level, and the levelling of it necessitated very considerable extra work. Much extra work, too, had been incurred in the finishing of limestone. The contractor in the ordinary course would be required only to leave a smooth margin to the stone, or, at the most, only a little tooling, but in this particular case he was called upon to put fluted stone throughout the buildings. After the work was completed Mr. Kerswell made out an account, and there arose disputes between him and the War Office as to whether he was to receive payment for what he claimed as additional and extra work. After a time some official at the War Office suggested that to settle the matter it would well if an arbitrator were appointed between them. Mr. Stewart was accepted as arbitrator, but it subsequently turned out that the War Office did not in any way treat Mr. Stewart as arbitrator. Mr. Stewart held an enquiry in Plymouth during October, 1902. Mr. Kerswell and his surveyor, Mr. Corderoy, were under the impression

when Mr. Stewart opened the enquiry that he was going to sit as arbitrator, but they were shortly disabused of that idea, because when Mr. Stewart was asked what his authority actually was he informed them that he was not there as arbitrator; he was there as agent for the War Office to make enquiries and report to the Secretary of State for War. Mr. Stewart reported that £3,243 19s. 11½d. was due to Mr. Kerswell. In consequence of what happened Mr. Kerswell came out poor; as a matter of fact, he had to make an arrangement with his creditors, and he hoped as a result of this enquiry that he was going to receive something which would enable him to make a fresh start.

Obituary.

Mr. James Ronald, builder and ex-bailie, of Stirling, died on April 12th, aged about 70.

Mr. W. Goldsmith, A.R.I.B.A., F.S.A., architect, of London, E.C., died recently, aged 49.

Mr. W. G. Bartleet, of the firm of Messrs. William G. Bartleet & Son, architects and surveyors, who died on March 10th last, aged 77 years, left estate valued at £86,015 gross.

Mr. Robert A. Bryden, architect, has just died, after some months of failing health, at the age of 64. He was a native of Glasgow, where most of his works remain to adorn the city. He had just attained to his professional jubilee. His chief works are the large buildings in Bothwell Street known as the Christian Institute, Quarrier's Homes (a town in itself), the new Maternity Hospital, and a hospital in the Isle of Man. He was a member of the Glasgow Institute of Architects and an F.R.I.B.A.

Mr. William Frame, A.R.I.B.A., architect to the Marquess of Bute, died recently at Cardiff, aged 58. He commenced his career in South Wales in the office of Mr. Pritchard, diocesan architect of Llandaff, and had a share in the building of the spire of the cathedral there. He then took a position under the late Mr. Burges in London, and went down with him to Cardiff when the late Marquess of Bute decided to restore Cardiff Castle and construct the clock tower. When Mr. Burges died Mr. Frame became private architect to the Marquess and continued the restoration of the castle and its historic Roman surroundings. He had, with Mr. E. W. M. Corbett, much to do in connection with the reproduction of the north gate, which is now nearing completion. Mr. Frame's work for the Bute Estate was not, however, confined to South Wales. He spent a good deal of time in Scotland, where he designed and superintended some important works for his lordship, among them being the restoration of the House of Falkland. He was also the architect for the restoration of Castell Coch, the old Welsh stronghold which guarded the Taff Valley near Tongwynlais. The Bute offices on the pier-head at Cardiff were also designed by him.

The Institute of Hygiene, Lima, Peru, is planning the establishment there of a permanent Health Exhibition, with a view to instructing the Peruvian public in the latest methods of hygiene, sanitation, &c. The Institute would be glad to receive samples or printed descriptions of such articles as disinfectants, hospital equipments, &c. An Italian bacteriologist, Dr. Ugo Biffi, is the director of the Institute, which is under the City government. The Institute is prepared, within certain limits, to defray the cost of carriage of samples forwarded.

CONCRETE-BLOCK ARCHITECTURE.*

By Louis H. Gibson.

I COULD never have hesitated long in accepting the cement-block idea. I have hesitated long, however, in agreeing to accept cement blocks as at present manufactured. I have recognized the inherent merits of concrete construction, and from the beginning have felt that making concrete in block form was a worthy building and commercial enterprise, but I have never seen an artistically successful structure executed with cement blocks, and, until recently, I have felt that I could not encourage this industry. I am doing it now in this way, not because of any decided encouragement through specific results, but on account of what I recognize as a possibility. I know that a worthy cement block can be made commercially. My conviction rests upon the well-known and well-recognized merits of concrete as a building material and because it is desirable to fabricate it into block form. It is difficult to form concrete along proper architectural lines into structural and decorative shapes, such as monolithic walls, columns and lintels. The block machine is the logical former of concrete for building purposes. Concrete will come into structural and decorative use largely through the agency of the machine.

Why the Architect stands off.

But architects are unfriendly to the concrete block as now made. Is this because the architect is unfriendly to concrete? I answer this question by asking another: Who has been more ready to use concrete as a structural medium than the architect? The architect wants to use the concrete block. He is always looking for a new medium, and when manufacturers realize the possibilities of the material he is ready to use it.

The most successful terra-cotta concern in the world makes the most artistic forms. The most prosperous pressed-brick makers in America make the most artistic brick. They have certain stock patterns, well designed, which a self-respecting architect is not ashamed to use. They will make what he wants, but if he has not time to wait for the new designs there are often those in stock which he does not hesitate to employ. The architect uses stone, terra-cotta, brick, and he uses them in block form. He is not using concrete in this form. This is the fault of the block-maker and not of the architect. As now made, he is afraid of it structurally and decoratively, and doubtful of the general capacity of the manufacturer to carry out his plans.

The Mistaken Idea about Mixing.

The modern alchemist who would turn sand and cement into gold must first learn how to make concrete. Block-makers and cement-workers generally are lamentably ignorant of this fundamental operation. The impression has got about that a labourer who is not fit for anything else can mix concrete, that the cheapest labour one can employ is good enough for this work.

Before we get through with our block business we are going to grade our sand, we are going to know that the voids are reduced to a minimum before the cement is introduced, and we will thoroughly mix the sand and the cement in the dry before the water is applied. Most cement-workers believe they are already doing this. Their wrong belief is the source of the trouble. It is the cocksureness of nearly all that is the real stumbling block. Block-makers particularly have been educated by the machine salesmen that any old thing can mix concrete. When we learn to mix concrete we can hope to

make the impervious block. Cement-makers, as a class, have done their work well and scientifically. They have availed themselves of all of the resources of science, and it appears absurd that this work should have stopped with the making of the cement. The chemist, the engineer and the cement-maker have joined hands in the mixing of concrete. In the making of blocks they have parted company.

We may take lessons from the modern mechanical mortar-maker in the mixing of the aggregate in concrete. He dries his sand and mixes it mechanically. The makers of bitulithic pavement have reduced the grading process to a science, and on that account are reaching a large measure of success. We may study a modern asphalt plant with profit.

Sand must be Clean.

yet most cement blocks that I know anything about are made of dirty sand, and most of the blocks that we see are dull, heavy, lifeless, and leaden in colour and texture. This can be obviated by clean sand and a proper proportion of cement of the right kind.

We will mix our aggregate with more water than has been common with most of us. We will experience troubles from crazing, hair-cracking, if we do not take advantage of our opportunities. The cause of this trouble from cracking suggests its own remedy. It is the relatively neat cement on the outside of the block, the difference between the composition of the surface of the block and the interior—a difference in contraction. If our blocks are of the right composition we may wash them and we may cover them with damp cloths while they are setting. We may rake them over with a fine-toothed tool. We may give them a texture with a wire brush. The man of resource, keen perception and artistic insight will find many ways of getting around this difficulty.

Texture.

The principle involving the production of proper texture is not difficult to understand when we analyze it. We want cement enough, certainly not too much. We know that we want it evenly distributed. The nearer we can come to exposing the sand on the surface the better. Those of us who can remember the lost art of old-fashioned hard-finished wall-plaster know what this means. With a brush and water the plasterer washed out all superfluous lime, and up to a certain point the more lime he washed out the harder and stronger, brighter and crisper, he got his plastering. This principle may be applied to the surfacing of cement blocks. In one way or another we shall wash out the neat cement. Unless the proportion of sand and cement be uniform, the texture will not be uniform. The best bricks that are now made for decorative purposes, for facing, are not intensely smooth. They have a grain—a texture, we call it. The surface is gritty; it has somewhat of a sand-paper quality; it receives the light in a pleasing way.

What Manufacturers will have to do.

An influential cause for the feeling which architects have about the cement block is the difficulty of having their plans exactly carried out. There is too much cut-and-dried business. The architect or the builder is not going to submit to compromises in one material that he does not have to submit to in others. In terra-cotta, stone and brick all plans can be carried out to a nicety, and there are no advantages otherwise in the concrete block which will lead to a compromise in its favour. The setting plans of a stone-cutter and a terra-cotta worker are marvels of neatness, exactness and accuracy. Great buildings are built practically without the sound of the hammer. Certainly the work is fitted before it leaves the cutting

shed or the factory. There is no reason why this should not be done in the same way by the block-maker. It must be done or the block business will not succeed.

There is no excuse for ugliness on the ground of cost. Good proportion costs no more than bad proportion, harmony of colour costs no more than inharmony: there is no more expense of material or labour in a well-formed moulding than in an ugly one.

It will be necessary for you to employ artistic designers who can design for you certain relatively simple standard designs which may be readily adaptable for various purposes. This is eminently a practical thing to do, and it must and will be done if the block business is to reach any large measure of commercial success.

The cement-block machine may produce and reproduce artistic forms for the masses. It may give us beautifully decorated structures at a minimum of cost. Art should be for everybody, and the block-machine should be a great art democrat.

A FORTY-STOREY SKYSCRAPER.

TOWERING far above the highest of New York's skyscrapers will soon be seen the new Singer building, the home of the Singer sewing machine. The structure will be built at the north-west corner of Broadway and Liberty Street, and will rise to a height of 593ft. above the pavement. (The highest point of the Cathedral of Cologne is 515ft.) It has been the aim of the Singer Co. to have the tallest building in the world, and it was with this object in view that the architect, Mr. Ernest Flagg, prepared the plans, naming forty storeys as the greatest height to which he could carry the structure with safety. Comparing it with other skyscrapers, it is nearly two-thirds as high again as the Park Row building, which is the tallest building in New York to-day, containing twenty-nine storeys and reaching to a height of 382ft. above the street.

Numerous other structures that will materially change the present skyline are also under way, or contemplated, in the immediate vicinity, but although most of them are larger buildings not one of them is to be as high as the Singer building. The two tallest are respectively twenty-eight and twenty-nine storeys.

The new structure is an L-shaped annex to the present Singer building. The foundation will be of reinforced concrete construction, supported on reinforced concrete piles, and the superstructure will be made as light in weight as possible consistent with the required strength. The exterior will be of pressed bricks, with limestone dressings.

Perhaps the greatest of the many difficulties with which the architect had to contend was that presented by the elements. A building of this height, standing alone, must be well braced to withstand the onslaught of the terrific gales that frequently pass over the city. The oscillation must be reduced to a minimum. This is accomplished by means of an elaborate system of wind-braces or large triangular sheets of steel which are placed in the angle formed by the intersection of each girder with the steel columns, which braces are securely riveted to both girders and columns, forming a thoroughly rigid mass that will resist any wind-pressure. The plans are now completed and in the hands of the building department, and it is expected that within two years this tallest of skyscrapers will be completed.

The Castle of Christiansborg, Copenhagen, which was destroyed by fire twenty years ago, is to be rebuilt for use both as a Royal palace and a Parliament House. The architect for the work is M. Thorvald Jorgensen.

* Extracts from a paper read at the convention of the National Association of Cement Users, at Milwaukee, Wis., U.S.A.

THE ARCHITECT AND THE CRITIC.

"ARCHITECTURE," the critic pronounces, "is dead. It is not any more a living art. It is a sort of man millinery—little better. The 'Ladies' Home Journal' tells my women-folk that skirts will be cut full this spring, or after the pompadour manner, and can I not see by the common practice that cornices are heavier this year and worn lower; the colossal order is in vogue, and so forth? Do not tell me that the modiste and the architect do not meet on a common ground. Architecture is defunct." This may be so, says Mr. H. W. Desmond in the "Architectural Record," of New York, for April. "On consideration, however, I ask how can I be sure of it, for the practice of architecture or the attempt to practice it continues. Indeed, with the critic's speech,

and the tone of it ringing in my ears, I can almost with greater certainty bring myself to the belief that the defunct one is criticism. Yet, I know that conclusion is not true either. The very bitterness of the reproach against modern architecture indicates reaction. The dead do not indict the dead. But the phenomena remains—the architects on one side, the critics on the other. And the separation itself is not the deplorable aspect of the situation. The dark side of the opposition is the indifference, the real indifference, of the critic to all the architect does or tries to do. And, on the other hand, we have to lament the complete apathy of the architect towards well-nigh everything the critic can conceivably say—except praise, and that he may lay on with a trowel.

"But what of the critic's credentials? Whose utterances are worth the reading? Besides,

as one well-known architect said recently: 'We've no time to read. All we need is pictures just to see what the "other fellow" is up to.' The man who spoke thus was not entirely fair, even to himself, but the fact remains that the critical body is so small, so withdrawn, so utterly 'in opposition,' it is impossible to produce sufficient testimony to establish indubitably the exact whereabouts of the 'critical position' in regard to the mass of contemporary architecture."

London—A City of Architectural Scraps.

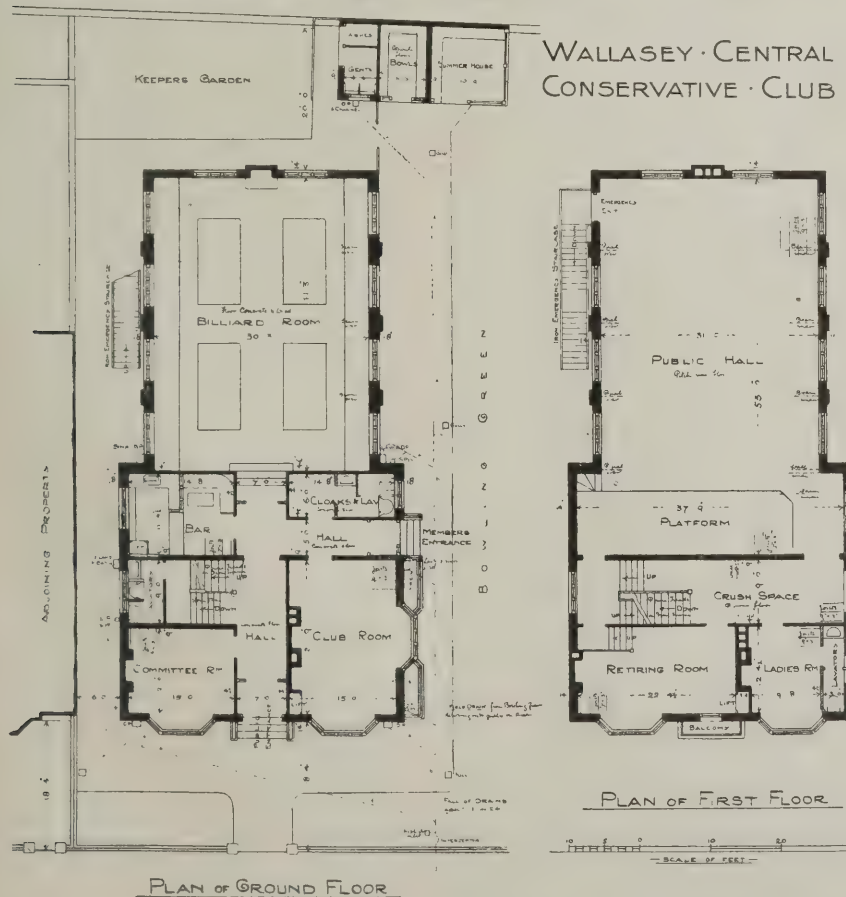
As an appendix to the foregoing we give the following criticism of new buildings in London which appeared recently in the "American Architect":—

The new War Office has lost its outer garment of scaffolding, and we may now examine it. Curious it is that, in spite of half a century's ridicule lavished upon the dome and "pepper-boxes" of the National Gallery, that same style of architecture should return to us. The new Admiralty rejoices in a dome, St. Paul's in miniature, and pepper-boxes; the new War Office has only the latter, two storeyed square turrets upon the circular base of the rounded corners of the building. The principal doorway is mean; the "ornament" in the semicircular pediment, the royal arms! A row of columns upon the first storey is presumably an effort to bring the new work into harmony with Inigo Jones's fine fragment hard by.

Now may we not wonder why Jones's plans for Whitehall Palace were not utilized, at all events for the façade? Surely the interior of the building might have been adapted to modern uses? It is a pity. The Banqueting Hall stands out nobly as a dignified building—grand in its simplicity. With the exception of the Foreign and Home Offices, which are also excellent specimens of simple dignity, the whole of the Whitehall buildings leave London where it was—a city of mere scraps architecturally.

Along the Strand hoardings still prevail. We wander up a street named Aldwych, between desert wastes. The Crescent is but a roadway. The Gladstone memorial is jammed against Wren's old church of St. Clement Danes, presumably that it may not be in the way of cars and omnibuses. The church of St. Mary-le-Strand is divested of so much pavement that it seems to have been shaved off on each side. A few trees would correct this; but trees would interfere with traffic. Alas, will the improvement of London never be a properly organized scheme? Paris years ago determined how to develop itself; London is all haphazard—tinkering; it is characteristic of the British race. In France everything is a well-studied organization; in England, the last new idea of the newest in office, just what may be best for the time being. However, after foreign travel, all Englishmen and women rejoice when they return to their haphazard manners of luggage management. In France, everywhere on the Continent, half an hour often does not suffice for claiming luggage. Here it is chucked out of a van, we poke it with our umbrellas, a porter picks it up, it is lifted into a cab, and off we go in three minutes! And the marvel is we never lose it—we may miss it, but it always turns up. Blessed methodless land! But luggage is not architecture.

Extensions to the Blackpool Sanatorium were opened recently. They provide considerable additions to the administrative block, a new pavilion for patients accommodating twenty-two beds, a double isolation block, and new laundry. The walls of the wards are finished in Keene's cement and Ripolin paint. Warming is by Shorland's Manchester grates. Laundry machinery has been supplied by Messrs. Summerscales & Sons, Ltd. The architect for the extensions was Mr. F. T. Waddington.



This building is being erected in Manor Road, Liscard, Cheshire, from designs by Mr. Leonard J. Hughes, architect, of 10, Victoria Street, Liverpool, the contractors being Messrs. Joshua Mills & Sons, of Liscard. The cost is put at £2,705. One of the chief features of the plan is the possibility of letting for public purposes part of ground floor and the whole of the first floor, second floor and basement, when not in use by club members, without disturbing the privacy of the billiard-room, clubroom and bar. This can be attained by simply locking the door between the public and the members' entrance halls. The building is kept to one end of the site, the remainder being laid out as a large bowling green.

R.I.B.A.

Two Papers on Plasterwork.

A MEETING of the Royal Institute of British Architects was held at 9, Conduit Street, W., on Monday evening, the chair being occupied by Mr. Edwin T. Hall, vice-president.

The deaths were announced of Mr. Robert Alexander Bryden, Fellow, elected in 1878, and Mr. William Goldsmith, Associate, elected in 1882.

Two papers on "Plasterwork" were then read by Mr. G. P. Bankart and Mr. Laurence A. Turner.

Mr. Bankart's Paper.

Mr. Bankart said that plaster had so long been looked down upon for its modern commonplace vulgarity of treatment that it seemed almost incongruous to think of it as a vehicle of art. Any really healthy revival seemed only seriously possible by again reverting to the beginnings, by the gleanings of some of that simple impulse which urged the artists of the past to find expression in materials and methods most in sympathy with their own nature, and in their right and full development.

What, the author asked, are some of the abstract points of value to be gathered from a general rumination amongst all the accumulated wealth of the labour of men's hands in the application and shaping of a kind of mud in or on buildings; and what may we rightly take to heart in pursuing or in attempting to give fresh hope and vitality to modern plasterwork? The shadow of the first half of the first century A.D. revealed to us remnants of modelled wall and ceiling decoration of a beauty subtlety and delicacy never since surpassed or even approached. It spoke to us of the extraordinary decorative instinct of the Greek and Roman in the combination of extreme simplicity of line and surface with refinement and power of execution. For the plasterer the lessons to be learned from these fragments of decorative art can never be too plainly noted or too highly praised. The stucco of the Romans tell us of their investigation, their admiration and of their imitation. This imitation was not the copying of the form, but of the spirit, of the art of the ancient Romans and Greeks. We of the twentieth century have our own religion, our science, our folklore, our national virtues, our industries and manufactures, to embody in our art.

Plaster in Renaissance Times.

Tracing the history of the plasterer's art through Renaissance times, and speaking of the results brought about by the changes in building construction, the author demonstrated that each one of these developments had its marked effect upon the decorative art of the plasterer. From each of these stages it would be found that the plasterer produced his best work when the particular kind of plaster he used, whether stucco, parge or plaster-of-Paris, was worked in its own particular plastering way, and was not forced into simulation of carving in marble, stone or wood. The success of his art seemed best assured when his material was put to the fullest right use without abuse.

To the question, Did the Classic or the Renaissance architect consider whether the methods then employed were legitimate or no? the author was inclined to suggest the negative, but that they were accepted as the most convenient and durable methods of expression then known. The primary object of the decoration of a ceiling or of a wall, as in all decoration, was the giving of pleasure to the eye. The construction of the ceiling had undoubtedly its bearing on the design, but once the impression of sufficient support and strength satisfied the artist, he vied in his emulation to obtain the praise of the

patron (eager to outshine his rivals); and to do this, while framing his work with due respect to reasonable economy, he thought chiefly of his enrichment, treated in the language of the time. This point concerning right or mistaken method, whether past or present, had an important bearing on all workmanship. Had the artists of the Italian Renaissance known of the method of casting

From Moulds of Flexible Gelatine,

the author thought that they as artists would have carried their method to a much greater pitch of perfection, and not so much in mechanical skill as in suiting their forms more particularly to the advantages of the mechanism. He claimed for plaster at least that respect and technical liberty which is due from the artist to any other material or medium of expression, whether the surface of operation be large or small. He believed each period of the art of the plasterer should be regarded on its own merits in combination with the peculiar circumstances and efficiency or inefficiency existing, according to the peculiar materials that it was then most convenient to procure and to manipulate. If mechanical skill be the plasterer's diploma, then should the twentieth century be able to dim the glories of the Italian Renaissance; but we must go back again to simplicity of line, of form and of spirit in the giving of pleasure with our money's worth. If this object is unattempted and unaccomplished, or undesired, by the lack of desire or knowledge of the sense of beauty on the part of the people and of the worker, then the world will be so much the poorer by ignoring not only the art of the plasterer but all of the lesser arts.

Mr. Turner's Paper.

Mr. Laurence A. Turner took for his subject "Decorative Plaster Ceilings," which he divided into two broad divisions—lime-plaster and plaster-of-Paris. These two materials, he said, required widely different methods in their use. As to which gave the most satisfactory plasteresque result there could not be two opinions. Lime-plaster must take the first place, and ceilings in this material must be modelled *in situ*. The quality we should try to reproduce in plasterwork is that which we find in the Elizabethan and Jacobean lime-plaster ceilings. These form the best models and standard of work for the art. Most are of lime-plaster; but there is no reason why the same effect should not be produced with plaster-of-Paris. The chief quality that made the old plasterwork so charming was the exceedingly soft, delicate and subtle play of light and shade that was produced on its modelled surfaces. In modern work it is the hardness of line and sharpness of shadow, dead flatness of the unornamental surface, that make it so dreadfully dull. The most satisfactory results in any plaster-decoration we possess are those in which there is no undercutting except in detached ornaments. Therefore it is necessary, in modelling a ceiling, to avoid all undercutting, hard edges and rigidity of line. Court everything that is the reverse of these qualities—softness, rounded contours, soft shadows, breadth of surface and extreme modulation of line and surface. Plasterwork worthy of the name must have

The Quality of Softness.

Every atom of it should be modelled. There should be a subtle play of light and shade all over it; the plain spaces as well as the mouldings and foliage should be alive with delicate modelling, and not dead and cold like the early Victorian ceilings. With the many new methods and materials discovered since that Utopian period for plasterers between 1400 and 1600, what can be done, the author asked, to produce a fine, satisfactory, decorative result at a reasonable cost? To make a ceiling nowadays in lime-plaster, using only the methods that those

old people used, it is useless to imagine that anything can be done that is not very costly. Besides, the difficulty of obtaining the properly slaked lime renders it almost impossible to model the plaster with the fingers. Tradition says that twenty years was not an out-of-the-way time for the lime to be slaked before use. The author advised the use of Keen's cement if well-slaked lime was not procurable. In ceilings he had

Modelled in situ,

in which Keen's cement had taken the place of lime; he had always mixed silver sand and size with it, the latter to prevent the cement from setting too quickly. He did not personally incline to the method of modelling in plaster *in situ*. He preferred to model the ceiling on the bench, in Keen's cement and sand, and to use his fingers only. When the model is finished a mould of plaster or gelatine is made from it, and the work cast in fibrous plaster. If there is a doubt about the amount of relief required, it is easy to offer up a cast *in situ*, and there is the advantage of being able to repeat the pattern instead of having to model the whole ceiling. Another advantage is that, by using sand with the cement, one can by using a coarser sand, and more of it, prevent the work from becoming too small in detail or too elaborate in finish, for the material will not allow of it. Another

Advantage of Fibrous Plaster

over lime is that the ceiling is three or four times lighter, and will not crack or fall, as the lime-plaster on laths sometimes does. The author confessed his partiality for ribbed or panelled ceilings, the method of construction of which he described in detail. Their beauty is chiefly dependent upon the modelled effect they should possess, the ever-varying play of light and shade of a most subtle kind. Very great care must be taken in modelling the plain ground for this type of ceiling, as the richness of effect is chiefly dependent upon it. The practice of using moulded wooden ribs, dividing up a ceiling into panels and painted white to appear like plaster, he strongly deprecated. It had the result of bringing a ceiling down and making it look heavy, whereas a well-modelled ceiling of plaster does the reverse, making the room look lighter and giving a sense of greater space. The ceilings of Wren's date, although very beautiful, depend upon their design for their beauty, and not upon that quality which is peculiar to plasterwork. They might equally well have been carved in wood or plaster. The Adams ceilings, made, the author believed, entirely from carved-wood moulds or carved wooden model, are hard and uninteresting, though very refined: they depend for effect entirely upon their design, and not upon modelling.

With regard to the question as to how far the architect should supply drawings for a ceiling, the author thought that nothing more than a small-scale drawing indicating the type of work he required should be given to the modeller; more than that only hampered him. The architect should supervise and criticize the models.

The author, in conclusion, emphasized his view that if a plasteresque effect be wanted the whole ceiling should be softly modelled, mouldings as well as ground; but if that was not to be, then let it be, frankly, carving produced in plaster.

A vote of thanks to the readers of the papers was proposed by Prof. Baldwin Brown, seconded by Mr. W. H. Atkin Berry and supported by the chairman, and Mr. Bankart and Mr. Turner replied.

It was announced that the annual meeting would be held on May 7th, and that a special meeting would be held on the same date to pass a resolution enabling the president and council to retain office until after the International Congress of Architects.

Tenders.

Addressed postcards on which lists of tenders may be stated will be sent post free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Fetter Lane, E.C. Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Birmingham.—For additions to premises in Caroline Street, for Messrs. Goodman, Ltd. Messrs. Ingall, Son & Mitton, architects and surveyors, 3, Temple Row West, Birmingham. Quantities by Mr. J. Percival Bridgwater, quantity surveyor, Queen's Chambers, Colmore Row, Birmingham:—

J. E. Harper	£3,365	15	0
T. Loud & Sons	3,297	0	0
T. Mills & Sons	3,270	0	0
A. J. Teall	3,200	0	0
J. Dallow & Sons	3,184	0	0
W. J. Whittall & Son	3,149	0	0
W. Harvey Gibbs*	3,015	0	0

* Accepted.

Birmingham.—For heating apparatus at the Baptist Mission Hall, in Hope Street. Messrs. E. Stanley Mitton & C. Silk, joint architects, 3, Temple Row West, Birmingham:—

Parker Winder & Achurch, Ltd.	£158	15	0
The Jevoon Co., Ltd.	146	0	0
Benjamin Parker, Ltd.	138	0	0
G. N. Haden & Sons*	128	0	0
A. J. Kallaway	98	0	0

* Accepted.

Breinton.—For alterations and additions to Breinton Manor House. Messrs. Groome & Bettington, architects and surveyors, Palace Chambers, Hereford:—

H. Smith	£1,674	0	0	£35
W. Rowbery	1,649	6	3	40
W. Powell	1,597	0	0	28
W. Bowers & Co.	1,498	0	0	22
C. Cooke	1,470	0	0	20
R. L. Friend	1,497	0	0	25
W. C. Bolt	1,400	0	0	25
E. W. Wilks,* Hereford	1,380	0	0	45

A.—Extra for granite plaster.

* Accepted subject to modifications.

Dartmouth.—For the erection of two shops and dwelling-houses in Victoria Road, for Mr. W. H. Brown, Dorchester. Mr. Montague Luke, architect, Studio Royal, Dartmouth, and at Plymouth:—

R. Watts	£1,785		
D. T. Pillar	1,730		
A. E. Knight,* Summerland Terrace, Dartmouth	1,685		

* Accepted.

Ilstock.—For the erection of a Council school, for the Leicestershire County Council Education Committee. Mr. W. M. Cowdell, architect, Grey Friars, Leicester:—

F. Elliott	£4,119	0	0
E. Haycock & Sons	3,960	0	0
W. Crane & Son	3,960	0	0
Bowles & Son	3,958	10	0
Haskard, Rudkin & Beck	3,868	0	0
E. Orton	3,868	0	0
T. A. Wileman	3,825	0	0
T. Barker & Son	3,700	0	0
C. Wright	3,694	10	0
Griffin Brothers	3,649	0	0
T. Hickman	3,634	0	0
W. Moss	3,634	0	0
W. F. Harding,* Loughborough	3,610	10	0

* Accepted.

Leyton.—For the erection of U.M.F. schools and alterations to existing church school. Messrs. George Baines & Son, architects, 5, Clement's Inn, Strand, W.C.:—

C. J. Sherwood	£1,731	0	0
C. North	1,492	7	0
W. Manders	1,450	0	0
Sands & Burley	1,345	14	6
Battley, Sons & Holness	1,237	0	0
F. J. Coxhead,* Bulwer Road, Leytonstone, E.	1,172	18	0

* Accepted provisionally.

London, N.—For the erection of new additions at St. John's Road Workhouse, and extension of Guardians' offices, St. John's Road, Upper Holloway, for the Guardians of St. Mary, Islington. Mr. W. Smith, architect, 63, Chancery Lane, W.C.:—

Reason	£21,958	0	0
Kiddle	19,733	0	0
Renshaw	19,644	0	0
Spencer, Santo & Co.	19,435	0	0
Perry & Co.	19,318	0	0
Martin	19,270	0	0
Stapleton & Sons	19,048	0	0
Hawkins & Co.	18,768	0	0
Treasure & Son	18,729	10	0
Laurence & Son	18,689	0	0
Wall	18,125	0	0
Godson & Sons	17,986	0	0
Kirk & Randall	17,978	0	0
Leslie	17,844	0	0
Knight & Son	17,799	0	0
Davey	17,779	0	0
Wallis & Son	17,730	0	0
Nightingale	17,623	0	0
Gough & Co.	17,594	0	0
Sheffield Brothers	17,555	0	0
Sabey & Son	17,385	0	0
Calnan & Son	17,373	0	0
Patman & Fotheringham	16,643	0	0
Johnson & Son,* London and Leicester	15,896	0	0

* Accepted.

Merthyr Tydfil.—Accepted for the erection of a new boys' school, Georgetown, for the Merthyr Tydfil Education Committee. Mr. J. L. Smith, architect, Central Chambers, High Street, Merthyr Tydfil:—

P. F. Howells, 17, Wellfield Place, Cardiff	£4,200		
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Liverpool.—Accepted for additions and alterations to premises, Walton Road and Warden Street, for Messrs. T. W. Frost & Co. Mr. J. H. Havelock Sutton, architect, Liverpool:—

J. & G. Chappell, Walton £2,090 12 3

London, S.E.—For pulling down 83, New Kent Road, Southwark, and erecting on the site a labour home, for the Council of the Oliver Borthwick Memorial "Morning Post" Embankment Home. Mr. George A. Lansdown, architect, 9, Regent Street, S.W.:—

Leslie & Co.	£17,397
Battley, Sons & Holness	16,888
J. Mowlem & Co.	16,615
Kirk & Kirk	16,484
J. Marsland & Sons	16,378
Spencer, Santo & Co.	16,197
H. & E. Lea	16,178
F. & H. F. Higgs	16,040
C. Ansell	16,000
W. Downs	15,988
Howard & Co.	15,968
B. E. Nightingale	15,658
J. Appleby & Sons	15,600
W. Wallis	15,497
Johnson & Co.	15,330
Patman & Fotheringham	15,273
T. G. Sharpington*	15,158

* Accepted.

London, W.C.—For the erection of new police married quarters at Huntley Street, W.C. Mr. J. Dixon Butler, architect, surveyor to the Metropolitan Police, New Scotland Yard, S.W. Quantities by Messrs. Thurgood, Son & Chidgey, Charing Cross Chambers, Duke Street, Adelphi:—

Lascelles & Co.	£26,223
Lathey Brothers	25,402
Asby & Horner	25,277
F. C. Minter	24,904
Foster & Dicksee	24,684
Willmott Brothers	24,290
Lovatt, Limited	24,000
Appleby & Son	23,750
C. Ansell	23,546
Higgs & Hill	23,543
W. H. Lorden	23,537
J. Carmichael	23,457
Clarke & Bracey	23,253
Prestige & Co.	23,207
Mowlem & Co.	23,155
Jarvis & Sons	22,868
Grover & Son	22,711
F. & H. F. Higgs	22,760
Holloway Brothers	22,570
Lawrance & Sons	22,217

London, E.—For rebuilding mill house at the Bow Brewery. Mr. Herbert Riches, architect, 3, Crooked Lane, King William Street, London, E.C. Quantities supplied:—

F. J. Coxhead	£2,250
G. Barker	2,239
Kirk & Kirk	2,100
F. & T. Thorne	2,100
Todd & Newman	1,949
J. T. Robey	1,933
Courney & Fairbairn	1,925
J. Jarvis & Sons	1,884
Perry & Co.*	1,865
W. Irwin	1,777

* Accepted (shortest time).

London, E.—For repairs and decorations to shop premises, Bromley-by-Bow. Mr. Herbert Riches, architect, 3, Crooked Lane, King William Street, London, E.C.:—

T. S. Elkington & Sons	£139	10	0
T. Osborn & Sons	114	0	0
G. Barker*	99	0	0

* Accepted.

London, N.—For repairs and decorations to "The Prince Albert" public-house, Hoxton. Mr. Herbert Riches, architect, 3, Crooked Lane, King William Street, London, E.C.:—

J. T. Robey	£286
F. Parsons & Sons	285
T. Osborn & Sons	236
A. W. Derby	209
T. S. Elkington & Sons*	165

* Accepted.

London, E.—For repairs and decorations to "The Nag's Head" public-house, Poplar. Mr. Herbert Riches, architect, 3, Crooked Lane, King William Street, London, E.C.:—

A. W. Derby	£507	0	0
T. Osborn & Sons	447	0	0
J. T. Robey	444	0	0
T. S. Elkington & Sons	430	10	0
G. Barker*	415	0	0

* Accepted.

Nottingham.—For the erection of dye-house, brown and sorting-rooms, &c., at Albany Works, Carlton Road, for Wright's Finishing Co., Ltd. Mr. Harry H. Goodall, architect, Parade Chambers, South Parade, Nottingham:—

F. M. Thompson & Sons	£939	0	0
G. A. Pillatt	889	0	0
G. Hopewell & Son	872	16	0
J. Hutchinson & Son	835	0	0
W. Maule & Co.	814	0	0
T. H. Harper,* Carlton	810	0	0

* Accepted.

[Rest of Nottingham.]

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Electrical Notes.

The Architect and Contractor in relation to Electrical Work.

Nowadays both the architect and the building contractor are forcibly concerned with electricity in one form or another, the architect more especially in respect of providing for electric lighting or ventilating, and the contractor in respect of the same and also of the uses to which electric motors can be put in the driving of hoists, mortar mills, &c. Yet both seem to keep themselves but little informed of what progress is being made in the electrical trade. The architect may have read a text-book or two, years old most probably, and thereby he thinks himself sufficiently well up in the subject, while the contractor's knowledge is picked up from hearsay and a little experience. The architect having now to make provision for so many new things in his buildings, it is not to be expected that he can possess any deep knowledge of the various specialist trades working under him, but he should more often try to learn from these specialist firms what may be useful to him in another building. As it is, he may provide for electric lighting in a hundred houses, and yet know nothing about the subject. The contractor, on the other hand, being so accustomed to steam and hand-driven machines, rather looks upon electric motors as something fanciful and not to be depended upon; he is, however, being forced from that position, and every year sees the increasing use of motors for such work. And thereby hangs a tale.

Suitability in Electric Motors.

The most suitable types of electric motors for various machine-driving were dealt with recently by Mr. W. A. Ker in a paper which he read before the Institution of Engineers and Shipbuilders in Scotland. Dealing with

reversing motors, which are seldom required to make lengthy runs in one direction, but are nearly always desired to run for a short time and then stop and reverse (as with hoisting gear and cranes), he said the shunt motor had an advantage over the series motor, and the best type to adopt was one with the fields permanently excited; though it was true that some machines having moving parts with but a small inertia, and requiring often to work with a small load when an increased speed of running with a fair acceleration was desirable (such as a jib crane with empty hook), might with advantage be fitted with series motors. He considered the following to be the most suitable:—Radial drills, shunt wound, variable speed; planing machines, compound with fly-wheel (a resistance might be automatically switched into the shunt circuit to increase the speed on the return stroke); punching and shearing machines, compound with fly-wheel; band, cold and frame saws, and wood planers, shunt; circular-saws, compound with small fly-wheel to assist motor when saw meets knots in wood; mortar-mills, compound with fly-wheel; mortising and tenoning machines, shunt; 3-motor travelling cranes, series in shops where rough work is carried out and great nicety of handling is not required. Most electric hoists and lifts are fitted with balance weights equal to the combined weight of the cage and half the ordinary load to be lifted. This enables a small motor to be used and ensures economy in current consumed. It is evident that, with a half-load in the cage, the motor can have no work to do, except to overcome friction, and if a series motor were used it would run at a very high speed and there would be considerable difficulty in stopping the cage at the right place; hence, a compound motor is most suitable for this work.

Life of Electric Lamps.

A great deal has been written about the life of both incandescent gas mantles and incandescent electric filaments, the deductions in the majority of cases being governed largely by the particular view of the writer, whether a partisan for gas or electricity. In the "Electrical Review" for April 6th, however, a very instructive, though short article, appears, setting forth the results of a series of tests made by Mr. Lancelot W. Wild. It is evident, he says, that owing to the deterioration of illuminating value that takes place almost from the commencement of the life of an incandescent lamp that it would pay to scrap lamps at a very early age were it not for the cost of renewals. For determining what was the economical time of scrapping Mr. Wild carried out a series of life tests on forty-eight 200-volt 16-c.p. incandescent lamps of twelve different makes, four lamps of each make being taken. They were tested under average working conditions with the following results:—At the commencement they gave 16·7-c.p. on a consumption of 59·8 watts, being 3·58 watts per c.p.; after 100 hours the c.p. had gone down to 15·9 and the wattage increased to 60·6; after 500 hours the figures were 13·15 and 58·5 respectively; after 700, 12·25 and 58·0; after 900, 11·55 and 57·6; and after 1,000 hours 11·3 and 57·4, these last figures representing a wattage of 5·08 per c.p. Taking the cost of lamps as 10d. each as a basis, and plotting the figures determined in the form of curves, it was found that the correct scrapping points were as follows:—

Price per unit.		Useful life.
1d.	- - - -	1,000 hours.
2d.	- - - -	500 "
3d.	- - - -	500 "
4d.	- - - -	450 "
5d.	- - - -	400 "
6d.	- - - -	350 "



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EDINBURGH ARCHITECTS AND THE NEW ART SCHOOL.

THE annual meeting of the Edinburgh Architectural Association was held last week, Mr. H. O. Tarbolton, F.R.I.B.A., president, in the chair.

The chairman of the Committee of Management reported that 1907 would be the jubilee year of the Association, and it had been suggested that the event should be celebrated by holding an exhibition and inviting the Royal Institute of British Architects to hold their annual dinner and other meetings in Edinburgh that year.

Mr. Hippolyte J. Blanc, R.S.A., was appointed president for the current session, and Mr. J. T. Baillie and Mr. W. T. Oldrieve were elected vice-presidents.

Mr. Tarbolton, in his valedictory address, said that matters dealing with the training of the architectural student had been very much influenced by recent events and possible forthcoming changes in art education in Edinburgh. The proposed new Municipal Art School was matter for congratulation, and with it would be introduced, he hoped, a new era of art activity. The foundation of this school would be a task that would demand the most disinterested and anxious attention on the part of the municipality, and he hoped no steps would be taken without consultation with acknowledged experts in architectural training. He maintained that the teaching throughout should be of a synthetic nature, *i.e.*, that there should be common groundwork. Painters, sculptors, decorators, designers and architects should have a definite and common basis of training, for he was convinced by so doing the student would be enabled to discover his real vocation. He thought, of course, that

practising architects should be, as far as possible, on the teaching staff. He would also strongly advise that opportunities should be given to advanced and successful students to continue in the school as pupil-teachers. A school established on the above lines would give a very thorough and general training, and would lay a sound foundation on which the student might continue his studies in later years.

Prof. Baldwin Brown, in moving a vote of thanks to Mr. Tarbolton, said they would like to see architecture taught in the school according to a proper system, and that the whole decorative arts should be grouped together under architecture and looking to architecture as their head. He should very much rather there was not a Committee of Management at all, but that there was placed a thoroughly competent architect, familiar with all decorative arts, as the head of the school, with a free hand to organize it and to gather round him those helpers whom he felt would be of advantage for his work.

Coming Events.

Thursday, April 26.

SOCIETY OF ARCHITECTS.—Mr. T. R. Croger on "Shakespeare and Old London," at 8 p.m.

MANCHESTER SOCIETY OF ARCHITECTS.—Annual general meeting.

INSTITUTION OF MECHANICAL ENGINEERS.—Anniversary Dinner.

Friday, April 27.

ARCHITECTURAL ASSOCIATION.—Mr. Walter Cave on "Fenestration," at 7.30 p.m.

ROYAL SANITARY INSTITUTE.—Discussion on "The Consumptive at Home" at 5 p.m.

Saturday, April 28.

JUNIOR INSTITUTION OF ENGINEERS.—Visit to the works of the Croydon Gas Co., Waddon, at 3 p.m.

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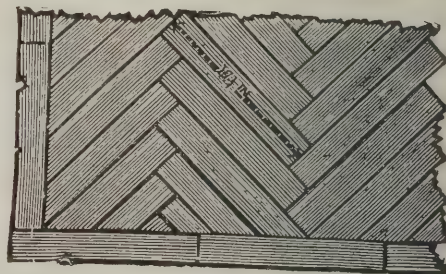
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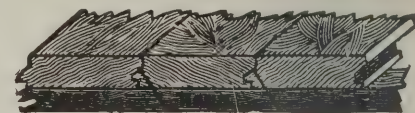
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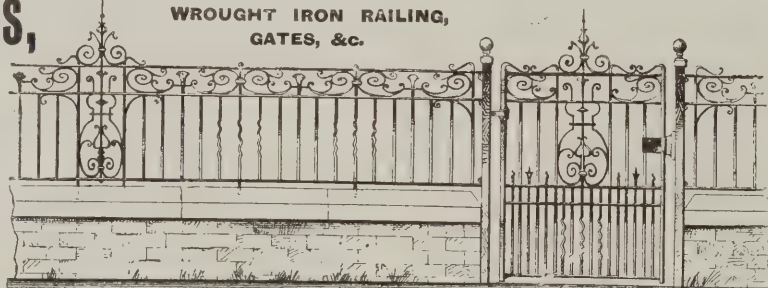
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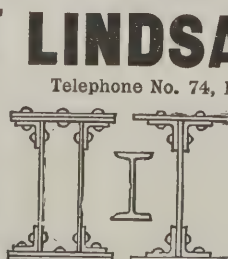
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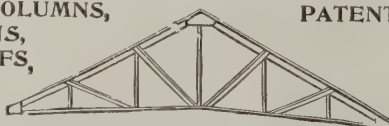
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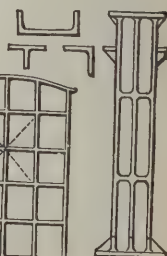


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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

April 25th, 1906.

CONTRACTORS' SUPPLEMENT (MONTHLY).

HOW TO BECOME A BUILDER.

By F. HIGGS (of F. & H. F. Higgs).

WHAT is it to be a "builder"? I do not refer to that product of the present day, the very modern limited liability company, often colossal in the size and scope of its operations (but always impersonal and to some extent irresponsible), in connection with which one cannot tell who is who; but rather I am writing of the expert craftsman whose duty and pleasure it is to crystallize into fact the artistic ideas and dreams of the architect and designer, and who is himself to a growing extent the colleague and fellow-worker with these artists rather than their servant.

As understood at the present day, a builder is one who undertakes works comprising the trades of excavator, bricklayer, mason, carpenter and joiner, ironsmith and founder, plasterer, plumber, and zinc or copper-smith, glazier, painter and decorator. Some knowledge of each of these trades is required if a lad is to become master of his business.

The Training of the Future Builder.

The youth who has this life-task before him must obviously begin it early; his school work should, if possible, be directed with this ultimate goal in view. I am aware it is often very difficult to thus predetermine the career of a young lad. Some show early in life a predisposition to one or other occupation, while others have no particular fancy. If a lad of the latter description has the good fortune either by birth or training to possess the genius of perseverance and a practical cast of mind, he will have a very fair chance of becoming a good builder.

Recalling my own schooldays, I have often regretted that so much time was spent upon classical studies, and have wished that I had learned more Euclid and mathematics. This apparently useless work was of value doubtless from the point of view of mental discipline, but I believe it would have been better had that discipline taken the form of mathematics and technical and mechanical matters.

Given, therefore, a sound practical education in such of the rudiments and principles of knowledge as will enable the youth to shape his future practice and conduct, let him as early as possible put himself apprentice to a master in trade whose business is not so extensive as to preclude his personal attention to its detail, or so engrossing as to prevent his doing what he can for his pupil.

In the Shop.

The term of his apprenticeship should be at least five years, or if he begins at fourteen, which I think the proper time, then seven years. He should spend the first two years of his time in the joiners' shop, during which he should have mastered the principles of framing, the use of the commoner tools, and be able to himself set out and put together an ordinary window and door; and if he can prevail upon the foreman to let him assist in setting-out the shop work, so much the better.

In the Office.

The third and fourth years of the term should be spent in the office to get himself acquainted with the routine of builders' bookkeeping, which, properly kept, should clearly show the out-of-pocket cost of every contract punctually up to date. An intimate acquaintance should here be gained of the prices of materials, and the causes and probabilities of the fluctuation of the same. If the master can see his way to entrust the pupil at this stage to keep the detail cost of the output of the work from the joiners', masons' and smiths' departments, then the experience so gained will prove invaluable in his future career.

Some knowledge of another branch of office-work must also here be gained, viz., the extremely important one of estimating, both upon quantities provided and from drawings and specification.

Presuming that our pupil has all the time zealously set himself to work by "scorning delights and living laborious days," he will have acquired some knowledge of his craft, but, as he himself will be the first to admit later on, very little of what the stern discipline of life and everyday experience will eventually force upon him.

Evening Schools.

He will at the same time be well advised to spend laborious nights as well as days, by attending one of the many technical schools or polytechnics now established on every hand, so that the theory of building construction may be acquired as well as the practice thereof, and the principles grasped of geometry, perspective, land surveying and mensuration, all of which are extremely useful in after-life, besides being sometimes necessary.

Then there are the principles of architecture, its various forms and orders, of which the builder should have some knowledge if he is to hold his own in his future dealings with architects.

One Year upon a Building.

The final term of apprenticeship—viz., one year in the case of a five years' total and three in the case of one of seven—should be spent upon a building. This is really the most useful and satisfactory portion of the period; and if our young friend is inclined to work hard, and is endowed with powers of observation and capacity for management, he will learn more in this section than in either of the previous two, particularly if, having proved himself worthy of it, his master is able to give him some amount of responsibility, and to a youth of capacity the more the better.

Usually he is placed as the job clerk or assistant to the foreman, acting also as timekeeper, and thus he will get some insight into the very important business of the organization of labour and the management and treatment of our friend the British building trades workman, than whom, speaking generally, it will be difficult to find a more sterling example of British pluck, capacity and patient endurance.

As a Foreman.

Perhaps before the period is closed the pupil will have engendered so much appre-

ciation and confidence in his master's mind that he will be entrusted as sole foreman to carry out some job, and in this case the saying will be amply fulfilled that "to him that hath shall more be given," and he will find that the solution of the difficulties and questions that are constantly arising will teach him more than he could possibly learn in any other way. He will also be gradually acquiring knowledge and experience of the various materials used in the building trade, whose name is legion, particularly in the matter of timber, and will be able to judge between good and inferior qualities. He will also, being observant and statistically inclined, keep account of the various labour costs of the work done under his supervision, and the results thus obtained will help him immensely when, later, he is estimating on his own account. In ascertaining these results he will need to be constantly measuring up the work done from time to time, and thus get accustomed to rapid measuring and calculation and at the same time discover on a sure basis which workmen are doing their duty and which should cease to be employed. He will also be able to discover by comparison with the bills of quantities whether the quantity surveyor has taken sufficient, and whether he has properly represented the work to be carried out. Further, if his master, being a wise man, has given him his quantities priced out, he will learn what prices are paying ones and what require revision in future estimates. All these points he will find invaluable to him in his future career.

Knowledge of Quantity Surveying.

Then when the quantity surveyor comes on the scene to adjust variations, or to measure the whole if it happens to be a job on a schedule, he will in his attentions and explanations be able to learn more of the principles of quantity surveying than a whole course of teaching at a County Council building school would afford, and he will see before him the actual items of material and labour which are taken up, according to the London custom, and the reason for their inclusion in a builder's estimate.

Of course, a young man in a position of this sort will make mistakes; as someone has said, "He who never made a mistake never made anything." Most employers rightly think that these mistakes with their accruing experience are made at their expense, and this is true, but full-blown foremen make blunders too, which also occur at the employer's expense, but the added zeal and enthusiasm of the young man makes up for a good deal.

The Premium.

Most builders of standing of course require a considerable premium for an apprentice to their whole trade, but nothing that is worth having can be had without paying for it, and in all cases the premium is returned several times over in salary. It is desirable in the early stages of the term that this salary should be calculated at an hourly rate, to stimulate regular and punctual attendance at duty. Progress, however, depends entirely upon the character and capacity of the pupil.

Commencing Business.

The young man having now served the full end of his term will be wise to stay a while longer if possible with his employer, to gain added experience before starting in trade for himself; and having thus become qualified so far as possible he may by the aid of friends open up some premises and commence business. He will find that he will learn more in one month in this new sphere than in twelve when he was working for another person, but his success will depend upon many things besides the knowledge of his trade, *e.g.*, prudence, foresight, capacity for management, ability to take large views as well as to attend to details, suave and conciliatory manners and address, and, above all, common-sense. If he does his work conscientiously and well, and gives satisfaction to the architects he works for, besides pleasing the person for whom he is building, he is sure to get on, as there is no better advertisement than the good opinion of one's clients and customers.

Capital is of course Necessary,

but provided a business is based on right principles, commercial as well as moral, assistance of this kind will soon be forthcoming; and presuming our young friend is of the thrifty sort and allows the bulk of his profits to accumulate, he will soon find his circumstances taking on a more easy complexion; but let him not imagine that any success can be attained without strenuous and untiring exertion. He must give his whole time and attention to his business, and he will then prove the truth of the Wise

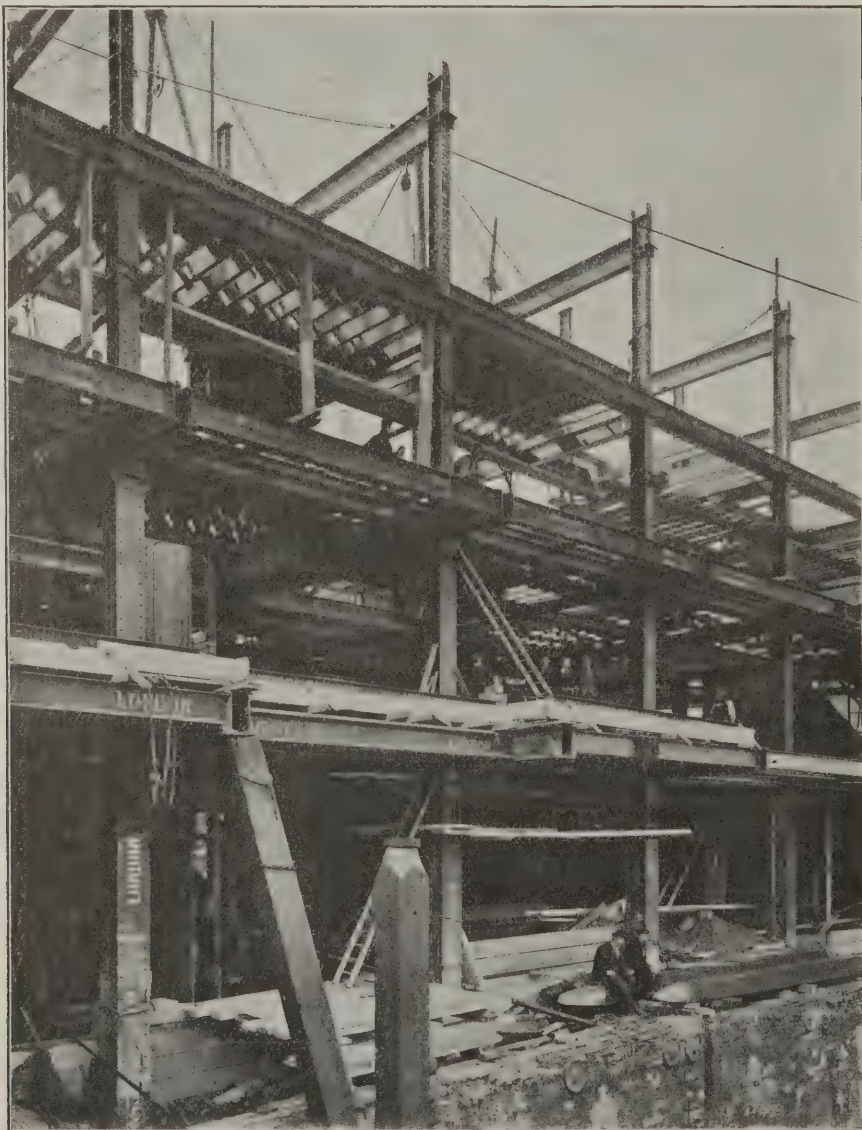


WAREHOUSES AT DAVIS' WHARF BERMONDSEY, ADJOINING TOWER BRIDGE.

King's observation: "Seest thou a man diligent in his business, he shall stand before kings."

A STEEL-FRAME WAREHOUSE.

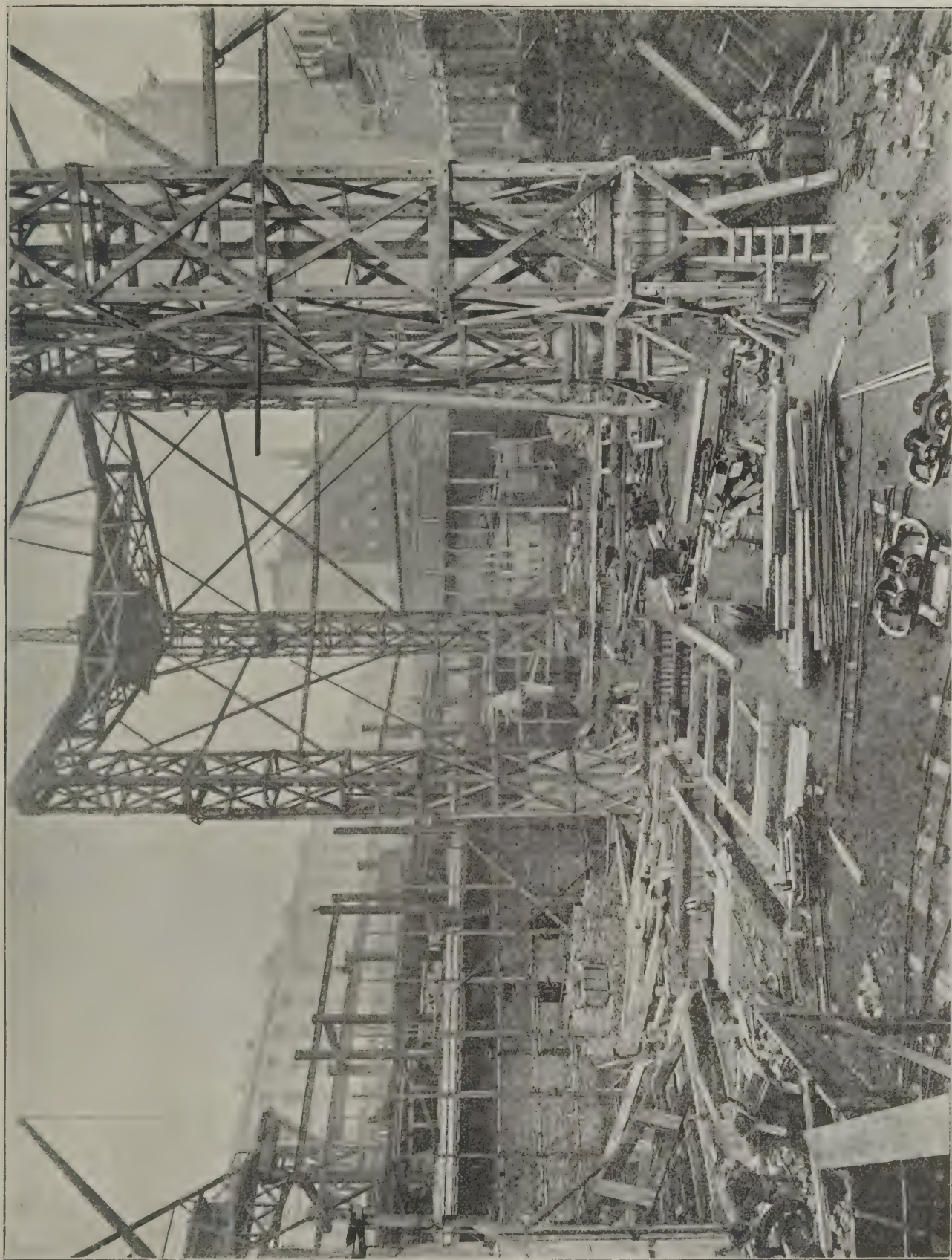
WE publish two illustrations showing the erection of a steel frame warehouse for Messrs. Leach and Co., Ltd., on a wharf on the Thames adjoining the Tower Bridge, namely, Davis' Wharf, Bermondsey, S.E. As this warehouse is used for storing all sorts of goods the loads on the floors are heavy, and in the warehouse itself have been calculated for a dead load of 3 cwts. per ft. super., while the balconies and the quay have been calculated to carry a live load of 3 cwts per ft. super. As regards the factors of safety adopted, the beams have been calculated for a maximum working stress of 7 tons per sq. in. The total weight of the steelwork is about 650 tons. The detail view shows very good types of connections, and also illustrates the manner in which the intermediate wood joists have been connected with the steel main beams. The foundations of a building adjoining the river naturally require considerable care, but in this case there was no particular trouble, as the old wharf wall still existed. The foundations for the stanchions consist of concrete and steel joist grillages, there being about 87 tons of steel joists under the stanchions and walls in the foundations. The general view shows one-half of the job which has already been completed and is now in use, and the portion still in course of erection. The steelwork has been executed by Messrs. Measures Brothers, Ltd., of 53B, Southwark Street, S.E., and reflects considerable credit upon these well-known iron and steel contractors and engineers. The builders are Messrs. Dove Brothers, Ltd., of Islington, while the architects are Messrs. Stock, Page & Stock, F.F.R.I.B.A., of 9, Denman Street, London Bridge, S.E.



STEELWORK AT DAVIS' WHARF BY MEASURES BROTHERS, LTD.

[Photos: Argos.]

Tenders for the new Wesleyan Hall at Westminster, to be erected on the site of the old Aquarium, are to be invited as soon as the ground is cleared. It was felt desirable to clear the ground before asking tenders for foundations, in order that contractors might know what they had to deal with. Tenders for the clearance of the site were obtained from seven or eight firms and the work awarded to the lowest tenderer. The architects of the building are Messrs. Lanchester & Rickards, of Vernon Place, Bloomsbury.



THE GREAT EXCAVATION FOR THE PICCADILLY HOTEL, LONDON. WILLIAM WOODWARD, F.R.I.B.A., AND WALTER EMDEN, JOINT ARCHITECTS.

Photograph taken on March 28th, 1906.

THE PICCADILLY HOTEL.

IN this issue we give the first of a series of photographs which we propose to publish showing the erection of the large new hotel—the Piccadilly Hotel—which is being erected at the Circus end of Piccadilly, London. Work on the clearance of the site, which was formerly occupied by St. James's Hall and Restaurant, was commenced several months ago. The view on the preceding page shows the vast excavation which has been made. This excavation goes down to 28ft. below the Regent Street level and to 33ft. over the general area. The hotel will have three storeys below ground—hence this immense excavation; yet it will be noticed in the photograph how even deeper places

are being dug out for motor rooms, heating chambers, &c. The brickwork, as shown, is up to ground-floor level on the front to the Quadrant, built round cast-iron stanchions, a detail view of one of which is illustrated: the construction is extensive, but so far presents nothing unusual in building work. The joint architects of the hotel are Messrs. William Woodward and Walter Emden, of London, though the elevation of the hotel to the Quadrant is the design of Mr. R. Norman Shaw, R.A., whose advice was sought on behalf of the Crown, the ground landlords. Messrs. Perry & Co., of Bow, are the builders. The Piccadilly elevation of the hotel was published in THE BUILDERS' JOURNAL for February 8th, 1905, in which issue will also be found some particulars of the accommodation to be provided. Altogether, including site, the cost of the undertaking is likely to be more than a million pounds sterling.

Builders' Notes.

The Congress of the International Association for the Testing of Materials will be held at the Palais des Académies, Brussels, from September 3rd to 8th next.

Builders' Accident Insurance.—The annual report of this company states that the policies in force show an increase over 1904. The decrease in revenue is mainly due to the shrinkage in the wages returns upon which premium is paid; a fact which all conversant with the state of the building and kindred trades during the past year will appreciate. The amount paid in respect of claims shows a decrease, while payments in respect of law charges, commission and cost of management show corresponding reductions. The amount of funds at the end of the year was £22,364, as against £19,669 at the close of the previous year.

Yorkshire Builders, &c., on District Councils.

—In the district council contests in Yorkshire the following gentlemen associated with the building and allied trades have been elected:—Mr. W. S. Farnell, timber merchant, for Birkenshaw; Mr. J. Turner, contractor, for Holmfirth; Mr. A. Waugh, contractor, for Ilkley; Mr. J. Broadbent, joiner, for Luddendenfoot; Mr. J. Maud, timber merchant, for Mytholmroyd; Mr. C. J. Foster, builder, for Normanton; Mr. F. Ratcliffe, contractor, for Oxenhope; Mr. C. Whiteley, builder, for Rishworth; Mr. F. Cowling, joiner, for Silsden; Mr. T. Turner, architect, for Silsden; Mr. T. Duckett, contractor, for Skipton; Mr. A. Marshall, builder, for Soothill Nether; Mr. H. H. Hall, architect, for Soothill Upper; Mr. S. Smith, stone merchant, for Southwram; Mr. A. Carr, builder, for Wheatley.

Collapse of a Wall at Shoreditch.—One man was killed and two men were injured by the collapse of a wall of a building in Rivington Street, Old Street, Shoreditch, on Thursday morning last. Bricklayers were at work on the building, which was being converted into an electric sub-station. Two men named Alexander and Gathercole were on a scaffold, facing a wall with glazed tiles, when suddenly the wall fell outwards, bringing down the scaffolding with it. A third man, an Italian, who was working on the ground, was overwhelmed in the debris. He was conveyed to the Mildmay Mission Hospital, where, shortly after noon, he died from his injuries. Gathercole and Alexander, who were both cut about the head, were taken to St. Bartholomew's Hospital. Gathercole was discharged in the course of the day, and Alexander is making good progress towards recovery.

Toronto Building Boom.—Provided there are no labour troubles, the building trade of Toronto is expected to be good for this and next season, because of the absolute necessity for many more houses, and also because of the many new warehouses, offices and public buildings to be erected under contracts already made and authority secured from public bodies. Regarding the probable outlay on these buildings, a prominent Canadian architect says a conservative estimate is 12,000,000 dollars (£2,400,000).

Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

DURING THE WEEK ending April 20th eleven failures in the building and timber trades in England and Wales were gazetted.

H. MEREDITH, builder, Hambledon. Adj. April 7th.

F. BESZANT, builder, Chippenham. Deficiency £90.

S. HOLBROOK, plumber, Ilkeston. P.E., Derby C.C., May 15th, at 11.

W. WAKELING, master bricklayer, Brentwood. R.O. April 7th.

J. CHARLESWORTH, builder, Wolstanton. Deficiency £803.

R. H. DEWHIRST, girder and roof maker, Bradford. Deficiency £434.

J. BLAND, builder and contractor, Battlebarrow. Deficiency £39.

E. DENNY, builder and contractor, Grange. Deficiency £150.

C. A. WATSON, builder and contractor, Spalding. Deficiency £952.

W. DUNCAN, builder, Chorlton-upon-Medlock. Liabilities £3,500; assets £87.

A. W. JAGGERS & Co., builders and contractors, Crofton Park. P.E., Greenwich C.C., May 8th, at 11.

J. ATHERTON, plumber, Great Yarmouth. R.O. April 10th.

J. BARRY & SON, builders and contractors, Scarborough. Adj. April 12th.

T. DAVID, house decorator, Mountain Ash. First meeting, 135, High Street, Merthyr Tydfil, April 26th, at 12. P.E., Temperance Hall, Aberdare, May 14th, at 10.30.

F. PHIPPS, builder, Oxford. First meeting, 1, St. Aldate's, Oxford, April 25th, at 3.30. P.E., County Hall, Oxford, April 25th, at 11.30.

J. ROWDEN, builder, Hammersmith. First meeting London Bankruptcy Court, April 26th, at 11. P.E., same, May 22nd, at 11.30.

M. BRITCHFIELD, builder, Skegby. First meeting, O.R.'s, Nottingham, April 27th, at 11.15. P.E., Nottingham C.C., May 4th, at 10.30.

Partnerships.

Dissolutions of Partnerships.

[The date when the partnership was dissolved is given in parenthesis where known.]

R. BENSON & R. DEWS, contractors, Bately. (April 2.)

J. SCHOFIELD & J. HOLT, joiners and builders, Rochdale. (April 5.) Debts by J. Holt.

E. JEWELL & E. T. DAVIES, builders and contractors, Glam. (April 3.) Debts by E. T. Davies.

G. Z. & W. C. STEVENS, builders and contractors, Holloway, N. (Feb. 24.) Debts by W. C. Stevens.

W. W. & H. R. WADE, builders and contractors, Aylsham. (April 6.) Debts by either partner.

G. HIND & A. E. DOUGHTY, plumbers, gasfitters and contractors, Liverpool. (Mar. 5.) Debts by G. Hind & A. E. Doughty.

A. W. LYNE & J. E. SMITH, builders and contractors, Clapham, S.W. (Mar. 31.) Debts by A. W. Lyne.

J. KNIGHT (deceased) & P. L. HAINE, timber, slate, lime, cement and builders' merchants. (Jan. 1.) Debts by P. L. Haine.

J. RADCLIFFE & SONS, builders and contractors, Huddersfield. (Mar. 9.) Debts by L. & A. Radcliffe, who continue.

G. WELLS & A. B. BROWN, builders, Newcastle-upon-Tyne. (April 2.) Debts by G. Wells, 74, Hazlewood Avenue, Jesmond, Newcastle.

J. R. WATERMAN, M. BOFF, T. WATERMAN & A. K. WATERMAN, builders and contractors, Watford. (Mar. 25.) Debts by M. Boff and T. & A. K. Waterman, who continue.

W. & G. TYSON, builders, Nottingham. (Mar. 24.) Debts by W. Tyson, who continues in his own name. G. Tyson will carry on business in his own name at 8, Wilford Road.

C. & A. HANN, builders, contractors and lime merchants, Beaminster. (Mar. 31.) C. Hann continues at Prout Bridge, Beaminster, as C. & C. Hann; A. Hann will carry on business at Fleet Street, Beaminster, as Albert Hann & Sons.



Photo: Argos.

PICCADILLY HOTEL: DETAIL OF CAST-IRON STANCHION AND CONNECTIONS.

The Month's Trade.

(Reports by our Special Correspondents.)

THE STONE, GRANITE AND MARBLE TRADES.

There is again very little change to be reported in these trades. The labour returns of the Board of Trade show that employment was generally fair in limestone quarries, dull in slate and granite quarries, and quiet in other quarries.

Employment in limestone quarries was fair in Derbyshire, Weardale and North Wales, and good in the Cleveland district and Cumberland. In the Bath stone quarries it was better than a month ago, when it was reported as slack. A slight improvement occurred in the Plymouth district, where, however, employment remained quiet.

As regards other stone, employment was good in chert quarries in Derbyshire, where overtime continued to be worked. It was slack in the Gloucestershire pennant stone quarries. In grindstone and building stone quarries in the Rowsley district employment was fair, and better than a month ago, and it was fair in sandstone quarries in North Wales. At Gateshead employment was somewhat irregular on account of bad weather. It continued moderate in the Cleve Hill road-material quarries and bad in Forfarshire, with much short time.

Employment in the granite quarries continued dull in Aberdeenshire. In Devonshire and Cornwall it continued bad, but it was a little better than a month ago in certain quarries. It was fairly good in Leicestershire.

With the sett-making industry employment was good at Edinburgh, and fair in North Wales and in Aberdeenshire. It continued moderate in the Cleve Hill district.

The returns for imports of stones, slabs and marble, rough, hewn and manufactured, for the month of March, 1906, as compared with the same month in 1904 and 1905, are as follows:—

Tons.			Value.		
1904.	1905.	1906.	1904.	1905.	1906.
104,026	105,849	93,289	£118,278	125,932	112,608.

THE SLATE AND TILE TRADES.

We are unable to report any change for the better in these trades, prices still remaining unremunerative and competition worse than ever. It was hoped a month or two ago that prices had reached the lowest possible level; this, however, does not appear to be the case, many orders having been taken recently at figures which experience shows to be below cost price.

This unfortunate state of things is entirely due to the fact that there is not sufficient work to keep the various contracting firms going, and there is little hope of any improvement until business increases. So far as can be ascertained from the various slate quarries, stocks are not excessive, nor do we think the merchants are buying heavily; consequently there is every probability of a sudden rise in prices directly the demand increases.

There is still considerable difficulty in obtaining certain specified sizes and qualities (more particularly in the three larger), viz., 24 x 12, 22 x 12 and 22 x 11, from some of the larger quarries, especially on the North Wales coast.

Westmorland Slates.

During the past month the railway companies have made a considerable reduction in the rates from these districts to London. Though the arrangement is only temporary it is hoped that the railway companies may feel justified in making it permanent. This should assist many of the quarries in this district, especially as regards the stouter slates, as hitherto the cost of transit has brought the cost of these qualities up to the same

level as the best. We understand that generally the trade in these slates shows no improvement, though one or two quarries appear to have been despatching material more freely. We have been unable to ascertain that any contracts of special interest have been settled during the past month.

Delabole Slate.

The Old Delabole Slate Company have recently introduced a slate procured from the deep bed of their quarry, which will be known as "Best quality specially stout slate." This slate has been specified for use on the Victoria and Albert Museum, and will be found to be of excellent quality. It is about double the thickness of the ordinary best slate from this quarry, and the cost will be about equal to the best quality regular size green slates. In country districts this slate weathers down to a pleasing silver-grey colour and the durability of the material is undoubted.

Sussex and Purbeck Stone Slates.

The demand for Sussex and Purbeck stone slating appears to have fallen off somewhat of late. This is doubtless owing to the difficulty of obtaining supplies, most of the quarries in the Horsham District having ceased working, except for purely local requirements; but we understand there is a possibility of a revival of this industry, as some fresh beds have recently been located. This material, like Colleyweston, is practically indestructible, and most of the old slates seen in Horsham have probably done previous service on two or three buildings. The cost of slating with this material (except in the immediate locality) is excessive owing to the heavy expenses for transit, many of these slates being zins. in thickness. One of the best examples of this kind of slate may be seen on the parish church at Horsham.

Precelly Slates.

There appears to be an increasing demand for these slates. They are more frequently specified and appear to meet certain requirements, coming as they do between the colour of Westmorland and Colleyweston. They present a picturesque appearance, being specially suited to buildings of a quaint design. The demand is particularly brisk for the quality known as rustics; to meet the requirements the quarry is being vigorously worked, and is, we understand, in better condition to supply demands than it has been at any previous period.

Broseley Tiles.

From the Broseley district we understand that the state of trade is much the same as last month, each works apparently securing a fair-sized order from time to time. Enquiries however are more frequent, and hopes are entertained of a revival in the near future. Enquiries have been frequent from Scotland and the North of England, Scotland especially being a new field for supply. Doubtless the demand for tiles in Scotland will increase, the rates being comparatively reasonable, and the brighter-coloured roof-covering will no doubt be welcome in many cases.

Sussex Tiles.

From the Sussex tile district we understand the first quarter of the year generally does not show a large output, but during March the demand for tiles of the hand-made sand faced type was nearly treble that of the corresponding period in 1905, giving hope that the ensuing months will show an equal improvement. The call for sand-faced tiles from this district has been met from accumulated stocks, the new infirmary at Shoreham having required about 300,000 tiles of this type from the works of the Keymer Brick and Tile Co. The outlook in this district is somewhat brighter than in other parts of the

country; several schools are about to be erected (at Portslade, Hellingly, Plumpton Bexhill, &c.), where local tiles will probably be used. It may not be generally known that some of the tile-works in the Sussex district also produce machine-made pressed nibbed-tiles. The demand for this type hitherto has been purely local and confined principally to speculative work.

THE CLAYWORKING INDUSTRY.

The extra demand for bricks which comes with the increased activity of the building trades in the Spring continues to effect a slight improvement in the brick trade, but the state of things must still remain bad as compared with former years. The Board of Trade returns for March state that employment during the month was on the whole slack. The slight improvement chronicled in our "Contractors' Supplement" for March continued, and there was also some improvement at Oldham, in the Market Harborough district, in South Wales, in South Staffordshire and at Birmingham. Employment continued good at Exeter and fair in the Tees and Hartlepool district.

THE PORTLAND CEMENT TRADE.

The forecast made in our previous "Contractors' Supplement" that prices for Portland cement would harden has been fulfilled, as manufacturers are now asking 1s. to 1s. 6d. per ton more than they were willing to accept earlier in the year. There is also less keenness on behalf of the manufacturers to book contracts ahead, even at the advanced price, as there is a general feeling prevailing that prices will rise considerably before the year is out, and thus compensate manufacturers for the enhanced prices they have to pay for their materials. In addition to the fact that the commerce of the world is active, there at last appears a little more movement in the home building trade, and architects are saying that plans and schemes formulated some years ago which have been waiting for more propitious times are being taken out of their pigeon-holes and having the dust removed ready for early development. It is the export trade, however, which is giving the greatest fillip to the cement market, and, with the sole exception perhaps of South Africa, the foreign and colonial outlets of the Thames and Medway manufacturers are calling for unusually large supplies. The imports for March again show a falling-off compared with the corresponding month of last year. This is due to two causes: firstly, the domestic consumer is beginning to find out that the proverb "penny wise pound foolish" is especially true when applied to cement, and that the alleged cheapness of a good deal of the Belgian article is more than counterbalanced by the smaller aggregate that can be safely used; and secondly, that the trade conditions in Belgium are such that there is less available for export. These various features give quite a buoyant tone to a market which has been drooping for so many years, and it is with relief that manufacturers are able to turn from a somewhat gloomy past to a more hopeful future.

News Items.

In answer to a question asked in the House of Commons recently, the Secretary to the Admiralty (Mr. E. Robertson) informed Colonel Lockwood that the Admiralty contracts stipulated that the Portland cement used should be what was technically known as artificial Portland cement.

The "Echo Industrielle" reports that the Belgian artificial Portland cement industry is suffering from a fraud said to be practised on a large scale. This consists in mixing natural cements with the artificial Portland

cement in order that the product may be sold as Portland cement, and at a much lower price than the genuine article. When put into use this adulterated product proves most unsatisfactory, and seriously damages the reputation of the genuine artificial Portland cement. In order to prevent being victimized by the fraud, buyers are warned by the cement industry of Belgium to see that the goods they purchase bear the marks of the reputed Portland cement factories.

Exports of Belgian cement in 1905 reached 688,825 tons, as against 588,295 tons in 1904, an increase of more than 100,000 tons, while importations into Belgium decreased by over 4,000 tons during 1905. In 1905 Great Britain received 206,584 tons of Belgian cement, against 231,213 tons in 1904.

The Yorkshire White Lime Co., Ltd., an Orange River Colony concern with property at Fountainspruit, in the Kroonstad neighbourhood, is about to engage in the manufacture of Portland cement. Mr. G. Reimers (a London expert) has reported favourably upon the clay found on the company's property, and limestone of the necessary purity is in close proximity. The new works are six miles from the nearest railway siding, and the Central South Africa Railway will provide transport by traction engines.

As showing how foreign cement manufacturers compete with those of the United Kingdom for the supply of British South Africa, the quarterly return issued by the South African Customs Bureau states that £59,000 worth of cement came from Great Britain as against £44,000 worth from foreign countries, chiefly Germany and Belgium.

The new Customs Tariff for Ecuador which came into force on January 1st last allows cement for building purposes to enter free.

The Australian Commonwealth Customs have decided that cement-stone machines, similar to presses for moulding hollow concrete building blocks, shall be admitted free, as machine tools.

The returns for imports and exports of cement for building and engineering purposes for the month of March as compared with the same month in 1904 and 1905 are as follows:—

		IMPORTS.		
		1904.	1905.	1906.
Tons	-	21,161	25,161	13,333
Value	-	£30,329	31,713	17,157
		EXPORTS.		
		1904.	1905.	1906.
Tons	-	22,841	35,857	12,888
Value	-	£37,776	59,502	79,930

Of the exports for March this year the Argentine Republic took 4,780 tons, British South Africa 9,637 tons, the British East Indies 11,278 tons, Canada 3,068 tons, New Zealand 2,477 tons, and Australia 1,010.

THE TIMBER TRADE.

The Board of Trade reports that employment in March with mill-sawyers and wood-cutting machinists on the whole was quiet, but was better than a month ago and a year ago. Trade unions with a membership of 4,813 reported 215 (or 4·5 per cent.) as unemployed at the end of March, compared with 50 per cent. at the end of February and 57 per cent. at the end of March, 1905. Employment was fair at Hartlepool, Sunderland, Huddersfield, Burnley, Liverpool, Warrington, Birkenhead, Birmingham, Norwich, Reading and Limerick; improving at Newcastle-on-Tyne, Jarrow, Nottingham, Northampton and Leek; and bad at Barrow, Rochdale, Stockport, Leeds, Hull, Grimsby, Loughborough, Wolverhampton and Dublin.

In accordance with the provisions of the Customs Regulation No. 131, a drawback will be allowed on the imported rough timber used in the manufacture of doors and sashes within the Australian Commonwealth upon exportation of such manufactured articles.

The Liverpool Market.

Operations in the Liverpool timber trade were somewhat interfered with by Easter, there having been a certain slowing-down of business before the holidays and a natural tardiness in resuming afterwards. Apart from this disturbance, however, business has been good. Prices generally are firm, and the conditions as regards supply and demand suggest higher rather than lower ranges.

Deals.

In builders' timber, the arrivals of spruce and pine deals from New Brunswick and Nova Scotia have been on a moderate scale, and the timber has been taken up freely for use inland. Values have lately ranged from £7 12s. 6d. to £8 5s. per standard, according to quality, but there has been a slight hardening, and recent business has been done at or near £8, with forward delivery business at £8 to £8 5s. The recent consumption has been slightly in excess of the consumption at the corresponding date of last year, but over the period from the beginning of January to the present date the consumption has been less than for the corresponding period in 1904 and 1905. The stock in hand is about one-fifth greater than at the corresponding date of last year, and represents about two-and-a-half months' consumption on the basis of recent deliveries.

Quebec pine deals have come to hand in small quantities. The demand has been very fair, while the stock is only about two-thirds of that held at the same date last year. The stock of Quebec spruce deals is nearly double the quantity held last year, but the stock then in hand was very small. The deliveries of this timber have been on a moderate scale, so that the stock in hand is ample for requirements. Values of Quebec pine deals have ranged from £22 10s. to £32 10s. per standard for first-quality wood, from £17 to £22 for second quality, and from £11 10s. to £13 for third quality. Spruce boards have ranged from £6 15s. to £7 5s. Canadian square wood has been quiet, both as regards arrivals and deliveries. Stocks are comparatively small, being less than half, in the aggregate of cub. ft., than the quantity held a year ago. With the recent small consumption the quantity seems ample for likely demands. The price has ranged for 1s. 8d. to 3s. 3d. per cub. ft., and red pine from 1s. 8d. to 2s. 3d. per cub. ft.

Pitch-pine

continues in a very strong position. Sawm wood and planks have come to hand in fair quantities, though not nearly so plentifully as at the corresponding time of last year. The stock of hewn timber is now very small; equalling less than a month's consumption, on the recent basis. The price has ranged from 1s. 3d. to 2s. per cub. ft., and holders are firm in their demands. The stock of sawn is still smaller, comparatively, being less than one-ninth of the quantity held a year ago, less than one-tenth of that held in 1904, and less than one-half the quantity consumed in a recent normal month. The price ranges from 1s. 4d. to 1s. 8d. per cub. ft. The stock of planks is also light, and less than the quantity of a recent normal month's consumption. The price ranges from 10d. to 1s. per cub. ft. Prime deals and boards range from £16 to £17 10s. per standard. There has been a freer importation of these last-named woods, and fair stocks are held. Business in pitch-

pine generally has, however, been restricted by the high range of prices, buyers taking up as little stock as possible in the hope of obtaining easier terms later.

Oak.

Oak in logs has been received in fair quantities from the United States. With an improved enquiry deliveries have been on a larger scale, and stocks are much below the quantities held in 1905 and 1904. Prices have consequently advanced, 1s. 6d. to 2s. 6d. per cub. ft. being the present range. The recent arrivals of planks have been on a moderate scale, but, for the present year, to date, the quantity received has been considerably in excess of the quantity received in the corresponding period last year, though less than in 1904. The deliveries have been in excess of those of a few weeks ago, and stocks have been greatly reduced. Values range from 1s. 6d. to 2s. 2d. per cub. ft., and are very firm thereat. Baltic oak has been entirely neglected of late. The stock in hand is small, but more than suffices for requirements on the basis of deliveries during the present year, to date.

Teak

has been imported freely and the stock is much in excess of that held at the corresponding date last year and in 1904. The demand has been small, so that prices are easy. Planks are quoted at £16 to £17 10s. per load, and East Indian wood at £13 to £20 per calliper load. Greenheart has been imported in fair quantity. The demand has been limited, and there is now a large stock of this wood in hand. From £7 to £7 5s. per load is the present range of values.

Mahogany.

Mahogany, chiefly African sorts, has been imported in considerable quantities. The stocks of Cuba, Tobasco, African and Colombian in brokers' hands, made, with the newly imported wood, scope for three days' good business in the auction room.

THE GLASS TRADE.

The glass trade continues fair. The Board of Trade returns for March show that with sheet-glass makers and flatteners at St. Helens employment in the month continued good. It was slack with pressed-glass makers in the Tyne and Wear district, though slightly better than last month. With plate-glass bevellers and silverers at Birmingham it was fair. Employment with glass blowers in London continued good.

By the new commercial treaty between Belgium and Austria-Hungary, concluded on February 12th last, the tariff schedule of the latter has been reduced for certain Belgium goods, and in virtue of the Austro-British treaty of 1876 these reductions are applicable to goods from the United Kingdom. The new rates for mirror, sheet and plate, and rough-cast glass, rough, not smoothed, polished, figured, foliated or coloured, not more than 5mm. thick, are 10 kronen per 100 kilograms (gross weight) for sheets the perimeter of which is 240 cm. or less, 11 kronen for over 240 and up to 400 cm., and 13 kronen for over 400 cm. If the rough glass is coloured it is charged a uniform rate of 24 kronen per 100 kilograms. If smooth, polished, figured, curved, even coloured or flashed, it is charged 28 kronen when not cut in facets and not foliated, 29 kronen when cut in facets but not foliated, or if cathedral glass (white or not), and 30 kronen if foliated.

The returns for imports and exports of glass for the first three months of 1906, as compared with the same period of 1904 and 1905, are as follows:—

		IMPORTS.			EXPORTS.		
		1904.	1905.	1906.	1904.	1905.	1906.
Window and German sheet, including shades and cylinders		342,094	236,665	374,334	185,648	141,665	211,868
Plate		117,378	122,237	100,614	141,609	149,519	130,832
Plate		-	-	-	18,636	27,628	32,912
					25,450	39,697	50,2

A trust has been formed of the manufacturers of plain glass in Spain. It is composed of nine companies, situated as follows:—Two in Bilbao, of which one will be closed; two in Gijon, of which one will be closed; one in San Sebastian; two in Reinosa, of which one will be closed; one in Mataporquera, which will be closed; and one in Seville, which will be closed as regards plain glass. The Seville factory will continue to manufacture undulated (*ondulado*) glass for roofing and stamper (*timbrado*) glass.

A new method of making window glass has been devised by Mr. Fourcault, a Belgian, who has sold his patent to the European syndicate of plate-glass manufacturers for £190,400. This syndicate consists of German, French and Belgian manufacturers, and one Bohemian factory. Hitherto, for windows, the molten glass has been blown into cylinders by glass-makers' pipes, and subsequently flattened, while in the making of plate glass the viscid mass was cast from the pots and rolled. The new invention draws the molten substance from the pot and conducts it between rollers lying side by side. Seventeen pairs of these rollers are built up towerlike above the pot. The liquid mass cools on its way between the rows of rollers and comes out from them polished on both sides, in any desired thickness (this being regulated by the relative position of the rollers), flattened and ready for use.

THE PAINT TRADES.

The paint trades are fair. As regards materials, the returns for imports and exports for March, 1906, as compared with the same month in 1904 and 1905, are as follows:—

	IMPORTS.			EXPORTS.		
	1904.	1905.	1906.	1904.	1905.	1906.
White lead	-	33,331	27,850	25,752	29,938	36,502
Zinc oxide	-	-	18,545	-	4,883	6,572
Other colours and pigments	-	131,965	131,745	119,056	119,904	119,671
Turpentine	-	13,715	9,395	-	-	-
Lac-dye, seedlac, shellac and sticklac	-	16,776	6,743	3,240	3,101	1,877
Linseed oil	-	-	2,092	-	-	64,506
			7,785			54,350
			2,652			44,665
			41,289			

THE IRONMONGERY TRADE.

The builders' ironmongery trade still remains under a cloud. Goods used by the engineering trades continue in good demand. The Board of Trade returns for March show that employment in the lock and latch trade at Wolverhampton continued bad, much short time still being worked. It had improved on cast-iron hollow-ware, but had declined with makers of iron hurdles and fences. In the hollow-ware trade it continued good at Wigan, fair at Birmingham and West Bromwich, and slack at Sheffield.

Employment in the stoves, grates, &c. trades continued fair at Falkirk, but was very quiet at Rotherham. At Glasgow it had improved slightly, but was still quiet; at Bolton it was fairly good.

With nut and bolt makers employment was good at Darlaston and Winlaton, and fair at Birmingham and in South Wales. With wire nail and cut nail makers at Birmingham it continued fair. At Black Heath with nail workers it was fair, but with rivet makers it was quiet.

Employment in the wire trade continued generally good and rather better than a month ago.

The returns for imports and exports for March 1906, as compared with the same month in 1904 and 1905, are as follows:—

	IMPORTS.			EXPORTS.		
	1904.	1905.	1906.	1904.	1905.	1906.
Wire nails	-	2,564	3,522	-	1,673	2,172
Nails (other than wire nails), screws and rivets	-	1,267	1,308	-	1,160	1,781
Bolts and nuts	-	470	494	-	-	-
			586			3,023
			1,075			2,190
			7,214			35,007
			8,224			41,615
			9,171			51,776
						20,956
						29,737
						38,291

THE IRON AND STEEL TRADES.

Whilst volcanoes have been displaying their unsuspected energy to an astonished world, and bishops and schoolmasters have been hurling upon us streams of oratorical lava, the steel market has done nothing to distinguish itself save maintain a state of dignified and philosophic calm. It is not, however, to be expected that its movements should embrace the whole gamut of human possibilities in the course of every month.

Circumstances of supply and demand must in all seasons prevent anything of the nature of a prolonged monotone, but even that, uninteresting though it may be, is preferable in the interests which this journal represents to a Wagnerian medley of inspired bulls and bears, so dear to the speculative mind.

Again, to gather a fair conception of the trade of the present and, what is more to the point, the possibilities of the near future, breadth of perspective should be aimed at, not a minute inspection of the most immediate conditions. Such a view, like a sunrise by Whistler, is instructive by reason of its broad effects, and much more nebulous of prophesy than the more confining pre-Raphaelitic production. Those little lulls and spurts which we see to-day are inevitable to all times and seasons—whether of prosperity or drought—are not to be regarded too seriously.

IRON AND STEEL EXPORTS FROM THE UNITED KINGDOM (TONS).

	1905.	1906.
Wrought-iron, &c.	31,285	32,652
Steel bars, &c.	30,860	43,666
Steel girders, &c.	15,173	27,296
Galvanized sheets	101,801	116,234
Black plates	13,484	15,012
Miscellaneous	164,845	221,923

The total increase in iron and steel exports for the three months, over the corresponding period of 1905, is 185,000 tons, representing a value of £1,895,000.

Turning from the contemplation of these figures to more immediate circumstances, the past few weeks show a record of very even tenour, but not by any means an unsatisfactory one.

From Scotland we hear of a noticeable falling-off in the income of orders with the inevitable accompaniment of a slackening of prices all round, and sellers seem to be acting with considerable reserve. Pig-iron descriptions show a shading of 6d. and 1s. all round, warrants being now quoted at about 55s. per ton. This has not, however, had any marked effect on prices of manufactured shapes. Steel angles are still quoted at £7 per ton, steel bars at £8 and sheets at £8 7s. 6d. As a matter of fact, makers have still a fair amount of orders on hand, and it is confidently expected that these prices will be maintained in spite of any appearance of weakness in the market. What the ultimate effect will be of the competition which our Scottish friends are experiencing from makers immediately over the border—i.e., in the north-east of England—remains to be seen.

A step further south, in Middlesbrough to wit, something of mild optimism is discernable. This is not inspired by any great briskness of demand, but rather for the negative reason that makers have not entirely worked through their orders. In manufactured steel generally there is no appreciable falling-off in prices in this district, which now stand somewhere in the region of the following figures:—

	£	s.	d.
Steel sheets	8	0	0 per ton.
" angles	6	10	0 "
" joists	6	7	6 "
" bars	7	0	0 "
Iron bars	7	5	0 "
Best iron bars	7	15	0 "
Iron angles	7	5	0 "

Turning to the industrial Mecca of the Midlands, we find that no great degree of originality has characterized the Birmingham market to distinguish it from other centres. If anything, however, the trade is just a trifle more confident in its anticipations than elsewhere. Ordinary merchant bar-iron, which as a rule strikes the keynote for all the lines in which we are particularly concerned, still maintains the figure of £7, rising to £7 5s., and sales which have been reported at £6 17s. 6d. have only been for inferior sorts. At any rate, the official figure of £7 5s. is not far wide of what is actually being obtained, and this remark applies to marked iron bars, for which the official quotation is £9.

Other lines in the Midlands remain pretty firm at the figures which prevailed two or three weeks ago. Steel angles are still quoted at £6 10s. to £6 12s. 6d., joists at £7 to £7 2s. 6d. and girder-plates at £7 10s. to £7 12s. 6d. Steel for structural work generally is in very fair demand, and a steady tone seems to prevail throughout.

On the Continent the complexion of affairs is somewhat different to what we have been experiencing on this side. Many people who have been looking for a slackening of trade in Belgium and Germany, and a more competitive attitude towards the markets of this country, have been considerably disappointed.

Trade all over, more particularly in rolled steel sections for building purposes, appears to be exceptionally brisk at all Continental centres. In fact many of the works are getting behindhand in the despatch of orders,

and all have quite sufficient to keep them actively employed for some time. Needless to say, there has been a marked change in quotations for Continental rolled steel in this country. Rolled steel joists and channels have slowly and steadily advanced since the end of March, and are still inclined to go up. Prices for joists delivered c.i.f. Thames or equal ports now range from £5 15s. per ton and upwards to £5 17s. 6d. per ton, according to specification, and channels 4s. to 6s. higher in ordinary sections. Steel angles range from £6 1s. to £6 2s. 6d. and steel tees from £6 2s. 6d. to £6 5s., delivered c.i.f. Thames. To buyers in this country who are favourably situated in the manufacturing localities—that is to say, within an easy freight radius of works—the Continental prices do not present any great attraction. In fact, among the generality of consumers on this side there is not likely to be any very spirited demand in the near future.

Other Metals.

Some buyers have lately been looking forward to an easing off in the prices of corrugated sheets, as one of those things which have only to be waited for to be achieved. The associated makers, however, do not display any great degree of alacrity in coming into line with this view, and are still holding out for their figure of £12 7s. 6d. for 24-gauge f.o.b. In fact, it is difficult to see by what reason any material shading of this figure can be expected, as the trade on the whole displays a good normal state of activity.

In lead, although the trade shows signs of increasing activity, the quotations are still somewhat behind the figures they touched some weeks back. Present prices, however, show a fair tendency to advance on the more recent quotations, soft foreign being quoted at £15 17s. 6d. and English at £16 5s.

In tin there has been a steady and consistent advance in prices, and the present figure of £176 per ton shows a very satisfactory condition in this market. In the United States there has been a remarkably heavy consumption latterly, and this has had its inevitable effect on London prices. The value imported into the United Kingdom from all sources shows an increase of £28,000 for the first quarter of the present year.

Copper also has shown considerable strength recently, although this is a line which at the best of times is sensitive to a variety of circumstances. The present figure is £84 15s. to £85 for standard copper, which compares with £82 a month ago.

No large amount of business has been done in spelter latterly, many buyers being inclined to hold back and wait events. Nevertheless the figure of £25 15s. per ton for good ordinary brands is well maintained, and conditions do not point to any material reduction of this price in the near future.

The tinplate trade is regarded with some concern, the recently advanced tariffs on material going to Germany, and considerable anxiety prevails in Wales as to future prospects. The increase in the duty is from 2s. 6½d. to 2s. 9½d. per cwt., which of course has been inspired by the leaders of the tinplate industry in Germany. Added to this, the Canadian Government are being urged to place an import duty on tinplate for the benefit of manufacturers in the Dominion, who say they are fully equal to meeting all local demands. So far as export prospects are concerned, the outlook for the Welsh industry certainly leaves something to be desired.

News Items.

Sheffield reports a large increase of activity in the file trade.

Blast furnacemen in the Cleveland district have been awarded an advance in wages of 3½ per cent.

The production of steel in the United States last year was 19,912,000 tons, representing an increase of 6,000,000 tons over the figures for 1904.

The increase in Germany's small steel trade is evidenced by the fact that last year she exported 10,400 tons of cutlery as compared with 7,559 tons in 1903.

The New South Wales Government propose to purchase £100,000 worth of wire netting to sell to the farmers, to assist the latter in dealing with the rabbit pest.

The spring meeting of the Iron and Steel Institute takes place on May 10th and 11th. Ten papers on various subjects appertaining to the industry are to be read, and six reports will be presented on work carried out by Carnegie scholarship holders.

An important discovery of iron ore deposits is reported from Ailerbach, in Saxony. The deposits are nearly two miles long, 167ft. in width and 70ft. deep, and represent by far the most extensive discovery of the kind yet recorded in Germany.

THE LIVERPOOL DISTRICT.

The report of the Liverpool Building Surveyor, Mr. W. Goldstraw, on the work done in his department during the year 1905, shows that last year 2,186 new dwelling-houses, 42 public buildings, 3 warehouses and 117 new stables and minor buildings were erected in the city of Liverpool, and that 181 extensive additions and alterations to property, and 577 small additions and alterations, were carried out. The report gives the following information, which is of interest and value as indicating work likely to be done as regards the erection of new dwelling-houses in the course of the present year. The growth of the city as a whole has continued at a steady rate, which has averaged 1,960 houses in each of the last ten years, and 2,167 in each of the last five years. Last year the number of new houses erected was 251 above the average of the previous nine years. Assuming, therefore, that the average of the last five years be maintained during the present year in Liverpool an addition of upwards of 2,100 dwelling-houses will be made to the number of houses existing on January 1st last. Some idea of the character of the demands likely to be made for building materials for the new dwelling-houses erected during the present year may be obtained by a survey of the character of the houses erected during each of the last three years. The rent-value of the houses erected was as follows:—

	1903.	1904.	1905.
Under £12	201	258	78
£12 to £18	363	284	394
£18 " £25	1,058	1,067	872
£25 " £35	706	449	638
£35 and upwards	125	116	204

News Items.

The Levenshulme Urban District Council purpose carrying out a scheme of street improvements at an estimated cost of about £13,439. At the Local Government Board enquiry there was no opposition.

It is probable that the work of erecting the new Council offices and library at Northwich will be proceeded with shortly. The Council recently made an offer to Messrs. Greenall, Whitley & Co. for certain property adjoining their present offices, in order to obtain a site for new offices, and negotiations are proceeding satisfactorily.

The Runcorn Rural District Council have obtained the sanction of the Local Government Board to its borrowing £1,620 for new sewerage works in the district of Walton Inferior, Cheshire.

The Birkenhead Town Council have decided that their new central library shall be erected on a plot of land owned by the corporation, in Market Street South. Towards the cost of the building the council will have a gift of £15,000 from Mr. Andrew Carnegie. The council have also decided to enlarge the

plant at the Bentinck Street electricity station at a cost of £11,896. The work to be done will include the provision of two boilers, a new engine and new condensing plant and the necessary adaptations. The education sub-committee for the neighbouring Bebington and Neston district area, Cheshire, have decided to erect a new secondary school.

The Lancashire Education Committee are now proceeding with an extensive scheme of school buildings which will require about three years to complete.

At Widnes, the want of a new hospital is being felt increasingly. The question of providing one came before the town council at their last meeting, but no decision respecting the matter was then arrived at. The matter, however, is likely to come up for consideration again shortly.

For warehouse floor-work, concrete has come into large use in the Liverpool and Manchester districts. The floors of the new dock warehouses and sheds of the Mersey Docks and Harbour Board are of this material. Some of the warehousing companies of the district have also employed it for their work.

THE WALLPAPER TRADE.

The wallpaper trade continues fair. Foreign competition is a little brisker though not serious, although imports are more than a year ago and slightly more than in February. Our exports, however, are only the merest shade better than a month ago, and less than a year ago and still further behind 1904, as the following return of paper-hangings for March will show. The results of the first three months' trading of the current year are, however, satisfactory, being very little behind last year and the year before. They are as follows:—

		IMPORTS.		
		1904.	1905.	1906.
Cwts.	-	—	4,338	6,519
Value	-	—	£11,778	18,120

		EXPORTS.		
		1904.	1905.	1906.
Cwts.	-	10,089	9,423	1,812
Value	-	£23,890	24,122	22,981

New Companies.

NEWRY BRICK AND STONE CO., LTD., Ireland. Capital: £7,000.

BLACK HILL BRICK AND TERRA-COTTA CO., Bolton. Capital: £5,000.

CEMENT PRODUCTS, The Vineyards, Gloucester Road, Cheltenham. Capital: £2,000.

LLOYD & JENKINS, to take over the business of house painters, decorators, &c., carried on at Villa Cross, Handsworth, as Lloyd & Jenkins.

STEPHEN EASTEN, to take over the business of a contractor, builder, builder's merchant, quarryowner, &c., carried on by S. Easten at Newcastle-on-Tyne. Capital: £25,000.

WYNDHAM & PHILLIPS, to acquire the business of brick, tile and pipe manufacturers, &c., carried on at Delph Works, Ruabon, by R. T. Phillips and R. W. Phillips, as Wyndham & Phillips. Capital: £10,000.

JOSEPH GLOVER & Co. (Liverpool), to acquire the business of a sanitary plumber, painter, decorator and general contractor carried on by J. Glover at 39, Knight Street, Liverpool. Capital: £2,000.

NEW SWEENEY BLUE BRICK AND TERRA-COTTA CO., to acquire the Sweeney Brickyard, Oswestry, Salop, to adopt an agreement with P. Muller & J. D. Lonsdale, and to carry on the business of brick and tile manufacturers, &c. Capital: £3,000.

KENTISH BRICK, TILE AND SLAB WORKS, to acquire certain leasehold property at Chislehurst Common, with the business of brick and tile makers and paviors carried on there, and to adopt an agreement with C. M. Heather and W. H. Weaver. Capital: £10,000.

IMPROVED CONSTRUCTION CO., to adopt an agreement with P. B. Jagger and J. A. Malcolm, and to carry on the business of manufacturers of and dealers in artificial stone concrete or other products having cement as a binding ingredient, and products having steel or other metal for stiffening or reinforcing purposes, whether for building, paving, or decorating, 58, Lombard Street, E.C. Capital: £50,000.

Complete List of Contracts Open.

With a few exceptions, news of Contracts Open are not repeated after they have been published once in these columns, so that readers will find particulars in our previous issue of other contracts that still remain open.

Unless expressly stated to the contrary all deposits required for bills of quantities, &c., are returned on receipt of *bona-fide* tenders.

The words "Fair Wages Clause" inserted in certain paragraphs signify that persons tendering must conform to a fair-wages clause in the contract, which requires them to pay the rates of wages current in the district.

BUILDING.

April 26. Taunton.—Rearranging the interior of Gray's Almshouse, East Street, Taunton. Plans and specification may be inspected at the office of J. Houghton Spencer, architect, 5, Hammet Street, Taunton, from 9.30 a.m. to 6 p.m., and sealed tenders, endorsed "Gray's Almshouse Tender for Works," to H. Byard Sheppard, 8, Hammet Street, Taunton, treasurer to Gray's Charity, on or before 10 a.m. on April 26.

April 26. Manchester.—Erection of a roof over the roadway at the Foreign Animals Wharf, Old Trafford. Drawings may be seen and specification and bill of quantities obtained at the office of the City Architect, Town Hall, upon payment of £1 rs. Sealed tenders, enclosed in the official envelope, to be delivered at the above office not later than 9 a.m. on April 26.

April 26. Golcar.—Erection of a residence at Well-house, Golcar. Plans may be seen and bills of quantities obtained at the office of J. Berry, architect, 3, Market Place, Huddersfield, to whom tenders must be sent, free of charge, by April 26.

April 27. Nelson.—Erection of twenty (more or less) houses. Plans and specifications may be seen at the office of Osborne & Rees, Nelson. Sealed tenders, endorsed "Tender for Houses," to be sent to T. H. Dowdeswell, Fairfield, Nelson, on or before April 27.

April 27. Chelmsford.—Widening a small brick bridge in the parish of Waltham Holy Cross, known as Broomstick Hall Bridge, for the County Council. Plans and specifications may be seen at the Surveyor's Office at Chelmsford on any day. Tenders must be delivered to the County Offices, Chelmsford, not later than April 27.

April 27. Chelmsford.—Brick and concrete abutments, &c., for a small bridge at Radwinter, near Saffron Walden, for the County Council. Plans and specifications may be seen at the Surveyor's Office at Chelmsford. Tenders must be delivered to the County Offices, Chelmsford, not later than April 27.

April 27. Waterloo.—Erection of public library and museum buildings adjoining the Town Hall, Waterloo, near Liverpool, for the U.D.C. Bills of quantities may be obtained from the clerk, upon payment of a deposit of £22s. Drawings and specifications may be seen at the office of O. D. Black & A. F. Milligan, architects, Central Chambers, South Castle Street, Liverpool. Sealed tenders, endorsed "Tender for Public Library and Museum," must be delivered to John I. Thompson, clerk to the Council, Town Hall, Waterloo, near Liverpool, not later than noon on April 27.

April 23. Neath.—Rebuilding the following public-houses for E. Evans Bevan:—(1) "Traveller's Rest," with stables, Nantyllyn, Maesteg; (2) "Farmer's Arms," Commercial Street, Maesteg; (3) "Crown Inn," Bridgend Road, Maesteg. Plans and specification may be seen and bills of quantities obtained at the offices of J. Cook Rees, architect, St. Thomas Chambers, Neath, on payment of £1 rs., to whom sealed and endorsed tenders must be sent by April 28.

April 23. Bradford.—Extension of Tyersal Infants' School. Plans may be seen and quantities obtained at the Architect's Department. Fair wages clause. Sealed and endorsed tenders should be delivered to T. Garbutt, secy., Education Office, Mancr Row, not later than 9 a.m. on April 28.

April 23. Hengoed.—Erection of a new English Baptist Chapel. Plans and specification can be seen at the Architect's Office, Station Road, Bargoed. Tenders to be sent to Arthur Morgan, Esq., Brooklands, Maesycwmmr, on or before April 28, 1906.

April 23. Pwllheli.—New Council school at Tydwellog, near Pwllheli. Additions and alterations to Lliardardau Council school, near Pwllheli. New master's house at Rhiw, near Pwllheli. Plans, &c., to be seen at the office of R. Lloyd Jones, county architect, 7, New Street, Pwllheli. Sealed tenders (separate), endorsed "Tender for School," to be sent to E. R. Davies, secy., of education, Carnarvon, not later than 10 a.m. on April 28.

April 23. Machynlleth.—Erection of a manse for the C.M. Church (Maengwyn), Machynlleth. Plans and specifications may be inspected on written application to R. W. Davies, architect, Carno, Mont., to whom sealed and endorsed tenders are to be delivered on or before April 28.

April 23. Bingley.—Erection of a mill at Bingley. Contractors can obtain quantities and inspect the plans and specifications up to April 28 at the offices of Samuel Jackson & Son, architects and engineers, 11, Tanfield Chambers, Bradford.

April 30. Aberaman.—Building twenty-nine houses at Aberaman, for the Brynheulog Building Club. Plans and specification can be seen at the office of T. Roderick, architect, Ashbrook House, Aberdare. Endorsed tenders to be sent in to F. Preece, secy., Aberaman Gardens, Aberdare, not later than April 30.

April 30. Ross.—Extending the platform at the Town Hall, for the U.D.C. The specification can be seen at the Council Offices. Tenders, endorsed "Town Hall Platform," to be delivered at the Council Offices not later than 12 noon on April 30.

April 30. Leeds.—Greenhouses and hot-water heating for the Union Workhouse, Beckett Street. Horticultural builders desirous of tendering for the erection of four ranges of greenhouses and the hot-water heating to same,

also builders prepared to tender for the bricklayers and concrete's work to same, will please send in their names to the architects, Thomas Winn & Sons, 84, Albion Street, Leeds, not later than April 30, when bills of quantities and particulars will be duly forwarded.

April 30. Tywardreath.—Renovation and alteration of the Wesleyan Church, Tywardreath, Par Station. Plans and specifications may be seen at the residence of Caleb Thomas, Tywardreath, Par Station, to whom tenders, sealed and endorsed "Church Tenders," must be sent on or before April 30. All further particulars may be obtained at the office of the architect, F. C. Jury, No. 1, Alma Villas, Tregonissey Road, St. Austell.

April 30. Grimsby.—Construction of attics, &c., at the Corporation Electricity Works, off Doughty Road. Copies of the plan, general conditions, specification, bills of quantities and form of tender may be obtained at the Borough Surveyor's Office, between 9 and 5, upon a deposit of £1. Tenders, sealed and endorsed "Attics, Electricity Works," must be delivered at the office of the Town Clerk, West St. Mary's Gate, not later than 5 p.m. on April 30.

April 30. New Tredegar.—Erection of new business premises in Commercial Street, for Mrs. Morgan, "The Dorothy." Tenders, sealed and endorsed, to be delivered not later than April 30. Plans and specifications may be seen with D. W. Price, Cloth Hall, New Tredegar.

May 1. Ponteland.—Additional blocks at the Cottage Homes. Contractors desirous of tendering should send their names to J. Atkinson, clerk to guardians, Union Offices, Newcastle-upon-Tyne, not later than noon on May 1. Quantities will be ready shortly, and all applications for same must be accompanied by deposit of £1. The plans can be seen at the offices of Oliver, Leeson & Wood, architects, Milburn House, Newcastle-upon-Tyne.

May 1. Llandilo.—Constructing a cattle market and auction mart, adjoining the Llandilo Bridge Station, Llandilo, for the Llandilo and District Cattle Market and Auction Mart Co., Ltd. Plans and specification may be seen at the office of Arthur S. Williams, architect, and quantities obtained, on deposit of £1 rs. Tenders, endorsed "Cattle Market," to be sent to Arthur S. Williams, architect and surveyor, Llandilo, not later than May 1.

May 1. North Walsham.—Erection of a classroom, art-room and offices at Paston Grammar School. Builders desirous of tendering are requested to send in their names on or before April 29 to the architects, Olley & Hayward, Queen Street, Great Yarmouth, together with a postal order for £1 for a copy of the bill of quantities, which will be forwarded in due course. Endorsed tenders to be delivered at the office of Fairfax Davies, clerk to the Governors, North Walsham, by noon on May 1.

May 1. Leek.—Extensions to the rectory-house at the Gasworks, Newcastle Road, Leek. Plans, sections, stipulations and specification may be seen, and bill of quantities and form of tender obtained, at the office of the Surveyor, upon payment of the sum of £1 rs. Fair wages clause. Sealed tenders (upon the form supplied only) and priced quantities and schedule to be forwarded under separate covers, endorsed "Rectory-house Extension," and addressed to the Chairman of the Gas Committee, to be delivered to W. E. Beacham, C.E., surveyor to the Council, Town Hall, Leek, before noon on May 1.

May 1. London, N.E.—Enlarging and improving the Kingsland Secondary School, Colvestone Crescent, Dalston, N.E., for the London County Council. Persons desiring to submit tenders may inspect the drawings and specification and obtain the bills of quantities, form of tender and other particulars at the Education Offices (Architect's Department), Victoria Embankment, W.C., upon payment to the cashier of the sum of £3. Tenders must be upon the official forms, and the printed instructions contained therein must be strictly complied with. Fair wages clause. Each tender must be enclosed in an envelope (which will be provided) and delivered at the Education Offices (Room 148), Victoria Embankment, W.C., not later than 11 a.m. on May 1.

May 1. Southend-on-Sea.—Erection of a new school (825 places). Bills of quantities may be obtained and the plans inspected at the offices of the architects, Greenhalgh & Brockbank, Bank Chambers, Southend-on-Sea, on payment of a deposit of £2 2s. Tenders to be sent in to R. Langton, clerk, Education Committee, Southend, by May 1.

May 1. Maesycwmmr.—Erection of a shop in North Avenue, Maesycwmmr, for W. H. White, Cardiff. Plans and specification may be seen at the offices of W. Harris, architect, Gilfach, Bargoed, to whom tenders are to be sent by May 1.

May 1. Leyton.—Erection of car-sheds on the site in Lea Bridge Road, for the U.D.C. Plans may be seen and specification, bill of quantities, form of tender and other particulars obtained of William Dawson, M.I.C.E., Town Hall, Leyton, between 10 and 4 (Saturday 10 to 12), upon payment of £2 2s. Sealed tenders (in special endorsed envelopes supplied with the forms) must be delivered at the meeting of the Council, to be held at the Town Hall, Leyton, at 8 p.m. on May 1.

May 1. Lisgoole.—School. Tenders will be received by the Rev. C. Halahan, Rossory Rectory, Enniskillen, on or before May 1, for the erection of the

proposed Jones Memorial School, at Lisgoole, according to drawings and specification to be seen every weekday at the office of T. Elliott, architect, Darling Street, Enniskillen.

May 1. Aberystwyth.—New science and technical buildings at the Aberystwyth County School, the plans and specifications of which can be inspected at the office of T. E. Morgan, architect, Aberystwyth. Sealed tenders to be sent in so as to reach John Evans, clerk, 6, Portland Street, Aberystwyth, on or before May 1.

May 1. Bervie.—Mason, carpenter, slater, plaster, plumber and painter works of a proposed police-station at Bervie, for the County Council of Kincardineshire. The plans may be seen with the Police Constable at Bervie; or with the architect, George Gregory, Stonehaven. Schedules of quantities can be had from the architect. Offers to be lodged with A. W. Kinnear, county clerk, Stonehaven, on or before May 1.

May 1. Kendal.—Altering and improving the branch shop in Wildman Street, for the Co-operative Society. Plans and specifications can be seen and bills of quantities obtained by applying to John Sta'ker, M.S.A., architect, Kendal, to whom tenders are to be sent, under cover, by noon on May 1.

May 2. London, N.E.—Building an economizer and fan-room, and altering and extending boiler flues at the Workhouse, Sidney Road, Homerton, N.E. Specification, conditions of contract, form of tender, and order to view the site can be obtained at the office of F. K. Coles, clerk's office, Hackney Union, Homerton, N.E., where also the plans (as prepared by L. J. Todd, consulting engineer, of 25, Bock Road, Stoke Newington, N.), may be inspected. Sealed tenders, endorsed "Economizer and fan-room at Workhouse," must be delivered at the clerk's office not later than 2 p.m. on May 2.

May 2. Huddersfield.—Alterations at Whitehouse Farm, Dalton. Plans, specifications, and general conditions may be seen, and bills of quantities and forms of tender obtained, on application at the offices of the Borough Engineer and Surveyor. Sealed tenders, endorsed "Tender for Alterations to Whitehouse Farm," signed in the handwriting of the tenderer or his agent, and addressed "Town Clerk, Town Hall, Huddersfield," must reach him not later than 10 a.m. on May 2.

May 2. London, N.—Erection of a public library at the corner of High Road and Station Road, Wood Green, for the U.D.C. Builders desirous of tendering should forward their names and addresses to C. J. Gunyon, A.M.I.C.E., the architect, at the Town Hall, Wood Green, not later than 5 p.m. on April 18, accompanied by a deposit of £2 2s. Form of tender and bills of quantities will then be forwarded. Tenders, upon the form supplied only, to be delivered to W. P. Harding, clerk of the Council, Town Hall, Wood Green, N., not later than 5 p.m. on May 2.

May 2. Totnes.—Erection of a board-room and offices, for the Guardians. Plans and specifications can be seen and bills of quantities obtained on payment of £2 2s., at the office of the architect, W. F. Tolitt, 10, High Street, Totnes. Tenders to be sent to F. K. Windcart, clerk, 19, High Street, Totnes, by May 2.

May 3. Glasgow.—Works to be executed in the construction of a potato shed and warehouse on the site of the old City Poor-house to the east of Buchanan Street Goods Station, and of a portion of a bridge to carry Dobbie's Loan for the Caledonian Railway Co. Drawings may be seen at the office of the Company's Engineer, Buchanan Street Station, Glasgow, where copies of the specification and schedule may be obtained on payment of £2 2s. Sealed tenders, endorsed "Tender for Buchanan Street Station Potato Shed, Warehouse and Relative Works," to be lodged with J. Blackburn, secy., Caledonian Railway Co.'s Offices, 302, Buchanan Street, Glasgow, by May 3.

May 3. Sunderland.—Erection of caretaker's house in connection with Harrison Buildings, in Silver Street. Drawings and conditions of contract may be seen, and specification, schedule of quantities and form of tender obtained at the Borough Surveyor's Office, Town Hall. Sealed tenders, addressed "To the Chairman of the Health Committee," and endorsed "Tender for Caretaker's House, Harrison Buildings," must be delivered at the Town Clerk's Office, Town Hall, before noon on May 3.

May 3. Hastings.—Repairs to two cottage homes, 100, Ashburnham Road and 59, Vicarage Road. A copy of the specification of the work may be obtained on application at the Union Offices, 11, Wellington Square, Hastings. Tenders to be sent in to Arthur R. Inskip, clerk, 11, Wellington Square, Hastings, not later than noon on May 3.

May 4. Norwich.—Enlargement of Shelton and Hardwick School, for the Norfolk Education Committee. Builders desirous of tendering should send in their names to A. F. Scott, architect, Castle Meadow, Norwich, at whose offices plans and specification can be inspected and bills of quantities obtained. A deposit of £1 rs. will be required. Tenders must be delivered by noon on May 4, addressed to "The Secretary, Norfolk Education Committee, 57, London Street, Norwich," and endorsed "Tender for Shelton and Hardwick School."

May 4. West Somerton.—Enlargement of the School. Builders desirous of tendering should send in their names to the Secretary, Norfolk Education Committee, 57, London Street, Norwich, at which office plans

and specification can be inspected and bills of quantities obtained. Tenders must be delivered by 12 noon on May 4, addressed to "The Secretary," at the above address, and endorsed "Tender for West Somerton School."

May 5. Burwardsley.—*Alterations and additions to the school buildings.* Plans and specifications can be seen at the office of H. Beswick, county architect, Newgate Street, Chester, and quantities obtained, on deposit of £1. Tenders, endorsed "Tender for Works at Burwardsley," to be sent to H. Grant Bailey, clerk, Crypt Chambers, Chester, on or before May 5.

May 5. Chelmsford.—*Erection of a pair of villas in Park Avenue.* Plans, specification and form of contract can be seen at the office of F. Whitmore, architect, 73, Duke Street, Chelmsford, to whom tenders, endorsed "Tenders for Villas, Park Avenue," must be delivered by May 5.

May 5. Rotherham.—*New Wesleyan church.* Thorpe Hesley, Rotherham. Quantities can be obtained at the office of A. E. Lambert, architect, 22, Park Row, Nottingham, after Monday, April 23. Tenders to be delivered to the undersigned not later than 11 a.m. on Saturday, May 5. Plans can be seen at the Wesleyan Day Schools, Thorpe Hesley, any day except Saturday, between the hours of 9 a.m. and 4 p.m. The Trustees do not bind themselves to accept the lowest or any tender. A. E. Lambert, architect, 22, Park Row, Nottingham.

May 5. Beverley.—*For the following work for the Corporation:* (a) the construction of a concrete retaining wall on piled foundations at their wharf on the River Hull, at Grovehill, Beverley; (b) The supply and erection of wrought-iron fencing at Queensgate Cemetery, Beverley; (c) the carrying out of private street works in Prince's Gardens, Beverley. Drawings, conditions and specifications can be seen and copies of the bills of quantities with forms of tender obtained on application to J. Gould Smith, A.M.I.C.E., Guildhall, Beverley. Sealed tenders, accompanied by priced quantities, endorsed respectively (a) "Concrete Wall, Grovehill," (b) "Cemetery Fencing," and (c) "Prince's Gardens," to be sent to J. Willis Mills, town clerk, Beverley, not later than noon on May 5.

May 5. Rainham.—*Erection of a new Council school to accommodate 250 children at Rainham, Kent.* The drawings and specifications may be inspected at the office of the architect, G. E. Bond, High Street, Rochester. Any person desiring to tender must send in his name to the Architect, accompanied by a deposit of £1, not later than noon on April 20. Tenders, on the form supplied, to be delivered to Ernest C. Harris, 76, High Street, Sittingbourne, not later than noon on May 5.

May 7. Alderley Edge.—*Erection of a new lodge, boundary walls, fencing and other work on the new cemetery on the Chelford Road, for the U.D.C.* The plans may be seen and bills of quantities obtained from the surveyor to the Council, Harold Sheldon, Council Offices, Alderley Edge, by payment of a deposit of £1 is. Tenders, sealed and endorsed "Tender, New Cemetery, Alderley Edge," must be delivered at the Council Offices, Alderley Edge, before noon on May 7, addressed to Walter Cobbett, clerk to the Council.

May 7. Leeds.—*Workhouse extensions.* Contractors desirous of tendering for the bricklayers and masons, carpenter and joiners, plumbers, plasterers, slaters, painters, concreters, ironfounders, tilers, hot water heating and electric lighting required in the erection of three new blocks and a master's house at the Workhouse, Beckett Street, must send in their names to the architects, Thomas Winn & Sons, 84, Albion Street, Leeds, on or before May 7th, when bills of quantities will be forwarded. Each application must be accompanied by a deposit of £2 2s.

May 7. Sawbridgeworth.—*Erection of a cart-shed at the depot in Church Street, for the U.D.C.* Plan and specifications can be seen at the Council offices between the hours of 10 and 4. Tenders, endorsed "Tender for Cart-shed," to be sent to William Morris, clerk to the Council, Council Offices, 15, Bell Street, Sawbridgeworth, by 4 p.m. on May 7.

May 8. London, E.—*Construction of a new wharf wall on the Channelsea River, at the Sewage Pumping Station, Abbey Road, West Ham.* Plans and specification may be seen and form of tender, bills of quantities and further particulars obtained at the office of John G. Morley, borough engineer, Town Hall, West Ham, E., upon payment of £1. Fair wages clause. Tenders, endorsed "Tender for New Wharf Wall, &c.," to be sent to Fred. E. Hilleary, town clerk, Town Hall, West Ham, E., not later than 4 p.m. on May 8.

May 8. London, W.—*Erection of a lodge, &c., at the Recreation Ground, for the Southall-Norwood U.D.C.* Plans and specifications may be seen and forms of tender obtained from R. Brown, borough engineer, Public Offices, Southall. Sealed tenders, in the envelopes supplied, and endorsed "Tender for Lodge, &c.," must be delivered to the clerk of the Council not later than 4 p.m. on May 8.

May 8. Coventry.—*Erection of a dwelling-house on the site of the Seven Stars Farm, Whitley, near Coventry.* Drawings, general conditions and specifications may be inspected, and bills of quantities obtained, on payment of £1 is. to the City Treasurer, on application at the office of the City Engineer, St. Mary's Hall, Coventry. Fair wages clause. Sealed tenders, endorsed "Tender for Dwelling-house, Whitley," to be delivered to the office of the Town Clerk, 10, Hay Lane, not later than May 8.

May 8. London, S.W.—*Strengthening and repairing floor of the dining hall, and performing works in connection therewith, at the Workhouse Buildings, Arthur Street, Chelsea, S.W.* Persons desirous of tendering may, upon application at the Guardians' Offices, any weekday up to May 8 next, between 10 to 4 (Saturdays until 1 p.m.), inspect the drawing and obtain a copy of the specification and form of tender prepared by the guardians' architects, Lansdell & Harrison, 66, Basinghall Street, E.C. Tenders must be signed, enclosed in a sealed envelope, and endorsed "Tender for Repairs to Dining Hall Floor, Chelsea Workhouse," and addressed and delivered to

Joshua Dowling, clerk of the Guardians, Guardians' Offices, 250, King's Road, Chelsea, S.W., not later than noon on May 8.

May 11. Bishop's Stortford.—*Excavators and bricklayers' work, and the erection of an additional engine-house and shed at the Sewage Pumping Station, for the U.D.C.* Plans and specifications can be seen and form of tender obtained at the office of R. S. Scott, A.M.I.C.E., surveyor, 7, North Street, Bishop's Stortford. Tenders, endorsed "Tender for Building," to be sent to Thomas Swatheridge, clerk, Council Offices, 7, North Street, Bishop's Stortford, by 4 p.m. on May 11.

May 12. Manchester.—*Alterations and additions to the Lancasterian Municipal School, Marshall Street, Oldham Road, Manchester.* Plans may be seen and a copy of the bills of quantities (including specification) may be obtained, on or after April 28, at the Education Offices, Deansgate, Manchester, on a deposit of £2 2s. Tenders, on the official forms and enclosed in the envelopes provided, must be delivered to the Education Offices, Deansgate, Manchester, not later than May 12.

May 12. Headington.—*Erection of a new provided school at Headington, in accordance with drawings and specification prepared by the architect, G. H. Blatherwick, City Chambers, South Parade, Nottingham.* Plans and specification may be seen at either the offices of the architect or Sidney Stallard, county surveyor, 8, New Road, Oxford, and bills of quantities and form of tender obtained from the latter on payment of £1 is. Tenders must be delivered before noon on May 12, addressed to the Secretary of the Education Committee, County Hall, Oxford, endorsed "Tender for Headington School."

May 14. London, S.W.—*Erection of baths at the Broadways, Tooting, for the Wandsworth Borough Council.* The drawings, specification and draft contract may be seen and form of tender and copy of the bills of quantities obtained at the Council House, East Hill, Wandsworth, S.W., between 10 and 4 (Saturdays 10 to 12), on payment of the sum of £2 2s. for each of the bills of quantities. Fair wages clause. Tenders, endorsed "Tooting Baths, Building," or "Tooting Baths, Engineering," as the case may be, accompanied by the priced bill of quantities in a separate envelope (which will be opened only in the case of the accepted tender), are to be delivered at the Council House not later than 3 p.m. on May 14. No tender will be accepted unless it is made upon one of the forms issued for the purpose.

May 16. Wigan.—*Erection and completion of proposed workhouse infirmary and other buildings and works, in the township of Billinge, near Wigan.* Drawings may be inspected and limited copies of bills of quantities and conditions of contract obtained, according to priority of application, from the architects, Heaton, Ralph & Heaton, Wigan, on payment of a deposit of £5. Tenders, endorsed "Tender for Workhouse Infirmary," to be delivered to Henry Ackley, clerk, 9, Victoria Buildings, King Street, Wigan, not later than May 16.

May 16. Litherland.—*New public elementary school at Beach Road, Litherland, near Liverpool.* The plans may be seen and bills of quantities obtained at the office of the county architect, Henry Littler, 16, Ribblesdale Place, Preston, by payment of a deposit of £2. Tenders must be delivered before noon on May 16, sealed and endorsed, to Josiah Dean, 22, Lord Street, Liverpool.

No date. Bradford.—*Various works (except painter's) in connection with the erection of shops and offices of an aggregate floor area of about 600 sq. yds. in Morley Street, Bradford.* Intending contractors are requested to apply (by post only) to Edgar H. Parkinson, architect, Queensgate Chambers, Bradford. Plans not on view until after despatch of quantities.

No date. Doncaster.—*Erection of works and offices, for the Rhodes Electrical Manufacturing Co., Ltd.* Quantities may be obtained from Percy Fox, architect, 14, Manchester Road, Bradford.

No date. Hutton Marr.—*Rebuilding voluntary school.* Contractors desirous of tendering for the whole or any of the various trades required are invited to send their names at once to H. Higginson, architect, 3, Lonsdale Street, Carlisle, when quantities will be supplied.

No date. Llandecwyn.—*New school at Llandecwyn, near Talsarnau.* The plans, specification and further particulars may be obtained on application to the architects, Deakin & Howard Jones, M.S.A., Plas Ynys, Borth, R.S.O.

No date. Whissonsett.—*House.* Builders desiring to tender for the erection of house on farm at Whissonsett, Norfolk, for John English, are requested to send in their names at once to Walker & Walker, architects and surveyors, Hill Street, Wisbech, and Terrington St. Clement.

No date. Invergowie.—*Church.* Contractors desirous of offering for the various works of the new parish church to be erected at Invergowie, near Dundee, to communicate with the architect, John Robertson, 39, Union Street, Inverness.

No date. Eckington.—*Alterations and additions to the old police station.* Persons desirous of tendering can see plans and specifications and obtain bills of quantities at the offices of W. Cecil Jackson, M.S.A., architect and surveyor, 29, Knifesmith Gate, Chesterfield.

No date. Denaby Main.—*Erection of 100 workmen's cottages and four lodging houses at Denaby Main.* For particulars apply to the Denaby and Cadeby Main Collieries, Ltd., Denaby Main, near Rotherham.

No date. Harrogate.—*Additions and alterations to St. Robert's Presbytery.* Contractors willing to tender should send their names and references to W. H. H. Marten, architect, Grove Chambers, Ilkley, when quantities will be sent to those selected when ready.

ENGINEERING.

April 27. Cwmbrwrla.—*Heating apparatus for Cwmbrwrla Independent Chapel.* All particulars may be obtained of the architect, W. David, 15, St. Helen's Crescent, Swansea. Sealed tenders must reach the secretary, W. E. Francis, 54, Middle Road, Cwmbrwrla, Swansea, not later than April 27.

April 27. Sofia.—*Bridge-work.* For the construction of a bridge over the Wladajafuss, at an estimated cost of 50,000 frs. (£2,000), for the Town Council, Sofia, by whom tenders will be received up to April 27.

April 28. East Runtun.—*Erection of the sea wall, &c., for the outfall protection works.* Plans can be seen at the office of A. F. Scott, West Street, Cromer. Tenders to be delivered not later than 6 p.m. on April 28, to T. Ling, clerk to the Erpingham R.D.C., Northrepps, and endorsed "Tenders for Sea Wall, East Runtun."

April 30. Cupar.—*Taking down and rebuilding a portion of existing arch of the Ladybura at the foot of Bishopgate, Burnside, Cupar.* Drawings may be seen and copy of the specification, schedule of quantities and form of tender obtained from Bruce, Proudfoot & Macrae, civil engineers, 67, Crossgate, Cupar. The tender to be delivered in a sealed cover, marked "Tender for Ladyburn Covering," and sent to J. L. Anderson, town clerk, Town Clerk's Office, Cupar, by 10 a.m. on April 30.

April 30. Darlington.—*Supply, delivery and erection of a counter current jet condensing plant complete with piping and cooling tower.* Plans, specification and form of tender may be obtained from the Borough Electrical Engineer, Electricity Works, Houghton Road, Darlington, on payment of a deposit of £1 is. Sealed tenders, endorsed "Condensing Plant," to be delivered at the office of H. G. Stevenson, town clerk, Houndgate, Darlington, on or before April 30.

May 1. Basingstoke.—*Construction of a circular concrete high-level service reservoir, holding about 22,000 gallons, and also for the erection of a wind engine and pump.* Plans may be seen and specification and quantities obtained at the office of F. Reginald Phipps, A.M.I.C.E., borough surveyor and waterworks engineer, Town Hall, Basingstoke, on payment of £1 is. for each contract. Tenders, on the prescribed form only, endorsed "Reservoir" or "Wind Engine," as the case may be, must be delivered by noon on May 1.

May 1. Gosport.—*Mainlaying, for the Gosport Waterworks Co.:*—Carting, handling, excavating for, laying and jointing about eight miles of 15in. and 16in. cast-iron pipes, castings, valves and other fittings and works. The drawings can be inspected and copies of the specification, conditions, quantities and tender forms obtained at the Company's Offices upon the payment of £5. Contractors must be prepared to enumerate works of a similar nature and magnitude previously carried out by them. Sealed tenders, endorsed "Mainlaying," and addressed to the Chairman of the Company, must be delivered at the office of E. T. Hildred, A.M.I.C.E., engineer and manager, Gosport Waterworks Co., 1, High Street, Gosport, not later than noon on May 1.

May 1. London, N.—*Hot-water heating apparatus for Pavilion No. 1 at the Northern (Convalescent) Fever Hospital, Winchmore Hill, N., for the Metropolitan Asylums Board, in accordance with drawings and specification prepared by W. T. Hatch, M.I.C.E., M.I.M.E., engineer-in-chief.* Drawings, specification, conditions of contract and form of tender may be inspected at the Office of the Board, Embankment, London, E.C., and obtained upon payment of a deposit of £1. Tenders, addressed as noted on the form, must be delivered at the Office of the Board not later than 10 a.m. on May 1.

May 2. Ipplepen.—*Supplying, delivering and laying about 4,000 yds. of 4in. and 3in. cast-iron water-mains, together with the requisite meters, sluice valves, air valves, washouts, hydrants and other fittings, the construction of a covered service reservoir, boundary walls, meter house and store, and other works, in the parish of Ipplepen, for the Newton Abbot R.D.C.* Drawings may be seen and copies of specifications, bills of quantities, and forms of tender obtained at the office of the engineer, F. W. Vanstone, Palace Chambers, Paignton, on payment of £5. Sealed tender, upon the form provided, endorsed "Ipplepen Waterworks," are to be delivered to Frederick Horner, clerk to the Council, Council Offices, Newton Abbot, not later than 10 a.m. on May 2.

May 2. London, E.C.—*Extension of Parkeston Quay and construction of a shed and sidings in connection therewith, for the Great Eastern Railway Co.* Persons desirous of tendering can, on application to the Engineer, obtain copies of the specifications and quantities, and the drawings can be inspected at his office at Liverpool Street on and after April 17 between 10 and 4. Sealed tenders, endorsed "Tender for Extension of Parkeston Quay," Contract No. 1, should be addressed to W. H. Pepper, corner, and must be delivered at the Secretary's Office, Liverpool Street Station, not later than 10 a.m. on May 2. Tenders to be sent through the "General Post Office." Any sent otherwise will not be considered. The sum of £10 ros. will be charged to each applicant for the specification and quantities, schedules and form of tender.

May 4. Stranraer.—*Construction of a concrete dam, the diversion of a farm road, the construction of a new filter and the rearrangement of existing filters and other works connected with the water supply of the Burgh.* Drawings may be seen and specifications, schedule, and form of tender may be obtained at the office of Gilbert Thomson, C.E., 164, Bath Street, Glasgow, on payment of deposit at £2 2s. Arrangements will be made to point out the site of the proposed works to intending offerors on the afternoon of April 27. Sealed offers, marked "Tender for Waterworks," to be lodged with W. Black, town clerk, Town Clerk's Office, Stranraer, not later than noon on May 4.

May 5. Guernsey.—*Quay wall, with low-level landing, on the southern side of St. Julian's Emplacement, Harbour of St. Peter-Port, Guernsey.* Drawings of the proposed works may be inspected, and the general conditions, specifications and forms of tender and other particulars obtained, upon application at the States Offices, Guernsey, on payment of £5. Tenders, enclosed in sealed envelopes, endorsed "Tender for Quay, St. Julian's," and addressed to John N. Brouard, supervisor of the harbour, &c., must be delivered so as to reach the States Office, Guernsey, on or before 3 p.m. on May 5.

May 7. Sydney (New South Wales).—*Plant.* For supply and erection of boilers, automatic stokers, pipe-work, &c.; turbo-alternator, sub-station machinery, switch-boards, &c., for the Municipal Council. Forms may be

obtained on application to T. Rooke, at the offices of Preece & Cardew, 8, Queen's Gate, Westminster, on deposit of £5 ss. Tenders to be sent in by May 7.

May 7. Sydney, N.S.W.—*Electric-lighting plant*—(a) Boilers, automatic stokers, pipe-work, &c., (b) turbo-alternator, sub-station machinery, switchboards, &c., for the Municipal Council. Specifications, plans and form of tender may be obtained on application to T. Rooke at the offices of Preece & Cardew, 8, Queen Anne's Gate, Westminster. A deposit of £5 ss. will be required on application, and a cash deposit or marked cheque for the sum of £1,000 will be required when the tender is sent in. Sealed tenders, endorsed "Tender for Electric Lighting Plant," are to be addressed to the Town Clerk, Town Hall, Sydney, and must be delivered by 4 p.m. on May 7.

May 8. Deptford.—*Construction of a footbridge* for the Borough Council, according to the drawings and specification which may be seen at the Borough Surveyor's Office at the Town Hall after April 23, during the ordinary office hours. It will be a condition of the contract that the steelwork must not be sublet. Fair wages clause. Bills of quantities prepared by W. T. Farthing & Son, together with the conditions of contract, may be obtained from the Town Clerk, Town Hall, Deptford, upon payment of a deposit of £1 ss. Persons desirous of tendering must send their names to the Town Clerk on or before April 17, to whom sealed tenders, in accordance with the Council's regulations printed on the form of tender, must be sent not later than 4 p.m. on May 8.

May 9. Brussels.—*For the construction of a metal bridge* at Beerlingen at an estimated cost of 44,907 francs (£1,676), for the "Société Nationale des Chemins de Fer Vicinaux." A deposit of 5,000 francs (about £200) is required to ratify any tender. Tenders should be addressed to the General Manager of the Company, at 24, Rue de la Science, Brussels, where specifications (price 1 franc) may be obtained.

May 11. Flamborough.—*For the construction of waterworks* at Flamborough, Yorkshire, including supplying and laying 2½ miles of 3-in. cast-iron pipes with all appurtenances, the construction of brick reservoir (capacity 50,000 gallons), and the erection of an engine-room. Plans can be seen at the offices of the engineers, Elliott & Brown, Burton Buildings, Parliament Street, Nottingham, from whom copies of the specification and bills of quantities and form of tender can be obtained on deposit of £2 ss. Sealed and endorsed tenders to be delivered to George Hankinson, clerk to the Bridlington R.D.C., Long Lane, Bridlington, on or before May 11.

May 12. Brussels.—*Railway plant.* For the construction of the section from S. Cécile to the French frontier, of the railway from Bértrix to the frontier via Mun. Estimated cost, 3,500,000 francs (£140,000); deposit, 100,000 francs (£7,500). Specifications ("cahier des charges," special No. 27) may be obtained at the Bourse, Brussels (price 4 francs 70 cents), where tenders will be received up to May 12.

May 16. Brussels.—*Railway plant.* For the construction of the Jodoigne to Esmael section of the local railway from Jodoigne to Tirlemont and St. Trond, and of buildings and roads in connection therewith. The estimated cost is 407,000 fr. (£16,040), and a deposit of 40,000 fr. (£1,600) is required. A copy of the specification may be obtained on payment of 1 fr. from M. Dartevel, rue de Turquie, No. 18, Saint Gilles, Brussels. Tenders, in sealed envelopes, should be addressed to the General Manager, Société Nationale des Chemins de Fer Vicinaux, 14, rue de la Science, Brussels.

May 23. Bristol.—*Electrically-driven hydraulic pressure pumps.* Erecting in the existing engine-house, Underfall Yard, testing and maintenance for twelve months after completion, of three sets of electrically-driven hydraulic pressure pumps. Each set is to be capable of delivering 150 gallons of water per minute against an accumulator pressure of 750 lbs. per sq. in. The contract includes the pumping machinery, and also the electro motors and accessories, and gearing for driving the pumps. On and after Thursday, April 12, copies of the specification, form of tender, form of contract and copies of contract drawings can be obtained from W. W. Squire, Engineer's Office, Cumberland Road, Bristol, on production of a receipt from the secretary of the Docks Committee showing that £5 has been paid as deposit. Tenders must be enclosed in a sealed envelope, endorsed "Tender for Electrically-driven Hydraulic Pressure Pumps," and addressed to the Secretary of the Docks Committee, 19, Queen Square, Bristol, and must be delivered to him, accompanied by the prescribed documents, before 10 a.m. on May 23.

June 1. Luxemburg.—*Supplying electricity* to the town of Luxemburg for lighting and tramway traction. Full particulars may be obtained from the "Collège des bourgmestres et échevins, Luxemburg."

June 2. London, N.—*Supply and erection of a refuse destructor* complete in all respects, for the Southgate U.D.C. Copies of the specification and full particulars may be obtained from C. G. Lawson, C.E., surveyor to the Council, on depositing a Bank of England note for £5 with him. Sealed tenders, endorsed "Tenders for Refuse Destructor," must reach W. M. Ellenor, clerk to the Council, Council Offices, Palmer's Green, London, N., not later than June 2.

IRON AND STEEL.

April 26. Milford Haven.—*Supply of the following cast-iron S. and F. water mains (coated):*—1,302 yds. 6ft. by gft., weight not more than 2 cwt. 1 qr. 20 lbs.; 255 yds. 4ft. by gft., weight not more than 1 cwt. 1 qr. 28 lb.; and 213 yds. 3ft. by gft., weight not more than 3 qrs. 21 lbs., and tested to stand 90ft. water-pressure. Price per ton delivered at Old Milford Station, G.W.R., not later than May 17, 1906. Sealed tenders, endorsed "Pipes," addressed to the Chairman, Gas and Water Works Committee, to be in not later than April 26.

April 26. Ramsgate.—*Supplying and fixing of cast and wrought-iron fences* on the Government Acre, West Cliff. Plan and specification can be seen and full particulars obtained on application at the Borough Engineer's office between 10 a.m. and 4 p.m. Tenders, endorsed

"Fence," and addressed to the Chairman of the Works Committee, are to be delivered at the Borough Engineer's office before 4 p.m. on April 26.

April 30. Skipton.—*Supply and delivery free of about 10 tons of 6-in. diameter and 35 tons of 3-in. diameter cast iron water mains.* Specification and form of tender may be obtained on application to John Mallison, waterworks engineer, Town Hall, Skipton, and 1 sealed tender, endorsed "Water Mains," are to be delivered to him not later than April 30.

May 1. Leyton.—*Supply and delivery of about 200 tons of steel roof-trusses, lattice girders, built-up columns, rolled steel joists and short cast iron columns for the new car shed, for the U.D.C.* Plans may be seen and specifications, bill of quantities, form of tender and other particulars obtained from William Dawson, M.I.C.E., Town Hall, Leyton, between 10 and 4 (Saturdays 10 to 12), upon the payment of £2 ss. Sealed tenders (in special endorsed envelopes supplied with the forms) must be delivered at the meeting of the Council to be held at the Town Hall, Leyton, at 8 p.m. on May 1.

May 2. London, E.C.—*Supply of 3,000 steel axles for carriages and wagons, for the Burma Railways Co., Ltd.* Specifications and forms of tender can be obtained at the Company's offices, 199, Gresham House, Old Broad Street, E.C. For each specification a fee of 20s. will be charged, which will not be returned. Tenders enclosed in sealed envelopes and marked "Tender for Steel Axles," must be delivered not later than noon on May 2.

May 4. Christiania.—*Supply of cast-iron socket pipes* as follows:—400 metres length of 100 millimetres diameter; 700 metres length of 150 millimetres diameter; 200 metres length of 203 millimetres diameter, and 200 metres length of 300 millimetres diameter. Tenders will be received at the Gasworks, Christiania, up to noon on May 4.

PAINTING AND PLUMBING.

April 30. Penrith.—*Outside painting* at the Fair Hill Hospital and other work. Full particulars may be obtained on application to G. Wainwright, clerk, Town Hall, Penrith, to whom sealed tenders endorsed "Hospital Painting," must be delivered not later than April 30.

May 1. Aldershot.—*Painting work* at the Isolation Hospital, for the U.D.C. Specification may be seen and all particulars obtained, upon application at the offices of the District Surveyor. Tenders, endorsed "Painting at Hospital," to be sent to W. E. Foster, clerk, on or before May 1.

May 2. Littlehampton.—*Painting, distempering and paperhanging works* at the U.D.C.'s buildings at Warmingcamp. Specification of works can be seen and form of tender obtained on application to the Council's surveyor, H. Howard, F.S.I., Town Offices. Tenders, under cover, and marked "Painting," to be delivered at the office of Arthur Shelley, clerk to the Council, Town Offices, Littlehampton, not later than noon on May 2.

May 2. London, E.C.—*External painting works* at Tooting Bec Asylum, Tooting, S.W.; internal and external cleaning and painting works at High Wood School, Brentwood, Essex, for the Metropolitan Asylums Board, each in accordance with specifications prepared by W. T. Hatch, M.I.C.E., M.I.M.E., engineer-in-chief. Specifications, conditions of contract, forms of tender, and in the case of Tooting Bec Asylum bill of quantities, may be inspected at the office of the Board, Embankment, London, E.C., and obtained upon payment of a deposit of £1 each. Tenders, addressed as noted on the forms, must be delivered at the office of the Board not later than 10 a.m. on May 2.

May 5. Easthamstead.—*Painting the outside of the workhouse buildings.* Specifications may be obtained of C. Yorke, surveyor, Bracknell, and tenders must be sent to C. B. Wilson, clerk, Bracknell, before May 5. Only persons residing within the district of the Easthamstead Union need apply.

May 8. Isle of Wight.—*Painting the ironwork and woodwork of the county bridges.* The specification may be seen on application to S. R. Cooks, county surveyor, Ryde. Tenders, endorsed "Bridges Painting," must be received by John Dufton, clerk to the Council, County Council Offices, 20, Holyrood Street, Newport, I.W., by May 8.

May 10. London, E.—*Distempering and painting works* at the Children's Homes, Stifford, near Grays, Essex, for the Guardians of Stepney Union. Specification and form of tender, &c., can be obtained on application to T. G. Stacey, clerk, Guardians' Offices, Barnes Street, Commercial Road, E., to whom tenders must be delivered by 4 p.m. on May 10.

No date. Seaforth.—*Painting and decorating the Congregational Church.* Apply, in first instance by letter, to W. T. Banbrook, 12, Cecil Road, Seaforth.

No date. Wigan.—*Painting, cleaning, &c., the Miners' Hall premises* in Milgate, inside and out. Particulars of same will be furnished on application to Joseph Parkinson.

ROADS AND CARTAGE.

April 26. Kingsbridge.—*Supply of the following materials* for the R.D.C.:—100 cub. yds. unbroken limestones, delivered at Kingsbridge Quay; 60 cub. yds. broken limestones, and 60 cub. yds. limestone quartering, delivered at Embankment Bridge or Frogmore; 50 cub. yds. flints, delivered at Kingsbridge Station; 900 cub. yds. broken Trevallard or Forder stones; and 100 cub. yds. Trevallard or Forder chippings, for use on the main roads during the year ending Ladyday, 1907. Tenders for the limestones and flints must state the price delivered as above, and for the Trevallard or Forder stones and chippings to state the price delivered at (a) Frogmore, (b) Embankment Bridge, (c) Salcombe, and (d) Kingsbridge. The prices quoted must in each case include the quay

dues where such are payable. Any further particulars may be obtained on application to William Beer, clerk, Kingsbridge, to whom sealed tenders are to be sent on or before April 26.

April 26. Edinburgh.—*Laying Granolithic on the footways*, in certain streets in Edinburgh and Portobello. Schedules of quantities may be obtained on application to the City Road Surveyor, City Chambers. Tenders sealed within the official envelopes supplied, must be lodged with Thomas Hunter, W.S., town clerk, City Chambers' Edinburgh, by 10 a.m. on April 26.

April 23. Glasgow.—*Paving various streets* in the city with asphalt and tar macadam paving. Specifications and forms of offer may be had on application at the Office of Public Works, City Chambers, 63, Cochrane Street. Sealed offers, marked outside "Offer for — Paving," must be lodged with A. W. Myles, town clerk, City Chambers, Glasgow, not later than April 23.

April 23. Sheffield.—*Supply and laying of tar macadam and foundation therefor* in the carriageways of certain streets within the city. Drawings, specification and general conditions may be seen and form of tender, together with quantities, obtained at the office of Charles F. Wilke, C.E., city surveyor, Town Hall, Sheffield. Tenders, endorsed "Tender for Tar Macadam Paving," to be sent in not later than 10 a.m. on April 23, addressed to "The Chairman and Members of the Highway and Sewerage Committee, City Surveyor's Office, Town Hall, Sheffield." Fair wages clause.

April 30. London, E.—*Cartage of soda* from Clyde Wharf, Victoria Docks, E., to the various institutions of the Metropolitan Asylums Board. Forms of tender (upon which alone tenders will be received), giving all particulars, can be obtained at the office of the Board, Embankment, London, E.C., where tenders, duly filled up, must be delivered not later than 10 a.m. on April 30.

May 1. Aldershot.—*Supply of about 70 tons of 3-in. Derbyshire or Kentish rag limestone tar paving.* Tenders, endorsed "Tar Paving," to be sent to F. C. Ören, district surveyor, Municipal Buildings, Aldershot, on or before May 1.

May 1. London, S.E.—*Kerbing, channelling and metalling the roadway* and paving the footpaths with artificial stone (in separate contracts) of Sunnydene Street, Sydenham, and Grierson Road, Honor Oak, for the Lewisham Borough Council. The plans and specifications may be seen and forms of tender obtained at the Town Hall, Catford (Surveyor's Department). Copies of the specification may also be had on payment of the sum of 5s. in each case, which will not be returned. The tenders must be on forms issued by the Council, enclosed in an envelope, sealed and endorsed "Tender for —," and must be delivered by 4 p.m. on May 1 at the Town Hall, and placed in the box there provided for the purpose. Fair wages clause.

May 1. London, W.—*Supply and delivery of 500 tons of best hard Guernsey granite spalls*, 250 tons to be delivered forthwith, for the Brentford Guardians. Forms of tender may be obtained upon application, and tenders, upon such forms must reach William Stephens, clerk to the Guardians, Union Offices, Isleworth, W., not later than 4 p.m. on May 1.

May 1. St. Albans.—*Repair of district roads*, for the R.D.C. Full particulars and forms of tender may be obtained on application to the Council's surveyor, H. F. Mence, Town Hall Chambers, St. Albans. Tenders must be delivered to R. W. Brabant, clerk to the Council, Union Offices, St. Albans, by May 1.

May 1. Uckfield.—*Road material*, for the U.D.C., as follows:—300 yds. of clean hand-picked surface flints, unbroken; 650 yds. of 2-in. and 50 yds. of 3-in. of quartzite, Guernsey granite, or Mendip (at the discretion of the Council); 50 tons of Portfield gravel. Delivered in quantities as ordered, carriage paid to Uckfield Railway Station by Oct. 1, 1906. Payment will be made by instalments. Forms of tender to be obtained on application at the office of the Council. Tenders, with samples, to be sent to C. Dawson, clerk, at the office of the Council on or before May 1, marked "Tenders for Road Material."

May 1. Poole.—*Quarrying, sifting, breaking and yarding gravel*, to pass a 2-in. ring gauge (rings will be supplied by the Surveyor), and for team work connected therewith, in the parishes comprised in the district of the R.D.C. Forms of tenders and other particulars can be had at once on application. Sealed tenders to be sent to R. T. S. Seymour, district surveyor, Wimborne Minster, by May 1.

May 1. Docking.—*Materials and team labour* for the parishes comprised in the R.D.C. Forms of tender and further information can be obtained from W. W. Hopking, Great Bircham, or E. B. Burdon, Burnham Overy. Tenders must be returned by post, marked outside "Tender for Materials," or "Team Labour," as the case may be, and must reach J. A. Stoughton, clerk, Workhouse, Docking, King's Lynn, no later than 10 a.m. on May 1. Contractors must fill in a form for each parish if wishing to contract for more than one parish.

May 1. Bromley.—*Supply on hire of a 12-ton compound steam road-roller*, with a Morrison or other approved scarifier attached, in accordance with the conditions, a copy of which can be obtained at the office of the Borough Engineer. Tenders, endorsed "Tender for Road Rolling," to be delivered, addressed to Frederick H. Norman, town clerk, Bromley, Kent, not later than 3 p.m. on May 1.

May 2. Hove.—*Supplying about 3,000 cub. yds. of Coombe rock flints*, to be delivered during the coming twelve months. They may be tendered for in parcels of not less than 200 cub. yds. each. Further particulars may be obtained at the office of the borough surveyor, H. H. Scott. Tenders on forms supplied, endorsed "Tender for Coombe Rock Flints," will be received by H. Endacott, town clerk, Town Hall, Hove, up to 6 p.m. on May 2.

May 3. Southend-on-Sea.—*Supply and laying of tar macadam* on the western esplanade from the Palmara Parade to Grosvenor Road. Plans and specification may be seen and bills of quantities obtained (on deposit of

cheque for £1 1s.) upon application to E. J. Elford, M.I.M.E., borough engineer. Sealed tenders, endorsed "Tar Macadam," to be accompanied by (a) a sample of the block furnace slag proposed to be used and (b) a sample of the manufactured tar macadam, to be delivered at the Town Clerk's Office, Southend-on-Sea, by noon on May 3.

May 5. Lexden.—*Stones, flints, &c.*, and for the hire of one or two steam road-rollers, for R.D.C. Conditions and forms of tender from John Ennals, Surveyor's Office, Copford, near Colchester. Tenders to be sent to Charles H. Tompson, clerk, Victoria Chambers, Colchester, not later than May 5 at 4 p.m.

May 5. Windsor.—*Cartage of road materials* from the Great Western Railway Station, Windsor, the railway stations at Datchet and Sunningdale, also from Ascot Siding and Ascot Station to the several roads in the district, for the R.D.C. It is approximately estimated that the quantity of materials to be carted from the several stations will be as follows:—Sunningdale, Ascot Siding and Ascot, 1,100 tons; Windsor (G.W.R.), 800 tons; Datchet, 350 tons. Forms of tender may be obtained upon application to the surveyor to the Council, William Menzies, Englefield Green, Surrey, and sealed tenders, marked "Tender for Cartage," are to be delivered to J. E. Gale, clerk, 3, Sheet Street, Windsor, not later than noon on May 5.

May 6. Beccles.—*Scarifying and rolling in the borough.* Tenders to reach T. O. Cuddihy, C.E., borough surveyor, Beccles, by noon on May 6, endorsed "Stetm Rolling."

May 8. London, E.—*Making up the following streets:*—Drew Road (part of), Leonard Street (part of) Wythes Street (part of), and Lord Street. Plans may be seen, and specification, form of tender and further particulars obtained at the office of John G. Morley, borough engineer, Town Hall, West Ham, E., upon payment of £1. Fair wages clause. Tenders, endorsed "Tender for Private Street Works," to be sent to F. E. Hilleary, town clerk, Town Hall, West Ham, E., not later than 4 p.m. on May 8.

May 8. Beccles.—*Road material, supply and delivery to Corporation Wharf at Beccles of 45 tons of 1½ in. gauge granite:*—(a) Montsorrel; (b) Gurnsey; (c) or Basalt, by Aug. 1. Tenders and samples to be sent endorsed "Tender for Road Metal," to the office of T. O. Cuddihy, C.E., borough surveyor, Beccles, by May 8.

SANITARY.

April 30. Ross.—*Excavations for a sewer, about 920 yds. in length, from Alton Lane to the Monument, Cantilupe Road, according to the plans and specifications which may be seen at the Council Offices.* Tenders to be in a lump sum and, as an alternative, at a schedule of prices. Tenders, endorsed "Smallbrook Sewer," to be delivered at the Council Offices not later than noon on April 30.

April 30. Edmonton.—*Supply and delivery of stoneware pipes as follows:*—50 18 in., 300 15 in., 300 12 in., 1,000 9 in., 1,000 6 in., 1,500 4 in., or more or less by the full truck load. Forms of tender may be obtained on application to G. E. Eachus, engineer to the Council, Town Hall, Edmonton. Fair wages clause. Persons tendering are requested to quote net prices without trade discounts. Sealed tenders (which must be upon the form supplied by the Council's Engineer), marked "Tender for Stoneware Pipes," to be delivered at the office of William Francis Payne, clerk of the Council, Town Hall, Edmonton, not later than noon on April 30.

May 2. Wanstead.—*For the following works, for the U.D.C.:*—(1) Red Bridge Lane: 1,383 ft. run of 12 in. pipe sewer, with manholes, &c. (2) Blake Hall Road: 2,469 ft. run of 12 in. pipe sewer, with manholes, &c. (3) Aldersbrook Road: Construction of gulleys, and providing and setting 1,749 ft. run 12 in. by 6 in. Norwegian granite edge kerb. Copies of specification and form of tender can be obtained and drawings and contract form inspected at the Council Offices, Wanstead, N.E., Surveyor's Department, between 10 a.m. and 4 p.m. Sealed tenders, on the forms and in the envelopes provided, are to be delivered at the Council Offices not later than May 2.

May 3. Leiston-cum-Sizewell.—*Securing of part of Snape Road.* About 423 yds. of 9 in. pipes with manholes, gulleys, &c., in accordance with the drawings and specifications, which may be seen at the office of James Baldry, Snape Road, Leiston, surveyor. Tenders, sealed and marked "Sewering," to be sent to John Fry, clerk of the council, Saxmundham, by May 3.

May 9. Swinton.—*Construction of a bacteria bed at the Swinton Sewage Works.* Plans and specifications may be seen and form of tender obtained on application to Henry Entwistle, surveyor of the council, Council Offices, Swinton. Sealed tenders to be returned in the envelope provided to W. T. Postlethwaite, clerk to the council, Council Offices, Swinton, Manchester, not later than May 9.

May 14. Crawley and Ifield.—*Construction of about 7,784 yds. of earthenware pipe sewers, ranging from 7 ins. to 15 ins., with the necessary tanks, pumping station engines and pumps, percolating filters, and the laying-out of a sewage irrigation area and other works, in the parishes of Crawley and Ifield, Sussex, in accordance with the specification and plans prepared by Sidney R. Lowcock, M.I.C.E.* The drawings may be inspected and copies of the specification and schedules of quantities with form of tender obtained, on application at the office of the Engineer, 50, Queen Anne's Gate, Westminster, S.W., between 10 and 4.30, on payment of a cheque for £5. Sealed tenders, endorsed "Tenders for Crawley and Ifield Sewerage," are to be delivered, with the schedule of quantities, with every item legibly priced in ink, and with the columns added up to the exact total amount of the tender to A. C. Coole, clerk to the Council, Horsham R.D.C. Offices, 9, Carfax, Horsham, Sussex, before noon on May 14.

TIMBER.

April 30. London, W.—*Providing and laying cross-sawn deal blocks on the existing foundations in Holland Park Avenue (18,850 sq. yds.), Thurlow Place (5,850 sq. yds.), and Church Street (4,350 sq. yds.), for the Kensington Borough Council.* Specification can be seen and

further particulars obtained at the office of A. R. Finch, A.M.I.C.E., borough engineer and surveyor, Town Hall, Kensington High Street. Fair wages clause. Tenders, sealed and endorsed "Tender for Wood Paving," to be delivered at the office of W. Chambers Leete, town clerk, Town Hall, Kensington, not later than noon on April 30.

April 30. Great Yarmouth.—440,000 jarrah or karri paving blocks in accordance with specification to be obtained at the Borough Surveyor's Office. Tenders to be on the form and in the envelope supplied, and delivered at the office of the Town Clerk, Town Hall Great Yarmouth, not later than noon on April 30.

April 30. Dundalk.—*Supply of the following timber from May 2, 1905, to May 2, 1907, to be delivered, carriage paid, at such time, in such quantities and in such places as may be required, subject to the approval of the Engineer for the Dundalk Harbour Commissioners:*—Round and square timber, deals, planks and battens, iron castings and chains, lines and ropes, &c. Particulars can be obtained at Harbour Office. Tenders to be lodged with the Secretary by April 30, addressed to the Chairman of the Board.

MISCELLANEOUS.

April 26. Dundee.—*Supply of the following stores for the Town Council:*—Battens, &c., bricks, cartage, cement, fireclay pipes, &c., flagstones, iron, steel, &c., iron castings, ironmongery goods, lime, oil, waste, &c., pitch and pitch oil, sand, Whinstone kerb and channel, Whinstone rubble and road metal, and wood for fencing, &c. Schedules of quantities and forms of tender may be obtained from J. Thomson, burgh engineer. Sealed tenders must be lodged with W. H. Blyth Martin, town clerk, Dundee, not later than April 26.

April 26. Glasgow.—*Supply of the following materials required by the Cleansing Department, for one year from June 1 next:*—Iron, ironmongery, iron bolts and nuts, iron castings, shovels, brass foundings and furnishings, tinware, galvanized iron goods, re-tireing wagon wheels, glass, lime and cement, bricks, fireclay goods, wood (British), wood (foreign), ash handles, &c., brushes, paints, &c., oils, carbons, sheet steel barrows, steel castings, mild steel perforated screens, cartage, &c. Specifications and forms of tender may be had on application to D. M'Coll, Superintendent of Cleansing, 38, Cochrane Street, Glasgow. Sealed tenders, marked outside "Tender for — (Cleansing Department)," must be lodged with A. W. Myles, town clerk, City Chambers, Glasgow, not later than April 26.

April 27. South Shields.—*Supply of machinery and tools required at the Electric Tramways Car-sheds.* Particulars can be obtained on application to John Wilson, general manager, Tramway Depot, Dean Road, South Shields. Tenders to be delivered to the Town Clerk's Office in the Court Buildings, South Shields, not later than noon on April 27, endorsed "Tender for Machinery and Tools."

April 23. Teddington.—*Supply of the following materials, for the U.D.C.:*—1,000 yds. of broken granite and 2,000 yds. of flints, to be delivered as required, either by barge alongside the Teddington public landing wharf on the River Thames, or by rail at the London and South-Western Railway Station, Teddington. Also for the execution of all smith's work and team labour, the supply of tools and implements, pipes, gulleys, &c. Specifications and forms of tender, together with particulars, may be obtained on application to Marshall Hainsworth, surveyor, Council Offices, Teddington. Sealed tenders, endorsed "Tenders for Granite, Flints, Smith's Work, Team Labour, Tools and implements, Pipes, Gulleys, &c.," as the case may be, to be delivered to G. H. Salmons, clerk, Council Offices, Teddington, not later than April 23.

April 23. Manchester.—*Supply of ferrule taps, to specification, ½ in., ¾ in. and 1 in. diameter, required up to the 31st March 1907, for the Waterworks Committee.* Particulars may be obtained on application to the Secretary, Waterworks Offices, Town Hall, Manchester. Tenders must be delivered not later than April 23.

April 30. Govan.—*Supply of the following stores, for the Electricity Department:*—Cables; cable accessories; meters; house fuse boxes; wrought-iron tubes and fittings; cast-iron pipes; bricks and cement; ironmongery, brushes, &c.; paints, soap, varnishes, &c.; timber; carbons for arc lamps; joint boxes; motors; motor starters. Schedules and forms of tender can be obtained from T. C. Parsons, burgh electrical engineer, Helen Street, Govan. Sealed offers, marked "Tender —," to be sent in to J. A. Houston, town clerk, Town Hall, Govan, on or before April 30.

May 1. London, S.W.—*Miscellaneous tools and stores, for the Southern Mahratta Railway Co., Ltd., as per specification and drawings, which may be seen at the offices of the Company.* The charge for the specification is £1 1s. each, which will not be returned. Tenders must be marked "Tender for Miscellaneous Tools and Stores," and sent in to Edward Z. Thornton, secy., 46, Queen Anne's Gate, London, not later than noon on May 1.

May 2. Arbroath.—*Supply of the following materials, for the Town Council:*—Pavement, kerb, channel and setts; fireclay pipes, bricks, lime and cement; cast-iron pipes and other castings; brass main service cocks. Schedules may now be had from the Borough Surveyor, and tenders are to be lodged with W. K. Macdonald, town clerk, Arbroath, before 10 a.m. on May 2.

May 9. Bradford.—*Supply of the following stores, for the Corporation:*—Pitch and oil required for street paving purposes; cast-iron gulleys, ventilators and storm grates; glazed earthenware pipes, blocks and junctions; timber for sewerage and other works. Forms of tender and all necessary information may be obtained on application at the office of J. H. Cox, city surveyor, at the Town Hall. Fair wages clause. Sealed tenders, endorsed "Tender for Materials—Street Works," to be sent to Frederick Stevens, town clerk, Town Hall, Bradford, on or before May 9.

THE LABOUR MARKET.

Board of Trade Returns for March.

THE Board of Trade returns show that employment in the building trades in March continued to show a general seasonal improvement, especially marked in the case of painters. Compared with a year ago, however, employment showed little change.

Returns received from sixty-two London employers showed that in the last week of March they paid wages to 11,623 workpeople of all classes, compared with 11,152 in February and 14,129 in March, 1905. Employment generally in London was rather better than a month ago, but a good deal worse than a year ago.

Returns were received from employers' associations in seventy-three districts outside London. In two-thirds of these employment was reported as dull generally; at Stratford-on-Avon and Maidstone it was very good, at Birkenhead good, at Ashton and Huddersfield fairly good, and at the remaining towns moderate or fair. Compared with a month ago, no change was reported in fifty-two towns, while in fourteen, including Stockport, Portsmouth, Bournemouth and Dublin, it was better; and in seven, including Hull, Chatham and Swansea, it was worse. Compared with a year ago employment was reported about the same in forty-four towns, worse in nineteen and better in ten.

The following information is based on returns from trade unions and from local correspondents:—

Bricklayers.

With bricklayers employment generally was bad, but better than a month ago. The improvement extended to every district, except Ireland, and was specially marked in Lancashire.

Stonemasons.

Employment with stonemasons was bad generally, but showed some improvement as compared with a month ago. It was worse than a year ago.

Carpenters and Joiners.

With carpenters and joiners employment was better than a month ago in all districts, the greatest improvement being shown in the Northern counties and Scotland. Compared with a year ago, there was on the whole little change. The percentage of trade-union members unemployed at the end of March was 7.4, compared with 9.5 in February and 7.9 in March, 1905.

Slaters and Tilers.

With slaters and tilers employment was bad. In England and Ireland it was worse than a month and a year ago; in Scotland it was better.

Plumbers.

With plumbers employment was worse than a month ago in London and Wales; in other districts it was better, most improvement being shown in Lancashire and Scotland. Compared with a year ago there was considerable decline in the East Midlands, Wales and Ireland, and some falling-off in London; most improvement was shown in the Northern counties. The percentage of trade-union members unemployed was 11.1 at the end of March, compared with 12.1 in February and 11.8 in March, 1905.

Plasterers.

With plasterers employment was better than a month ago. Generally it was dull, but in Scotland it was fair; it was moderate at Stockton, Bolton, Barrow, Coventry and Exeter, and fair at Oldham.

Painters.

Employment generally with painters was fairly good, and very much better than a month ago.

Labourers.

With labourers there was a slight improvement, but employment generally was bad.

Current Rates of Wages in
Large Centres.

Towns.	Masons.	Bricklayers.	Carpenters and Joiners.	Plasterers.	Slaters.	Plumbers.	Painters.	Labourers.
Aberdeen -	8	8	8	8	8	8	8	4 1/2-5 1/2
Acronington -	9	9	8 1/2	9	7 1/2	8 1/2	—	5-5 1/2
Lyne -	9 1/2	10	9	10	8 1/2	9	8 1/2	5 1/2-6 1/2
Barnsley -	9	9	8 1/2	9	8 1/2	8	8	6 1/2
Barrow-in-Furness -	9	9	8 1/2	9	9	8 1/2	8 1/2	6-6 1/2
Bath -	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	5-5 1/2
Belfast -	8 1/2	8 1/2	8 1/2	8 1/2	8	8	8	19s. wk
Birkenhead -	9 1/2	9 1/2	9 1/2	9 1/2	9	9 1/2	8 1/2	5-6 1/2
Birmingham -	10	9 1/2	9 1/2	10	9	9 1/2	8 1/2	6 1/2-7
Blackburn -	9 1/2	10	9	9	9	9	8	5 1/2-6 1/2
Blackpool -	9 1/2	9 1/2	8 1/2	9 1/2	8 1/2	9	8 1/2	5 1/2-6
Bolton -	9 1/2	10	9 1/2	10 1/2	9	9	8 1/2	6-7
Bournemouth -	8 1/2	8 1/2	8 1/2	8 1/2	8	8	7 1/2	5 1/2
Bradford -	9	9	8 1/2	8 1/2	9	9	8	6-6 1/2
Brighton -	9	8 1/2	8 1/2	8 1/2	8	8	7	5 1/2
Bristol -	9	9	9	9	9	9	8 1/2	6-6 1/2
Burnley -	—	—	—	—	—	—	—	—
Burton-on-Trent -	8 1/2	8 1/2	8 1/2	—	—	—	—	5 1/2-6
Bury -	9 1/2	10	9 1/2	9	9	9	8 1/2	5-6 1/2
Cambridge -	8 1/2	8 1/2	8 1/2	8 1/2	8 1/2	8 1/2	6 1/2	5-5 1/2
Cardiff -	9	9	9	9	9	9	8 1/2	5 1/2
Carlisle -	8 1/2	8 1/2	8 1/2	8 1/2	8	8	8	5-5 1/2
Chatham -	9	9	8 1/2	9	10	8 1/2	7	5 1/2
Cheltenham -	8-8 1/2	8 1/2	8 1/2	7 1/2	—	8 1/2	7 1/2	5
Chester -	9	9	8 1/2	9	9	8 1/2	7 1/2	5-5 1/2
Coatbridge and Airdrie -	9 1/2	9 1/2	9	9 1/2	9	8 1/2	9	6
Cork -	7 1/2	7 1/2	7 1/2	7 1/2	7 1/2	8	8	3 1/2
Colchester -	8	8	8	8	8	8	7 1/2	5 1/2
Coventry -	9 1/2	8 1/2	8 1/2	8 1/2	8 1/2	9	8	5 1/2
Crews -	8 1/2	8 1/2	7	8	8	8	7	6
Darlington -	9	9	8 1/2	9	9 1/2	8	7 1/2	6
Darwen -	9 1/2	9 1/2	9	9	9	8 1/2	8 1/2	6
Derby -	9	9	8 1/2	9	9	8 1/2	7 1/2	5 1/2-6
Dublin -	8-8 1/2	8 1/2	8-8 1/2	8	8	8	7 1/2	4 1/2-4 3/4
Dudley -	8 1/2	8	8	8 1/2	8 1/2	9	7	5 1/2
Dundee -	8-8 1/2	10	9	8 1/2	8 1/2	8 1/2	8 1/2	5 1/2-5 3/4
Eastbourne -	8 1/2	8	8	9	pce.	8	7 1/2	5 1/2
Edinburgh -	8 1/2	9	9	—	—	—	—	—
Exeter -	8	8	7 1/2	7 1/2	7 1/2	7 1/2	6	5
Glasgow -	—	9 1/2	9 1/2	9 1/2	9	9	9	5 1/2-6
Gloucester -	7 1/2	8	8	7 1/2	7 1/2	8	7 1/2	5
Greenock -	9 1/2	10	9	9 1/2	9	9	9	5 1/2
Grimsby -	—	9	8	9	pce.	—	7 1/2	6-7
Halifax -	9	9	8 1/2	8 1/2	8 1/2	8 1/2	7 1/2	6
Hartlepool -	9 1/2	10	9 1/2	9 1/2	—	—	—	7-7 1/2
Hastings and St. Leonards -	8	8	8	8	—	8	7	5 1/2-6
Huddersfield -	9	9	11	9	7 1/2-8	7 1/2	8	6
Hull -	9 1/2	9	9	9	9	9	8	6 1/2-7
Ipswich -	8	8	8	9	9	8	7 1/2	5-5 1/2
Keighley -	8 1/2	8 1/2	8 1/2	7 1/2	8 1/2	7 1/2	7 1/2	6
Lancaster -	9 1/2	10	8 1/2	9	9	8	8 1/2	5 1/2-6
Leeds -	9 1/2	9 1/2	9 1/2	9 1/2	9	9	8	6 1/2-7
Leicester -	9	9	9	10	9	9	8	6-6 1/2
Leigh -	9 1/2	9 1/2	9 1/2	9	8 1/2	9	8	6-6 1/2
Lincoln -	8 1/2	8	8	9	8	8	7 1/2	5-6
Liverpool -	9 1/2	9 1/2	9 1/2	9 1/2	9 1/2	9 1/2	8 1/2	5-6
London -	10 1/2	10 1/2	10 1/2	11	11	—	—	—
Londonderry -	7	7	7	7	7	7 1/2	7 1/2	15s. wk.
Macclesfield -	8	8	8	7 1/2	6 1/2	7 1/2	7 1/2	5
Manchester -	9 1/2	10	9 1/2	10	9	9 1/2	8 1/2	5 1/2-7
Merthyr Tydfil -	8 1/2	8 1/2	8	8 1/2	8	8	7 1/2	5 1/2
Middlesbrough -	9	9 1/2	9 1/2	9 1/2	10	9	8	6 1/2-6 3/4
Newcastle -	9 1/2	9 1/2	9 1/2	9	10	9	9	6
Newport (Mon.) -	8 1/2	8 1/2	7 1/2	8 1/2	8 1/2	7 1/2	7 1/2	5 1/2
Northampton -	8 1/2	8 1/2	8 1/2	—	—	—	—	7 1/2-8
North Shields -	10	10	10	10 1/2	9 1/2	9	6 1/2	7
Norwich -	8	8	8	8	7 1/2	8	6 1/2	5
Nottingham -	9 1/2	9	9	10	9	9	8 1/2	6 1/2-7
Oldham -	9 1/2	10	9 1/2	9	8 1/2	9	8 1/2	5 1/2-7
Oxford -	8 1/2	8	8	8	8	8	7	5 1/2
Paisley -	9	9 1/2	9	9	9	9 1/2	9	6
Perth -	8	10	8	8	8	8	7 1/2	5 1/2-6
Plymouth -	8	8	8	8	8	8	7	5
Portsmouth -	8 1/2	8 1/2	8 1/2	pce.	7 1/2	8 1/2	6 1/2-7	5
Preston -	9 1/2	10	9 1/2	9 1/2	8 1/2	8 1/2	8 1/2	5 1/2-6
Rochdale -	9 1/2	10	9	9	8 1/2	9	8 1/2	5 1/2-6 1/2
Rotherham -	9 1/2	9 1/2	8 1/2	8 1/2	8	8 1/2	7 1/2	5 1/2
Scarborough -	8 1/2	8 1/2	8	8 1/2	30s. wk.	8	7 1/2	6
St. Helens -	9	9	9	9	9	8 1/2	8 1/2	5 1/2-6
Sheffield -	9 1/2	9 1/2	9	9	9	9	8 1/2	5 1/2-6 1/2
Southampton -	8	8	8	pce.	8	8	7 1/2	5
Southport -	9	9	8 1/2	9	9	9	8 1/2	5
South Shields -	9 1/2	—	9 1/2	—	10	8 1/2	9	6
Stockport -	9 1/2	9 1/2	9	10	8 1/2	8 1/2	8	4 1/2-7
Stockton-on-Tees -	9	9 1/2	9 1/2	9 1/2	10	9	8	6 1/2-6 3/4
Sunderland -	9 1/2	10	9 1/2	10	10	8 1/2	9	6 1/2-7
Swansea -	8 1/2	—	8 1/2	—	—	8 1/2	7 1/2	5 1/2
Swindon -	—	—	—	—	—	—	—	—
Torquay -	7	7	7 1/2	7	7	7	7	4 1/2-5
Wakefield -	9	8 1/2	8 1/2	8 1/2	8 1/2	7 1/2	7 1/2	6
Walsall -	9	8 1/2	8 1/2	8 1/2	8 1/2	8 1/2	7	5 1/2-6 1/2
Warrington -	8 1/2	9 1/2	9 1/2	9 1/2	9 1/2	9 1/2	8 1/2	5 1/2-6 1/2
West Bromwich -	9 1/2	9	8 1/2	9	pce.	8 1/2	7	6-6 1/2
Wigan -	9 1/2	10	9	9	8 1/2	9	8 1/2	5 1/2-7
Wolverhampton -	9	9	9	8 1/2	8 1/2	8 1/2	7 1/2	6-6 1/2
Worcester -	8 1/2	8 1/2	8 1/2	8 1/2	8 1/2	8 1/2	7	5 1/2
Yarmouth -	7	7 1/2	7 1/2	A	7 1/2	5 1/2-7	6	4-4 1/2

A. Done by bricklayers.

Current Market Prices

				£ s. d.		£ s. d.	
FORAGE.							
Beans	...	...	per qr.	1	17	0	
Clover, best	...	...	per load	3	17	6	4 5 0
Hay, good	...	...	do.	3	10	0	3 12 6
Sainfoin mixture	...	...	do.	3	5	0	3 15 0
Straw	...	...	do.	1	8	0	1 14 0
MISCELLANEOUS.							
Bricks Stocks, d/d to job	per 1,000			1	14	0	—
Do. Flettons on rail	do.			1	4	0	—
Do. Pressed Wire Cuts, d/d to job	do.			1	16	0	—
Do. Blue brindled wire cuts	do.			1	1	0	—
Do. do. wire cuts	do.			1	5	0	—
Do. do. pressed facings	do.			1	17	6	—
Coke Breeze, into carts at gasworks	per load			0	2	0	—
Do. d/d to job	do.			0	4	0	—
Sand	per yard			0	7	6	—
Ballast	do.			0	6	6	—
Granite Chippings	do.			0	10	6	—
Do. do. 1 1/2 in.	do.			0	11	6	—
Cement	per ton			1	11	6	—
Lime	do.			1	4	0	—
Granite Broken, 1 1/2 in.	do.			0	15	6	—
Do. do. 2 in.	do.			0	15	0	—
Do. do. 2 1/2 in.	do.			0	14	6	—
Do. Kerb, Norwegian, 6 x 12 and 12 x 6 in river	per foot			0	1	2	—
Do. do. do. circular 12 x 8 in river	do.			0	1	5	—
Do. do. do. circular 6 x 12 in river	do.			0	1	5	—
Do. do. Guernsey, 6 x 12 in river	do.			0	1	4	—
Do. do. do. circular 12 x 6 do.	do.			0	1	6	—
Do. do. do. do. do.	do.			0	1	8	—
Do. do. do. 18 x 8 do.	do.			0	1	8	—
Do. do. do. do. do.	do.			0	1	10	—
Do. Pitchings, Norwegian, 3 x 6	per ton.			1	8	0	—
Do. do. do. 3 x 7	do.			1	10	0	—
Do. do. do. 3 x 5	do.			1	9	0	—
Do. do. do. 4 x 5	do.			1	8	0	—
Do. do. do. 4 x 4	do.			1	13	0	—
Do. do. do. 4 x 6	do.			1	5	0	—
Do. do. do. 5 x 6	do.			1	4	0	—
Do. Pitchings, Norwegian, 5 x 7	per ton			1	4	0	—
Do. do. do. Special, 4 x 6	do.			1	11	0	—
Do. do. do. do. 5 x 7	do.			1	18	0	—
Do. do. Guernsey, 3 x 6	do.			1	10	0	—
Do. do. do. 3 x 7 & 3 x 9	do.			1	8	6	—
Do. do. do. 3 x 5	do.			1	10	0	—
Do. do. do. 4 x 5	do.			1	10	0	—
Do. do. do. 4 x 4	do.			1	13	0	—
Do. do. do. 4 x 6	do.			1	9	0	—
Do. do. do. 4 x 7	do.			1	6	6	—
Do. do. do. 5 x 7	do.			1	5	0	—
Do. do. Specials add.	do.			0	6	0	—
Glass, English Sheet, in crates of stock sizes, 15 oz., 2nds	per sq. ft.			0	0	3 1/2	—
Do. do. do. 3rds, 2nds	do.			0	0	2 1/2	—
Do. do. do. 21 oz. 2nds	do.			0	0	5	—
Do. do. do. do. 3rds, 26 oz. 2nds	do.			0	0	3 1/2	—
Do. do. do. do. 26 oz. 2nds	do.			0	0	6	—
Do. do. do. do. 32 oz. 2nds	do.			0	0	4 1/2	—
Do. do. do. do. 3rds, 2nds	do.			0	0	8	—
Do. do. do. do. 3rds, 2nds	do.			0	0	6	—
Do. English patent plain rolled plate in stock crates	do.			0	0	2	—
Do. do. do. 1 1/2 in.	do.			0	0	2 1/2	—
Do. do. do. do. 1 1/2 in.	do.			0	0	2 1/2	—
Castor Oil, French	per cwt.			1	10	0	1 2 0
Colza Oil, English	do.			1	5	6	—
Copperas	per ton			2	0	0	—
Lard Oil	per cwt.			2	15	0	2 17 0
Lead, white, ground, carbonate	per ton			16	0	0	—
Do. red	do.			15	0	0	0 19 0
Linseed Oil, barrels	per cwt.			1	2	9	—
Petroleum, American	per gal.			0	0	6 1/2	0 0 6 1/2
Do. Russian	do.			0	0	5 1/2	0 0 5 1/2
Pitch	per barrel			0	8	0	—
Shellac, orange	per cwt.			9	9	0	—
Soda, crystals	per ton			3	2	6	3 5 0
Tallow, Town	per cwt.			1	7	0	1 7 6
Tar, Stockholm	per barrel			1	5	0	—
Turpentine	per cwt.			2	6	7 1/2	—
METALS.							
Standard Copper	per ton			84	10	0	85 0 0
Do. Strong sheets	do.			94	15	0	95 0 0
Lead, Soft Foreign	do.			15	17	6	16 0 0
Do. English	do.			16	5	0	16 10 0
Do. pipes	do.			19	0	0	19 2 6
Do. sheets	do.			18	10	0	18 12 6
Galvanised Corrugated sheets	do.			12	7	6	12 10 0
Spelter G.M.	do.			25	15	0	26 0 0
Angles, Scotland	do.			6	15	0	7 0 0
Bars	do.			7	15	0	8 0 0
Marked bars, Staffs	do.			9	0	0	—
Common bars do.	do.			7	5	0	—
Angles, M'boro.	do.			6	10	0	6 12 6
Joists	do.			6	7	6	6 10 0

Builders' Current Price List of Specialities.

This list is not intended to promote undercutting, and prices are subject to discounts for a quantity and for cash. Readers are advised to write for these discounts. Where prices for goods are standardised and fluctuation takes place in trade discounts, our prices have the discounts deducted. In some cases it is difficult for firms to quote prices, and we have stated where they will be pleased to send catalogues and quotations immediately on receipt of applications.

Goods.	Description.	Merchants or Manufacturers.	Address.	Size.	Weight.	Quantity.	Price		
							On Rail.	D'vrd. at London Termini.	D'vrd. to Buyer.
Baths:									
Iron	Rolled edge, white vitreous enamelled.	Doulton & Co., Ltd.	Lambeth, London	5ft. 6in. inside.	—	each	£4 7s. 6d.	—	—
Bathroom Suites	Complete as advertised	Standard Sanitary Manufacturing Co.	22, Holborn Viaduct, London.	—	—	—	—	—	£18 18s.
Blinds:									
"Japa"	Sanitary	Japa Blinds, Ltd.	55, Barbican, London, E.C.	All sizes	72 long 36 wide.	—	—	From 2s. 6d. to 16s. doz.	Free.
Boilers:									
Saville	Wrought-iron for hot-water heating and supply.	Hartley & Sugden, Ltd.	Halifax	30 x 11 to 72 x 30.	3 cwt. to 17 cwt.	each	£9 5s. to £52.	Free in Great Britain.	—
Bricks:									
Blue	Staffordshire pressed	Hathern Station Brick and Terra Cotta Co., Ltd.	Loughborough	9 x 4½ x 2½	3½ tons	1000	£2 15s.	£3 13s.	—
Facing	Blue and brindled	G. Woolliscroft & Sons, Ltd.	Hanley, Staffs.	9 x 4½ x 3	3½ tons	1000	35s. to 37s. 6d.	£4 3s. to £3 5s. 6d.	—
Facing	Red terra-cotta	G. Woolliscroft & Sons, Ltd.	Hanley, Staffs.	9 x 4½ x 3	3½ tons	1000	£2 10s.	£3 18s.	—
Stocks	Sand stocks	Gibbs Brothers	Loughborough	9 x 4½ x 2½	2½ tons	1000	£2	£2 15s.	—
Casements and Sashes:									
Metal Casements	Iron, steel, and bronze	George Wragge, Ltd.	London and Manchester	Registered sections.	—	each	From 15s.	16s.	—
Metal Sashes	Ditto	Ditto	Ditto	Ditto	—	ft. super.	From 6d.	—	—
Castings:									
Iron	Plain and ornamental	Walter Macfarlane & Co.	Saracen Foundry, Glasgow	—	—	—	Prices on application.		
Cement, Lime, &c.:									
Cement	Portland	Associated Portland Cement Manufacturers (1900), Ltd.	Dixon House, 72, Fenchurch Street, E.C.	—	—	—	Prices on application.		
Lime	—	Associated Portland Cement Manufacturers (1900), Ltd.	Dixon House, 72, Fenchurch Street, E.C.	—	—	—	Prices on application.		
Chimney Cowls:									
"Acme" and Spherical	Exhausts and intakes	Acme Ventilating & Heating Co.	35, Tarleton Street, Liverpool.	6 to 24ins. diam. tube	—	each	—	—	17s. 6d. to £15.
Chimney-Pieces:									
Marble	—	J. & H. Patteson	7, Bayley Street, Bedford Sq., London, and Oxford St., Manchester.	—	—	—	Prices on application.		
Closets:									
Cisterns, Seats, &c.	For houses	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	set, with fittings.	£2 to £10	—	—
Latrines	For schools and workmen	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	stall each	30s. to 70s.	—	—
"Simplicitas"	—	Doulton & Co., Ltd.	Lambeth, London	—	—	—	£1 15s.	—	—
Columns	Cast-iron	Measures Bros., Ltd.	53B, Southwark Street, London, S.E.	stock patterns.	—	ton	£7	£7	—
Compoboard	Swedish	Messers, Ltd.	79½, Gracechurch Street, E.C.	4ft. x 8 to 18ft. x 8in. and ½ in.	1 ton	2,000ft. super.	Prices on application.		
Concrete:									
Armoured	Floors and roofs	Trussed Concrete Steel Co.	Caxton House, Westminster.	—	—	sq. yard	—	—	8s.*
Conduits:									
"Simplex" steel	Screwed wireduct	Simplex Steel Conduit Co., Ltd.	Garrison Lane, Birmingham.	½ to 2 diam.	20lbs. to 140lbs.	100ft.	—	—	12s. 8d. to 13 3s.
Door Furniture:									
Door Springs	With silent check	Robert Adams (patentee)	3 & 5, Emerald Street, London, W.C.	For medium doors.	—	each	D.A. 46s S.A. 42s	D.A. 46s. 3A. 42s.	—
Sliding Door Fittings	Top and bottom rollers and guide rails.	John Bousfield	Bar Iron Works, York	various	—	each	—	rollers from 6s. 6d.	—
Drain:									
Testing Apparatus	For smoke or air test: No. 358	Burn Brothers	Rotunda Works, 3, Blackfriars Rd., London, S.E.	—	About 30lbs.	each	£4 4s.	—	—
Elevators:									
"Otis"	Electric and hydraulic	Otis Elevator Co., Ltd.	4, Queen Victoria Street, London.	—	—	—	Prices on application.		
Enamels:									
"Sanaline"	Pure white or colours	Asp'nall's Enamel, Ltd.	New Cross, London	—	—	gallon	—	—	18s.
Faience:									
White and coloured	For elevations	Alfred Whitehead	Prudential Build'gs, Leeds	—	—	sq. yard	74s. 6d.	79s.	—
Fans:									
Fans, Blowers, and Motors.	Belt, electric or steam driven.	Mathews & Yates, Ltd.	Cyc'one Works, Swinton, Manchester.	all sizes	—	—	Prices on application.		
Felt:									
Ruberoid Sacking Felt	High-grade inodorous felt	Robert W. Blackwell & Co., Ltd.	59, City Road, London, E.C.	36 x 72	44lbs.	roll,	—	—	13s. 6d.
Fencing:									
Iron	"Greenhill" patent automatic railing.	Hill & Smith	Brierley Hill Iron Works, Staffs.	3½ ft. high ½ verticals.	40lbs. yd.	24sq.yds. yard	4s. 5d.	4s. 9d.	—
Fireproofing (See also Partitions):									
Terrawode Brickwood	Fireproof floors	Jabez Thompson & Sons	Northwich, Cheshire	—	—	sq. yd.	6s.	7s.	—
Columbian	Reinforced concrete floors and roofs.	Columbian Fireproofing Co.	37, King William Street, London.	4ins. thick	—	—	Prices on application.		
Steel Sheeting	For partitions, reinforced concrete, damp-course, &c.	The Fireproof Co., Ltd.	10, York Buildings, Adelphi, W.C.	all sizes	all weights.	sq. yard	from 1s. 3d.	from 1s. 3d.	plus rail charge.
Expanded Steel	Reinforcement for every description of concrete work.	New Expanded Metal Co.	York Mansion, York Street, Westminster, S.W.	up to 16ft. x 8ft.	2lbs. to 30lbs.	sq. yard	5d. to 4s. 9d.	Price list on application.	
Floors and Roofs	Steel concrete	Homan & Rodgers	17, Gracechurch Street	—	—	sq. yd.	—	—	7s.*
Floors and Roofs	Reinforced concrete	Trussed Concrete Steel Co.	Caxton House, Westminster.	—	—	sq. yd.	—	—	8s.*
Floors and Roofs	Reinforced concrete	Potter & Co., Ltd.	66, Victoria Street, London, S.W.	—	—	sq. yard	—	—	From 6s.*
Floors:									
Columbian	Concrete fireproof floors and roofs.	Columbian Fireproofing Co.	37, King William Street, London.	—	—	—	Prices on application.		
Euboecolith	Patent flooring	Euboecolith Patent Flooring	3, Victoria Street, Westminster.	—	—	yard sup.	5s. to 6s.	—	—

* Erected.

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Builders' Current Price List of Specialities—(continued).

Goods.	Description.	Merchants or Manufacturers.	Address.	Size.	Weight.	Quantity.	Price		
							On Rail.	Delv'd at London 1 to Termini.	Delv'd to Buyer
Galvanised Iron:									
Sheets	Corrugated	Baldwins, Ltd.	5, Fenchurch St., London, E.C.	5ft. to 9ft. x 2ft. x 22 or 24 G.	—	ton	—	£14 10s.	—
Sheets	Flat	Baldwins, Ltd.	5, Fenchurch St., London, E.C.	72 x 24 to 36 x 20 or 24 G.	—	ton	—	£15	—
Buildings	Of every description	Baldwins, Ltd.	5, Fenchurch St., London, E.C.	—	—	—	Prices on application.		
Gas Generators:									
Acetylene	Five-light portable	Strode & Co.	48, Osnaburgh Street, London.	15ins. diameter, 24ins. high.	—	each	—	£3	—
Glass:									
Stained and Embossed	Leaded lights, embossed and brilliant cutglass.	Young & Martin, Ltd.	Stratford, E.	—	—	—	Prices on application.		
Stained	Memorial and other windows	E. E. Oldacre & Co.	Stirling Place, Hove	—	—	ft. super.	Prices on application.		
Guards, Wire:									
Straight Lattice	Half mesh	Richard Johnson, Clapham & Morris, Ltd.	Manchester.	6ft. x 3ft.	14lbs.	sq. ft.	5d.	5½d.	5¾d.
Hooks:									
Hat and Coat	"Schola" pattern for schools, &c.	Brookes & Co., Ltd.	4, Cateaton Street, Manchester.	—	—	—	Prices on application.		
Joinery:									
Panelling	High class 1-in. Austrian oak panelling.	Elliott's Moulding & Joinery Co., Ltd.	Newbury	3ft. to 7ft. high.	ft. super.	2s.	2s. 1d.	—	—
Joists:									
Steel	Broad flange beams	H. J. Skelton & Co.	71, Finsbury Pavement, London, E.C.	—	—	ton	—	£6 10s.	—
Steel	English and foreign	Columbian Fireproofing Co.	37, King William Street, London.	—	—	—	Prices on application.		
Steel	Belgian and German	Measures Bros., Ltd.	53B, Southwark Street, London, S.E.	3 to 20 deep.	—	ton	£6 10s. basis sections.	£6 10s. basis sections.	—
Laundry Machinery:									
Ironing Machines	High-class "Decondin"	W. Summerscales & Sons, Ltd.	Keighley, Yorks	54ins. to 120ins.	—	each	£50 to £180	£52 to £188 10s.	—
Lavatories:									
Glazed Ware	For schools, workmen, and private houses.	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	set, with fittings.	£1 10s. to £4.	—	—
Leaded Lights									
All descriptions	—	E. E. Oldacre & Co.	Stirling Place, Hove	—	—	ft. super.	Prices on application.		
Lifts:									
Electric	All other types	A. Smith & Stevens	Battersea, London	All sizes.	All weights.	—	Prices on application.		
Hand-power	All kinds, for all purposes	George Johnson	227, St. John's Hill, London, S.W.	—	—	—	Prices on application.		
"The Premier"	Dinner and service lift to raise ½ cwt.	The Lift and Hoist Co.	Premier Iron Works, Prince Street, Deptford, S.E.	Cage inside 2ft. wide, 1 ft. 6 deep, 2 ft. 6 high.	—	—	—	£9 10s.	—
Lighting and Heating:									
Electric light and gasfittings, &c.	—	Young & Martin, Ltd.	Stratford, E.	—	—	—	Prices on application.		
Lightning Conductors									
Copper tape	—	Joseph Lewis	5 & 6, Great Winchester Street, London, E.C.	¾ x ½ and upwards.	—	foot run	from 1s.	—	—
Locks:									
Coin Collecting	Bright brass or bronzed	New Century Co.	235, High Holborn, London, W.C.	14ins. x 4½ins. x 1½ins.	—	each	—	—	35s.
Kaye's Patent	Four lever mortice, iron and brass.	Joseph Kaye & Sons, Ltd.	93, High Holborn, London, W.C.	—	—	each	—	—	7s. 6d. 10s. 6d.
"C. and B."	Registered mortise Nos. 1, 2, and 3.	Colledge & Bridgen	Midland Works, Wolverhampton.	6 inch	—	dozen	—	—	£3 6s. £2 5s. £1 9s.
Mantelpieces:									
White Wood	With overmantel	The Hardware Trading Co.	12, New Oxford Street, London, W.C.	Opening 38 x 38.	72ins.	each	£2	—	—
Marble, Mosaic, and Stone Work:									
Glass Mosaic	Coloured art	The Cloisonné Glass Co.	40, Berners Street, W.	—	—	sq. ft.	—	From 3s. upwards.	—
Plain or to design	—	J. & H. Patteson	7, Bayley Street, Bedford Square, London, and Oxford Street, Manchester.	—	—	—	Prices on application.		
Motor Wagons									
Steam	—	St. Pancras Ironworks Co., Ltd.	171, St. Pancras Road, London, N.W.	—	4 tons 19cwt.	each	—	From £530.	—
Paint:									
"Japonika," Enamel	Elastic, impervious, covers goods, sup. per gal.	John Line & Sons, Ltd.	Alfred Place, Tottenham Court Rd., London, W.C.	—	—	gallon	18s.	—	—
Anti-corrosive, &c.	"Bitumastic" solution and enamel.	Wailles, Dove & Co., Ltd.	Newcastle-on-Tyne, London, Liverpool, Cardiff, Birmingham, and Glasgow.	—	—	—	Prices on application.		
Partitions:									
Dovetail Corrugated Steel Sheeting.	For partitions, reinforced concrete, &c.	The Fireproof Co., Ltd.	10, York Buildings, Adelphi W.C.	All sizes	All weights.	sq. yard	From 1s. 3d.	From 1s. 3d.	1s. 3d. plus rail.
Partitions	"Kulm" slabs	H. W. Cullum & Co.	Craven House, Kingsway, London, S.W.	—	—	sq. yard	Prices on application.		
Patent Plaster	Hollow interlocking blocks	Havelock Patent Plaster Partition Co.	63, Finsbury Pavement, E.C.	29 x 17	70lbs. super. yard.	super. yard.	3s. 6d.	4s. 6d.	6s.*
Plaster	Partition slabs	Jabez Thompson & Sons	Northwich, Cheshire	12 x 12 x 2	—	sq. yard	3s. 6d.	4s.	—
Porous Brick	Porous terra-cotta blocks	Hempstead Patent Brick Co.	Hemel Hempstead	9 x 12 x 1½	—	sq. yard	2s.	2s. 4d.	—
Terrawode Brickwood School	Partition bricks	Jabez Thompson & Sons	Northwich, Cheshire	9 x 4½ x 3	2 tons	1000 sq. ft.	£3 5s.	£4 9s.	—
John Stones	—	—	"Rosside," Ulverston	—	—	—	Prices on application.		
Pavement Lights									
Prismatic	—	St. Pancras Ironworks Co., Ltd.	171, St. Pancras Road, London, N.W.	—	—	per ft. super.	—	From 4s. 6d.	—
Photo Prints, Copies, &c.:									
"True to scale"	(Dorel system)	W. F. Stanley & Co., Ltd.	13, Railway Approach, London Bridge, S.E.	Imperial	—	2 copies	2s.	—	2s. 3d. p free
True scale	Dorel and photo-litho methods.	Vincent, Brooks, Day & Son, Ltd.	48, Parker Street, Kingsway, London, W.C.	—	—	—	Prices on application.		
All Kinds	On any material	London Drawing and Tracing Office.	98, Gray's Inn Road	—	—	—	Prices on application.		

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Builders' Current Price List of Specialities—(continued).

Goods.	Description.	Merchants or Manufacturers.	Address.	Size.	Weight.	Quantity.	Price		
							On Rail.	Divrd. at London Termini.	Divrd. to Buyer.
Pipes:									
Columbian	Armoured cement for water and sewage conveyance.	Columbian Fireproofing Co.	37, King William Street, London.	—	—	—	Prices on application.		
Drain (iron)	Immense assortment of fittings stocked.	Burn Bros.	Rotunda Works, 3, Blackfriars Rd., London, S.E.	2 to 6	L.C.C. weights.	—	Prices on application.		
Pipe joint paste	"Wisconsin" Graphite	G. F. Hopkins & Co.	112, Westminster Bridge Road, London, S.E.	—	—	1 lb. to 60 lbs.	1s. 1d. to 6d.	—	—
Plaster:									
Fibrous, &c.	For relief decoration	G. and A. Brown, Ltd.	167, Hammersmith Road, W.	—	—	—	Prices on application.		
Keene's & Parian	—	Associated Portland Cement Manufacturers (1900), Ltd.	Dixon House, 72, Fenchurch Street, E.C.	—	—	—	Prices on application.		
"Pytho"	For interior plastering	Plaster, Brick, and Stone Co., Ltd.	Wall Grange, near Leek, Staffs.	—	—	1 ton	37s. 6d.	42s. 2d.	—
Rainwater Heads and Pipes:									
Rainwater Heads	Cast lead and iron	George Wragge, Ltd.	London and Manchester	stock designs.	—	each	From 16s. 6d.	17s. 6d.	—
Roofs:									
Ruberoïd Roofing	High-grade prepared roofing	Robert W. Blackwell & Co., Ltd.	59, City Road, London, E.C.	36 x 72	40lbs. to 100lbs.	216 sq. ft.	—	1 ply, 17s. 4d.; 2 ply, 16s. 6d.; 3 ply, 16s. 6d. upwds.	1 ply, 20s. 6d.; 2 ply, 34s. 6d.
Steel	—	E. F. Blakeley & Co.	Vauxhall Ironworks, Liverpool.	—	—	ft. super.	—	—	—
Sanitary:									
Engineers' Appliances	Baths, lavatories, closets, pipes, cisterns, pumps, &c.	Young & Marten, Ltd.	Stratford, E.	—	—	—	Prices on application.		
Syphons and Tanks	Automatic flushing	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	each	£1 to £3	—	—
Waste Preventors	"Paisley," painted	Doulton & Co., Ltd.	Lambeth, London	2 gallon	—	each	£1 3s. 6d.	—	—
Waste Preventors	"Well," painted	Doulton & Co., Ltd.	Lambeth, London	2 gallon	—	each	16s.	—	—
Scaffolding:									
Putlogs	Hewn birch	Vigers Bros.	67-68, King William Street, E.C.	—	—	dozen	5s. 3d. in docks.	—	—
Shutters:									
Revolving	No. 7 convex wood lath	Clark, Bunnett & Co., Ltd.	New Cross Road, London, S.E.	—	—	ft. super.	1s. 6d.	—	—
Signs	Anything and Everything	H. B. Torode	22, Henrietta Street, Strand	L.C.C. regulation size	—	—	Prices on application.		
Sinks:									
Glazed Ware	"Krator," "Helios," "Bel-fast" and "Edinburgh."	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	each	10s. to £5.	—	—
Slates and Slating:									
"Arfon" Slates	Unfading green	Pearson Bros. & Campbell	18, Water Street, Liverpool	—	—	—	Prices on application.		
Buttermere or Cumberland and Westmoreland Green Slates.	Light sea green, olive, and dark.	Buttermere Green Slate and Stone Works.	Keswick	30 to 12 long.	—	ton	£4 5s.	£5	—
Slating and Tiling	All kinds—green slating speciality.	Roberts, Adlard & Co.	London, & Faversham, Brighton, &c.	as required	—	1,000	Prices on application.		
Slates and Slating	Portmadoc, French and American.	Young & Marten, Ltd.	Stratford, E.	—	—	—	Prices on application.		
Sound-Proofing:									
Deafening Quilt	Cabots' double ply	Arthur L. Gibson & Co.	19/21, Tower Street, Upper St. Martin's Lane, London, W.C.	—	120 lbs.	bale, 500sq. ft.	36s. 6d.	—	—
Spring:									
Door Checks	"Blount"	Charles Winn & Co.	Birmingham	—	—	—	Prices on application.		
Stone:									
Bramley Fall	Sandstone, light and grey	B. Whitaker & Sons, Ltd.	Horsforth, near Leeds	any sizes	14ft. to 1 ton.	cube ft.	10d.	1s. 9d.	—
Granite	Architectural and monumental.	Kirkpatrick Brothers	Trafford Park, Manchester	—	—	—	Prices on application.		
Dark-Bed Hopton Wood	Hard limestone, colour grey	J. Hodson & Son, Ltd.	Nottingham	random blocks.	—	foot cube	1s. 2d.	2s.	—
Staircases:									
Spiral	—	St. Pancras Ironworks Co., Ltd.	171, St. Pancras Road, London, N.W.	From 3ft. 6ins. in diameter.	—	per ft. rise.	—	From 13s.	—
Terra-cotta:									
Window Heads	Buff or red	Walwyn T. Chapman	Cleethorpes	3 x 9 4 1/2 x 10.	1cwt.	each	5s.	—	—
Tiles:									
Coloured Enamelled	Best quality in brown, blue, green, &c.	Carter & Co.	Encaustic Tile Works, Poole.	usual sizes	1 ton	55yds. sup.	10s. 6d. per yd.	11s. per yd. sup.	11s. 2d. per yd.
Tessellated	Best quality any plain pattern	Carter & Co.	Encaustic Tile Works, Poole.	usual sizes	2 tons	80yds. sup.	5s. per yd. sup.	5s. 4d. per yd.	5s. 6d. per yd.
Decorative	Floor	Craven, Dunnill & Co., Ltd.	Jackfield, R.S.O., Shropshire.	every size	56lbs.	sq. yard	3s. 6d. from 5s. 6d.	4s. 6d.	4s. 6d.
Wall	—	Ditto	Ditto	—	40lbs.	—	from 13s. 9d.	6s. 4d.	6s. 4d.
Mosaic	—	Ditto	Ditto	—	48lbs.	—	from 13s. 9d.	15s.	15s.
Faience	—	Ditto	Ditto	—	170lbs.	—	from 13s. 9d.	£1 5s.	£1 5s.
"Opalite"	Opal glass, with Sheldermine backing.	Wm. Griffiths	126, Hamilton Ho., Bishopsgate St. Without, E.C.	9 x 3 and 6 x 6	—	sq. yard	—	—	10s. 6d.
Wall	Patent undercut back	T. & R. Boote, Ltd.	Burslem	6 x 6	50 lbs.	sq. yard	6s.	6s. 6d.	6s. 9d.
"Durolite"	Glass tiles, with patent fire-proof backing to prevent surface cracking.	Durolite, Ltd.	36, Camomile Street, London, E.C., and St. Helens, Lancashire.	white and tinted 6 x 6 and 9 x 3 marbles 12 x 6 30ins. x 24yds.	—	sq. yd.	—	—	10s. 0d. tinted 11s. 6d. mrbls. 12s. 6d.
Tracing Cloth:									
"Ivoryine"	Pure white	Norton & Gregory, Ltd.	Castle Lane, Westminster	30, 36, 40.	—	roll	Prices on application.		
"Koh-i-noor"	—	L. & C. Hardmuth	12, Golden Lane, London, E.C.	42.	—	roll of 24yds.	—	—	11s.
"Triumph" Brand	Blue	Norton & Gregory, Ltd.	Castle Lane, Westminster	30ins. x 20yds.	—	roll	—	—	—
Urinals:									
Glazed Ware	Circular slab and T-backs	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	stall, with fittings.	£3 to £15	—	—
Ventilators:									
"Acme" and Spherical	Exhausts and intakes	Acme Ventilating & Heating Co.	35, Tarleton Street, Liverpool.	6ins. to 24 diam. tube	—	each	—	—	17s. 6d. to £15.
Boyle's Patent	Latest "air-pump" ventilators (design No. 175).	Robert Boyle & Son	London and Glasgow	12ins. to 54ins. diam.	—	each	—	—	25s. to £18 18s
Vices:									
"Lightning"	Instantaneous action	C. Nurse & Co.	r81-r83, Walworth Road, London, S.E.	jaws 9 ins. opening 12	50 lbs.	each	17s.	—	—

* Erected.

† Approximate price fixed, complete, in London.

‡ Executed.

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The New Regulations for Secondary Schools.

THE Board of Education have just issued a set of building regulations for secondary schools and pupil-teacher centres dealing with the principles to be observed in the design and fitting-up of new buildings; rules as to construction, &c.; and certain requirements as to plans, specifications and estimates. There is wisely no attempt to force these regulations upon existing schools of the class. The Board intimate that such cases will be dealt with on their merits and as they arise, but they warn authorities to carefully consider the principles embodied in this new set of regulations before submitting schemes for the alteration of existing buildings. Part I., which deals with the principles to be observed in designing and fitting-up the buildings in question, seems on the whole moderate and unobjectionable. It allows a great deal of latitude, and the Board recognize that, owing to the wide difference between the various grades of secondary schools and pupil-teacher centres, it is undesirable to attempt to lay down any hard-and-fast rules as to the actual method of planning to be adopted, and they state their readiness to approve variations where shown to be satisfactory. Part II., which deals with the rules as to the hygienic and sanitary condition of the premises, the construction of the fabric and the safety of the scholars in cases of emergency, are intended to be applied rigorously, and only in circumstances of a very exceptional character will variations be allowed. We think this is somewhat a pity, because on close inspection we see there is much that is of questionable advantage and a good deal that will unnecessarily increase the cost; and, finally, insufficient attention is paid to ventilation, heating and fire-protection.

Architecture at the Georgian Exhibition.

THE Spring Exhibition at the Whitechapel Art Gallery is devoted to "Georgian England," and a proportion of the limited space available has been allotted to architecture. For a century after the Great Fire London was probably the stateliest capital in Europe, and even so lately as the time of George IV. easily held her own with Paris. Artists of the eighteenth century were fond of delineating the streets, squares and river banks, and in the gallery are many examples by Paul and Thomas Sandby, Samuel Scott, Girtin, Varley and Rowlandson. T. Sandby's "Covent Garden" (No. 17) is an admirable example of a tinted pencil drawing, displaying architecture for its own sake, none of the cabbages and carrots which give so much colour to the scene being depicted. We see in its beauty Jones's piazza, which has since been partially destroyed. Varley's "St. Pancras" (No. 22) must have been painted upon the site of Euston Station at a time when the "New Road" (as the Euston and Marylebone Roads were originally named) formed the northern limit of the Metropolis. If it were not for that unmistakable steeple appearing above the trees, one would have imagined London to be miles away. But artists sometimes see less as well as more than ordinary mortals. In No. 38 we see how such a faithful delineator as Samuel Scott was not free from the common fault of unduly exaggerating the width of a street in order to put the buildings in a less sharp perspective. In his anxiety to do justice to the tower of St. Magnus Church, as well as the Monument, he makes Fish Street Hill appear as wide as Kingsway! In No. 45 he shows us the Adelphi Terrace in red brickwork; the stucco was applied in the last century only. A series of photographs of the architecture of Bath includes many doorways and other details. Of the plans, that of No. 41, Gay Street is the most interesting. Here a small town house on a corner site, about 30ft. square only, is invested with dignity and individuality mainly by placing the principal rooms on each floor on the diagonal axis, with a semicircular end towards the street corner and another within towards the stairs. Landings and passages are reduced to a minimum, and perfect symmetry attained without any undue sacrifice of convenience. Leoni's designs for the projected "villa" at Carshalton show that it would have been one of the most stately residences in England and a worthy rival of Wanstead House, which it in some ways resembled. Some of the garden accessories of this projected palace have only lately been disposed of and removed. No. 92, "Carnarvon Castle," by Girtin, almost makes one sigh for the days when our ruins stood up desolate but in perfect harmony with their surroundings, not marred by an environment of railway, iron-roofing and tourists' refreshment houses. Here

we have only castle, mountain and sea. There are many paintings by Hogarth, Reynolds, Gainsborough, Hoppner, Wilson and others. The portrait of Gibbs by Hogarth is the one usually to be seen at St. Martin's-in-the-Fields, which church is generally regarded as the masterpiece of that architect. The statement in the catalogue of this exhibit that in the eighteenth century "architecture became a popular hobby" is confirmed by an incident in Gibb's career. He published a book of his designs, and made a profit of nearly £2,000 by the edition and subsequent sale of the plates! The writer of the catalogue notes, after much appreciation of English Renaissance architecture, tells us that it degenerated slowly "to die in King's Cross Station and the Wesleyan chapels of Hackney and Homerton." Why King's Cross Station? This, in spite of later accretions and untidy environment, is the most expressive and dignified of all our London termini. Previously we have been told that "building must be the outcome of structural necessity nobly expressed." King's Cross might have been more approximately cited in this connection. The exhibition is open free daily from noon until 10 p.m., and closes on May 9th. A similar exhibition on a permanent basis could most fitly occupy the galleries of Kensington Palace.

Architects at $\frac{1}{2}$ Per Cent.

IN connection with the rebuilding of the Carmarthen Workhouse after a fire which occurred there recently, our attention has been called to what appears to us to be a piece of most unprofessional conduct. The Carmarthen Board of Guardians, in their ignorance, actually advertised for tenders from architects for the rebuilding, notwithstanding that there was a firm of architects of repute who had been acting for them for the last forty years. The result has been a competition among a few architects to undersell each other. Messrs. George Morgan & Sons, two members of which belong to the Institute, are the only ones who come out of the affair with honour. Messrs. Morgan, who have acted as the Board's architects for the period stated above, clearly gave the Guardians to understand that the standard of payment was 5 per cent., and furthermore that no architect of any training or standing would depart from this scale in any important building. We refrain from mentioning the names of the architects who replied to the advertisement, as also the absurd amount for which they offered to undertake the work, hoping that they at least will see the error of their ways. The Guardians have betrayed their trust as a public body by deciding by 18 votes to 11 to appoint a local architect whose offer was the lowest, amounting actually to $\frac{1}{2}$ per cent. commission. This architect also stated that he did not require a clerk of works!

COTTAGES ON SMALL HOLDINGS.

AT this time, when the question of the unemployed and the landless claims so much public attention—a question involving multitudinous difficulties—some practical scheme for dealing with the matter and supplying a remedy is sure to be appreciated.

It is evident that emigration to other countries is not the antidote, as emigration must drain a country of its strongest, leaving the unfit behind to go lower in the ranks of the unemployed.

Although the name "farm labour colony" is popularly associated with home colonization schemes, these institutions should be called "labour training farms," as out of such institutions (although many are under the control of the Poor Law authorities) must come the promotion and establishment of small holdings if they are to be of any permanent or practical use in relieving the unemployed. As the result of the prevailing distress, Mr. Joseph Fels conceived the idea of buying tracts of land in various districts and setting aside the greater part of such tracts for public authorities to take over as farm labour colonies, intending the balance of the land to be turned into small holdings, in the hope that many of these holdings would ultimately be taken up and profitably cultivated by the men trained on the colonies.

It is proposed that various branches of agricultural work shall be done on these small holdings—such as fruit-growing, market gardening, dairy work, bee-keeping, pig and poultry raising, and the more intensive cultivation for which greenhouses are required.

The cottages here illustrated are now being

built at Mayland, in Essex, and although this scheme is not primarily a commercial enterprise, it is important that the small holdings should be made to pay. The cottages are being built with the fullest regard to economy, with wholesome provision for the future occupants. It is intended that the rental of each holding of 5 acres shall be such as will pay a fair return for the capital outlay on buildings and cost of land.

The cottages are built of yellow stock bricks and roofed with dark Broseley tiles, which have been selected on account of their non-absorptive qualities, as at present the cottagers will be entirely dependent for their water-supply on the roof water from cottages and outbuildings. Each will be provided with an independent system with filter and storage tank, and a pump will be fitted in the scullery.

The attempt has been made to keep the roofs of the simplest form, the chimneys in the centre of the ridge, the staircase completely in the slope of the roof, and the windows under the eaves and in gable ends.

The cottages and the necessary farm outbuildings are being erected on behalf of Mr. Joseph Fels under the supervision of Mr. George Mosses and Mr. George Sabey, who are employing the labour direct. In the present stage of the work it is impossible to arrive at any definite statement of the cost. The architect is Mr. Charles H. Holden, A.R.I.B.A., 39, Wilson Street, E.C.

We hope later, when the work has been carried out, to give some photographs of these cottages, which are very interesting examples of simple design. The plans, it will be noticed, are squarely treated throughout, while the elevations exhibit the hand of a very capable architect.

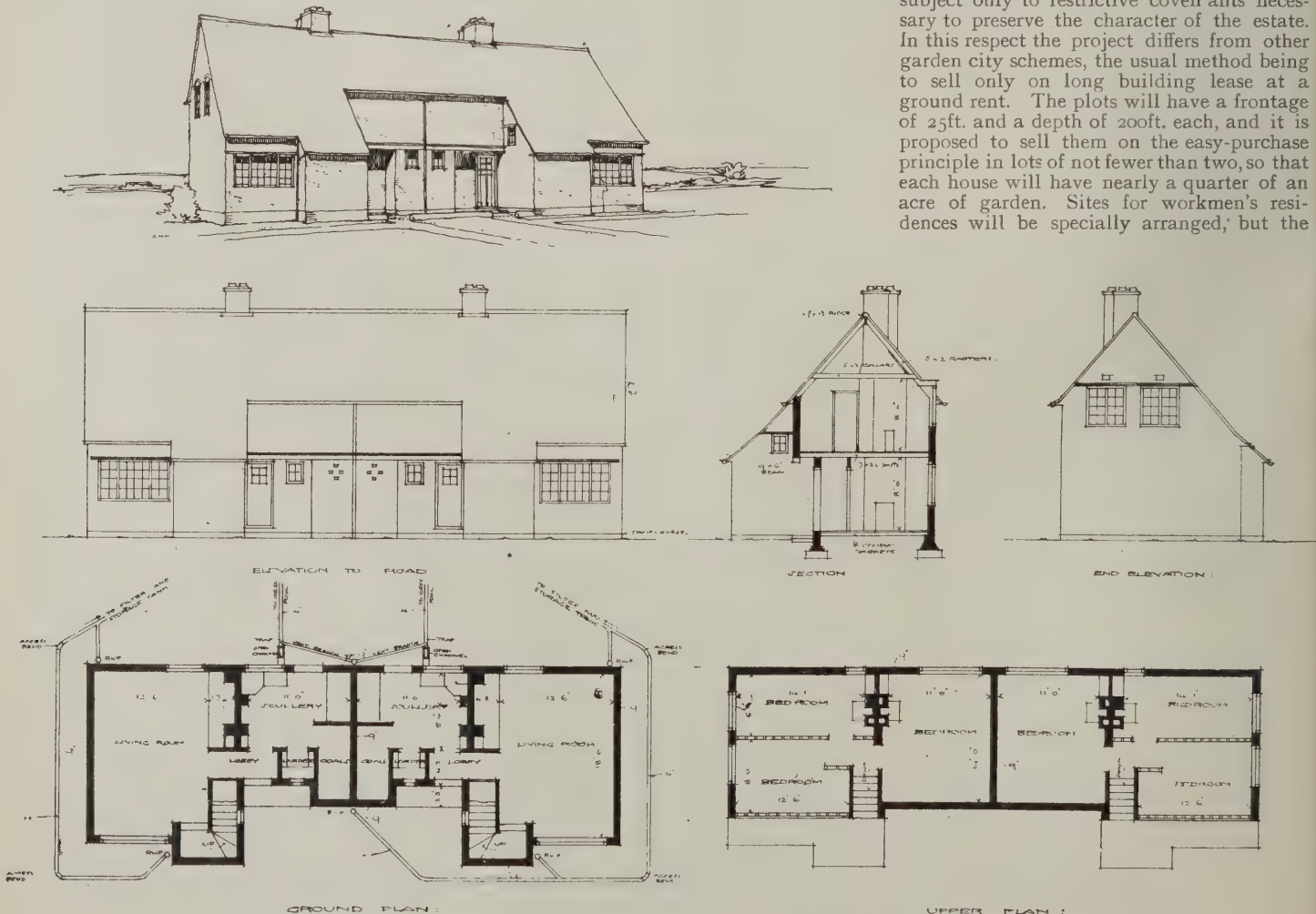
ANOTHER GARDEN CITY.

A Chatham Site Selected.

YET another garden city is proposed. This will be the first of a series which the British Garden Cities (Ltd.) hope to erect. For their initial experiment a freehold site, formerly known as the Wigmore Estate, near Chatham, has been secured. This site, 365 acres in extent, is about three miles from Chatham and half that distance from Rainham Station on the South-Eastern and Chatham Railway. It is within ten minutes' walk of the electric tramways from Chatham to Rainham, which are to be completed this spring. The site is high, overlooking the estuary and forts of the River Medway, and is dry and healthy. It will be laid out on the American "block" system, and it is proposed to provide a twenty acre park, a hotel, and a racing track and football-ground, around which will be a circle of business premises and co-operative stores.

Public Buildings.

The public buildings will comprise at least a school, a library and a village hall. The company will at first restrict its operations to parcelling out the estate, selling plots for buildings, providing sewers and making roads, leaving purchasers of plots free to build houses or cottages as they wish, subject, in order to secure some uniformity, to certain specifications and designs of the company's architects and surveyors. As the development of the estate proceeds the company will be prepared to financially assist plot-buyers to build and to undertake the supply of gas, water and electric light. A leading feature of the scheme is that all plots sold by the company will be the absolute freehold property of the purchasers, subject only to restrictive covenants necessary to preserve the character of the estate. In this respect the project differs from other garden city schemes, the usual method being to sell only on long building lease at a ground rent. The plots will have a frontage of 25ft. and a depth of 200ft. each, and it is proposed to sell them on the easy-purchase principle in lots of not fewer than two, so that each house will have nearly a quarter of an acre of garden. Sites for workmen's residences will be specially arranged, but the

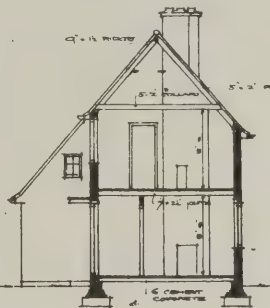


FARM COTTAGES AT MAYLAND, ESSEX. CHARLES H. HOLDEN, A.R.I.B.A., ARCHITECT.

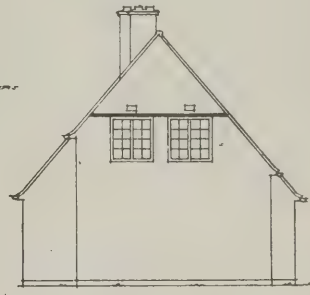
company has decided to allow only substantial cottages to be built at a minimum cost of £250 each, the better class of house varying in cost from £300 to £500, and possibly more. The average will be about £400. It is hoped that residents will be drawn not merely from the adjacent towns but from among the workers of London, seeing that when the electric tramway is completed the garden city will be within an hour's run of the metropolis, with a service of about fifty trains daily. Garden cities appear to be getting rather the vogue now, owing to the increasing congestion in towns, and provided they are conducted on sensible and practical lines there is every hope for their permanent success.



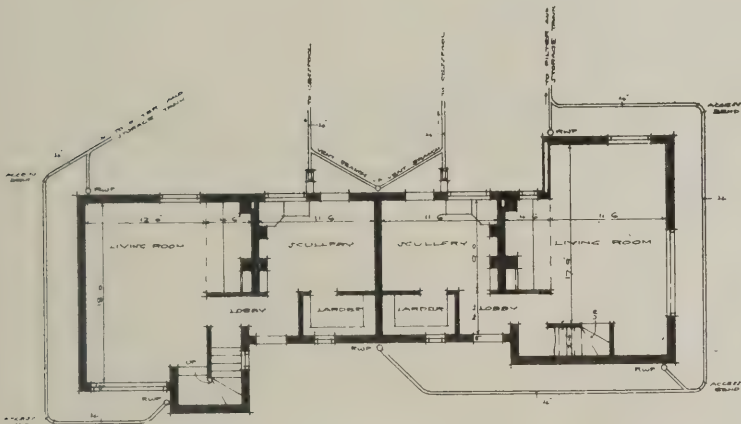
ELEVATION TO ROAD 1



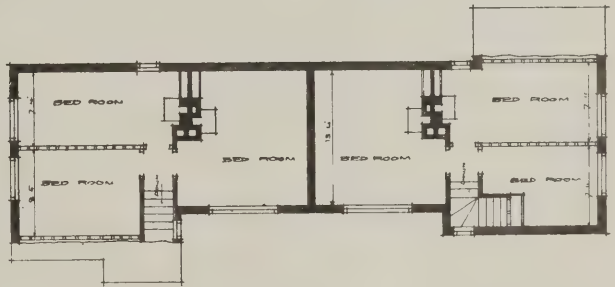
SECTION 1



END ELEVATION 1



GROUND PLAN



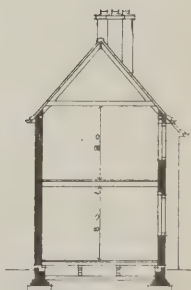
UPPER PLAN



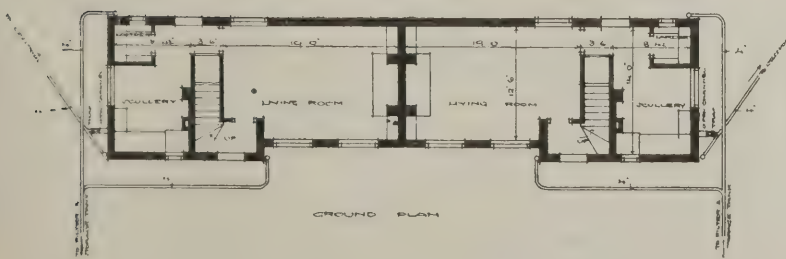
ELEVATION TO ROAD 1



SIDE ELEVATION



SECTION 2



GROUND PLAN



UPPER PLAN

THE ARCHITECTURAL ASSOCIATION.

Mr. Walter Cave on Fenestration.

A MEETING of the Architectural Association was held on Friday evening at 18, Tufton Street, Westminster, the chair being occupied by the president, Mr. E. Guy Dawber, F.R.I.B.A.

The following new members were elected:—Messrs. H. S. Watling, E. J. Tanner and A. R. Ashby.

The president read the report of the scrutineers, and announced the election of officers for the session 1906-07 to be as follows:—President, Mr. R. S. Balfour; vice-presidents, Mr. Walter Cave (394 votes) and Mr. A. Needham Wilson (392 votes); council: Messrs. E. Guy Dawber (346 votes), Arnold Mitchell (279 votes), Louis Ambler (265 votes) J. B. Fulton (260 votes), A. Maryon Watson (253 votes), J. Murray (243 votes), W. Curtis Green (209 votes), Arthur Keen (193 votes) and E. W. M. Wonnacott (153 votes); hon. treasurer, Mr. Henry T. Hare; editor of A.A. Journal, Mr. Maurice E. Webb; hon. librarian, Mr. E. Gunn; hon. secretaries, Messrs. H. Tanner, junior, and C. Wontner Smith; hon. solicitor, Mr. W. H. Jamieson; hon. assistant librarians, Messrs. H. J. Wonow and Percy May.

Mr. Walter Cave then read a paper on "Fenestration." He dealt with his subject chronologically. Beginning first with Egypt, he took

The Gigantic Temple at Karnac as typical of the early hypostyle buildings, lighted only through unglazed clearstories. The introduction of light throughout the building was not considered a necessity—partly due, perhaps, to rites of the Egyptian religion, and partly due, perhaps, to the wonderfully brilliant skies of the East. In later times there was evidence that the

domestic buildings had openings in the front walls over low screens, and in the temples of Edfu and Dendera the same arrangement could still be seen.

How the Greeks lighted their Buildings.

Turning to Grecian architecture and the method of lighting those wonderful temples, we found a greater difficulty and more uncertainty. In the Erechtheum and the great temple at Agrigento, in Sicily (420 and 480 B.C.), according to the accepted restorations, there were windows on the side walls, but these were both exceptional instances, and even here the problem of how the central part was lit remained a matter of conjecture.

Both these examples might be taken as proving the rule that the Greeks did not consider that openings in the screen-walls were the best form of lighting their temples.

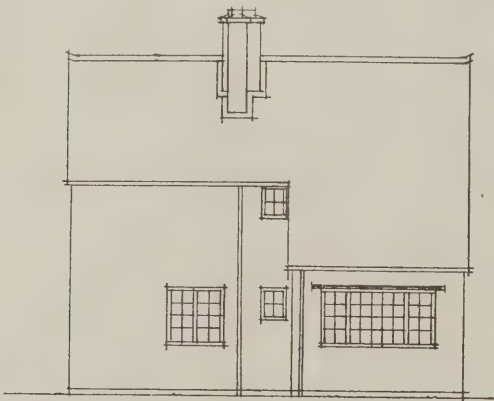
All Greek architecture came from the South, the land of brilliant sunshine, where windows, as we understood them, were either unknown or of quite subsidiary im-

portance. They were very few in number in all Classical work, and never placed to form more than one tier: for which reason, Mr. Cave said, we might draw the conclusion that windows were never really successful in columnar architecture. The Greeks felt this, and never developed the scheme, and the modern attempts to combine fenestrated with columnar architecture showed the impossibility of making a happy compromise between two totally conflicting styles.

That the Greeks had a method for lighting their temples was generally accepted by all archaeologists, and it seemed evident that if it was not from the side walls, it was from some form of clearstory adapted to a sloping roof, as suggested by Mr. Fergusson in his "History of Architecture." St. Peter's, Eaton Square, was an attempt, and a successful one, to light a church by this method. It was not till the time of the Roman Empire that the admission of light came to be considered as an integral part of the design.

Roman Top-lighting.

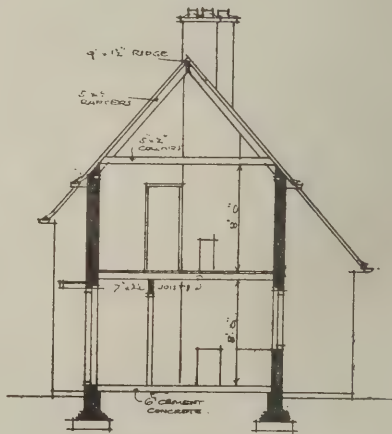
The great eye of the Pantheon was a good



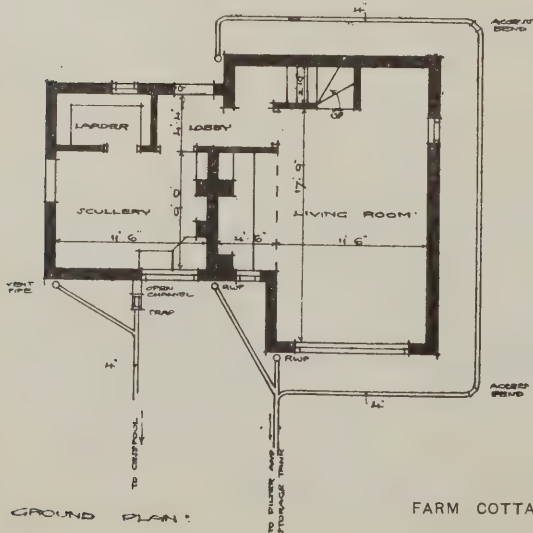
SOUTH ELEVATION:



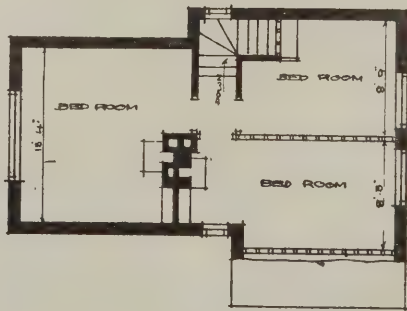
WEST ELEVATION



SECTION:



GROUND PLAN:



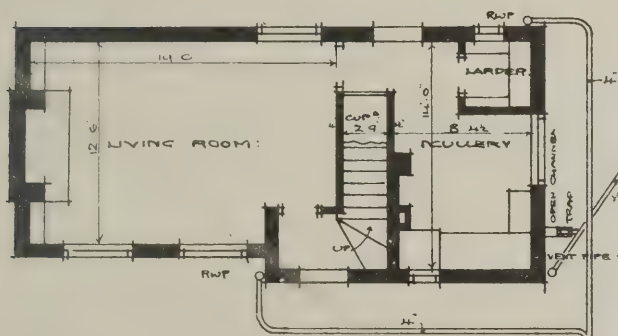
UPPER PLAN:



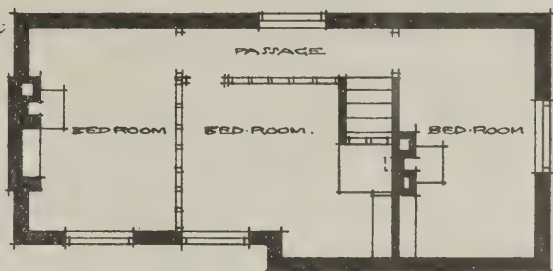
ELEVATION TO ROAD :

SIDE ELEVATION :

SECTION :



GROUND PLAN :



UPPER PLAN

starting-point for a more detailed consideration of the subject. In this truly remarkable building we had an interior completely and perfectly lit by one central opening in the dome, 27ft. in diameter. The total cubical contents of the Pantheon represented nearly 2,000,000 cub. ft., giving the extraordinary result that each sq. ft. of skylight lighted 3,380 cub. ft. of space.

The arch and dome construction of the Romans gave an opportunity for windows, which were introduced high up beneath the vaulting and above the four-barrel arches supporting the dome; these were usually great semi-circular openings and divided by massive mullions into three divisions, one of which, according to Viollet-le-Duc, was finished with frames of bronze enclosing panes of glass, alabaster or simply lattice-work. This was presumably the usual way of lighting the great central courts of the Roman buildings.

The true Roman architecture was based on the use of the Greek lintel construction combined with the Etruscan arch, and, without going into the details of the origin of the latter, it was sufficient for our purpose to note that this combination gave an opportunity of lighting buildings from the side walls. The intercolumniation of the Greeks, as had been pointed out, precluded a satisfactory form of fenestration, but, with the pillars placed at a distance from one another equal to their own height, the intervening screen-wall was well adapted, if not obviously intended, for window openings. In later times by superimposing one order above another, giving a series of storeys, the opportunity for systematic fenestration was attained, and the windows thus became an integral part of the design.

Romanesque Windows.

In many of the Early Romanesque buildings in Italy there was a curious arrangement

of windows, these being designed from the inside with little regard to the exterior; and it was highly probable that the Early Christian antagonism to all the heathen practices might have led them to ignore their exteriors, on which the Greeks spent so much thought and labour.

In the Byzantine style the same remarks to a certain extent held good. Mr. Cave, however, here left the eastern architecture and followed the progress of fenestration westward, turning at once to

The English Gothic Buildings.

The windows in our Early Norman work were small, due to the desire for protection against enemies in those troubled times when churches (and especially their towers) were used as places of defence and refuge, the difficulty and expense of obtaining glass, and to the window itself having come from the East, or the land of sunshine.

With the advent of the pointed, or lancet,

windows of the thirteenth century a real attempt was made to make a design in fenestration both from the inside and out. In the lofty square-ended fronts of the Cistercian buildings we found the windows ranged in deeply-set arrays of varied arcading. But, as a rule, the Early Gothic windows in the arcades were subordinated to the general wall scheme.

Tracery.

Towards the end of the thirteenth century came a most remarkable change in the window treatment of our great Gothic buildings, "which," as Mr. Prior had said in his valuable work on Gothic art, "must be judged as no mere freak of a designing architect, but as a revolution worked by Gothic creativeness in some thirty years, such as the centuries of Egyptian or Greek art did not accomplish." That was tracery, in conjunction with glass, this combination reaching such a pitch at Selby that the tracery



FARM COTTAGE AT MAYLAND, ESSEX. CHARLES H. HOLDEN, A.R.I.B.A., ARCHITECT.

practically became the cloissons of a great masoned enamel. Gradually the glass-painter exercised more and more influence over the mason, and thus we found, at Gloucester and King's College Chapel, Cambridge, windows of such a size that the intervening wall spaces were only piers to carry the lofty stone vaults.

The Change.

With the decay of Gothic, which Mr. Cave said might for purposes of classification be taken as about 1500, a foreign influence began to make itself felt in England, and the interest in the national style, which had been mainly confined to the ecclesiastical structures, was transferred to the domestic buildings after the dissolution of the monasteries under Henry VIII.

The Italian Renaissance was the first of the outside influences, but before the classical traditions had really been thoroughly assimilated by the English builders there arose, under Queen Elizabeth, a marvellous growth of stately country houses, in which the followers of the fast-perishing Gothic style made their last effort to accomplish something new. The great country houses of the sixteenth century, with their stone-mullioned windows in many divisions, fitted with well-proportioned leaded glazing, were to be found scattered up and down the length and breadth of the country; and the wonderful ease with which this form of fenestration was adapted to the great façades of Kirby and Montacute, as well as to the modest gables of the Cotswold manors, took such a hold on the national mind that this style of window might be said never to have completely died out.

The necessity for a defensible house had by this time disappeared, and the reaction was, like all reactions, inclined to the opposite extreme, so that we found, in cases like Astley Hall, Lancashire, and Little Moreton, a range of windows practically dividing the façade into alternate horizontal bands of glass and solid wall surface.

The development of the bay window was also one of the striking characteristics of these times.

Proportions of Mullioned Windows.

The proportions of these mullioned windows was worthy of careful consideration. The single transom was generally placed so that its lower line was nearly in the centre of the window. The proportion of glass to mullion was usually 1 of mullion to $2\frac{1}{2}$ of glass. The glass-line took the centre of the mullion, and the face of the mullion, if not flush with the external wall, had only a small member beyond it. The mullions were about twice as deep as they were wide. Where more than one transom was used the divisions became less towards the top—with some curious exceptions, as at Kirby Hall.

In the earlier type of houses, and in the smaller examples—as, for instance, in the Cotswold district—the windows were small, and the amount of plain wall surface thus produced made up a composition in fenestration which could hardly be equalled for its dignity and sense of repose.

But the classical ideas which had, by the end of the sixteenth century, gained a firm foothold in the interior of the house, at last showed themselves both in the arrangement and details of the windows, and the outer member of the jamb developed into the architrave, though the mullion and transom held its ground. Woollaton Hall might be taken as typical of the transitional period, though the effect of the fenestration could not be considered entirely satisfactory.

The Banqueting House in Whitehall, finished in 1622, marked the beginning of a new era in English architecture. As had been pointed out, one of the characteristics of the great Tudor buildings was a long and low proportion produced by strongly-marked horizontal lines of windows with no studied

architectural effect. But, said Mr. Cave, in the fragment of the palace in Whitehall we were face to face with a great, and successful, attempt to create a building full of the subtle proportions and use of purely architectural forms which Inigo Jones had studied in Italy under the influence of the great architects of the Renaissance.

The window treatment was of exceptional interest. The proportion of voids and solids was well balanced, and worked out at about 1 to $3\frac{1}{2}$ —that was to say, only slightly less window space than in the Vendramini Palace at Venice. But the façade of the Banqueting House gave a far greater sense of dignity and strength on account of the plainer treatment of the wall surfaces between the windows, only broken by the columns and pilasters without the panelling and more restless ornament of the Venetian example.

The proportions of the windows themselves worked out at rather under two squares in height, which was somewhat wider than was usual in most of the Italian square-headed lights, which were generally about twice as high as their width—for example, the Palazzo Zecca at Venice, the Palazzo Ugigionni at Florence, and the Palazzo and Villa Farnese at Rome.

Difficulties.

The great difficulty of adapting this new architecture to the requirements of the day was felt from the first. A style of building which depended for its effect on well-judged proportion and a systematic arrangement of windows presented immense difficulties to the architects of the late Tudor buildings, whose art was, to all intents and purposes, unconscious, and in no way scientific. But architecture had suddenly become a science as well as an art, a science of proportion, and a knowledge of the great buildings in Italy was essential for those who embarked on the new undertaking.

In most of the great domestic buildings in England of the Tudor period the essentially English characteristic was the plan, and, following as a natural result with an indigenous style, the internal arrangements found an expression on the outside—in short, the buildings were designed from the inside to the outside. But, with this new and wonderful architecture borrowed from a distant country, this was reversed, and too often everything was sacrificed to the proportion and treatment of the façade. Thus we found English country houses following in all respects the villas and palaces of Italy—buildings designed by Italians for Italy, which were in many ways quite unsuitable for our northern climate.

The Effect of this Revolution

in architecture on the fenestration of our English buildings was very marked; for a long time the mullion and transom was still used, and with good effect—for instance, at the Ashmolean at Oxford and Wolseley Palace at Winchester. But the sash-window, divided by the heavy bars, became the accepted type to the purist, and the difficulties of the adaptation of the Roman architecture produced much defective lighting of interiors.

Such defects as the inevitably dark windows under the vast porticoes at Prior Park, near Bath, and Amesbury Abbey, Wiltshire, were inseparable from the use of a huge order, magnificent though the effect might be from the outside.

Two Examples considered in Detail.

Turning to a more detailed account of the window treatment of the seventeenth and eighteenth centuries, Mr. Cave took Hampton Court Palace and the Horse Guards as representing the leading tendencies of these times.

On the east or garden front of Hampton Court, begun by Wren in 1689, the internal arrangement was at once seen from the elevation. The ground-floor rooms were not of first-rate importance, and the windows were

subordinated to the great range of state chambers on the first floor—the *piano nobile* of the Italian palaces. These lofty windows had a proportion which was extremely dignified; the divisions of the sash-bars worked out at 20ins. high to 14ins. wide. The window-openings, 13ft. high to 5ft. wide—a far narrower proportion than was usual in Italy, and one that Wren was particularly fond of (as, for instance, in the orangery at Kensington Palace, where the end-square windows were 5ft. wide by 13ft. 6ins. high)—roughly speaking, two and a half times the width.

The circular windows gave a most interesting note to the façades at Hampton Court, and the division of the bars was most ingenious; above the secondary cornice the windows were practically square, and the sash-bar divisions of the same proportion, but on a much smaller scale than those below.

It would seem that Wren's idea was to produce an effect of height, and at the same time to indicate the relative importance of the rooms within.

At the Horse Guards, in Whitehall, we found the whole composition more broken up than usual in a Palladian design by the varied heights and planes of different parts of the building. The main part of the building was designed by Kent, in 1742, with the exception of the attic story on each angle of the central part and the clock turret, which were added by Vardy some ten years after his death. The composite windows under a single semi-circular arch were here used with considerable effect, and gave the necessary importance to the larger rooms on the first floor, while the second floor was entirely subordinated, and the window openings kept as plain as possible. These rooms were really treated as a mezzanine floor, and it was interesting to compare the arrangement with the Home Office on the south side of the parade ground, also probably by Kent, where the mezzanine windows were omitted in the front, and only showed on the ends. The result was that a fine solid-wall effect was produced with a complete entablature, but at the sacrifice of the interior lighting to these rooms.

This plan of disguising the real arrangement of the interior could never be considered as satisfactory, and an angle view, where both faces could be seen simultaneously, gave an unpleasant sensation of something wrong.

In the main façade of the Horse Guards the eye was at once satisfied, but on the end wings the same defect was seen, and the frieze and architrave of the cornice had to be stopped short on the return ends to allow for the windows on the mezzanine floors. The proportions of the windows themselves were interesting; their relative value to the solid wall surface represented 1 to $3\frac{1}{2}$, or rather more window than Inigo Jones' Banqueting Hall, and rather less than the Vendramini Palace at Venice.

Conclusion.

In concluding his paper Mr. Cave said:—
"Let the plan of a building be fully considered and designed from the first with due regard not only for the requirements but for the exterior, and let the window treatment bear on the exterior its proper relation to the internal arrangements. If the plan is faithfully designed to meet the given conditions it must of necessity reflect the life and habits of those for whom it is intended, and if the window treatment is also faithfully designed to suit the rooms, the result will be sincerity in the fenestration."

Mr. E. Prioleau Warren proposed a vote of thanks to Mr. Cave, which Mr. Allan Potter seconded. The president, in supporting it, mentioned that it was always surprising to find in measuring any well-proportioned windows that they were so much smaller in reality than they appeared. Mr. Cave briefly replied. The lecture was illustrated by a number of splendid slides.

R.I.B.A. REINFORCED CONCRETE COMMITTEE.

THE following statement, which was read at the first meeting of the Concrete Committee nominated by the Royal Institute of British Architects to consider and report upon the use of reinforced concrete in buildings and other structures, gives an idea of the nature and scope of the investigations which the Committee has been formed to carry out:—

First, then, it appears that we should inquire into what has been done already and ask the owners or architects or engineers of such work for particulars, and how the buildings have stood the test of time.

We shall have a secretary who can apply to railway companies, owners of mills, private owners, architects, engineers and others, who will no doubt willingly place the results of their experience at our service. Some of us may visit works; some have actual experience in the new system; and when we have digested this knowledge we can as a body express an opinion as to its usefulness, its safety, its permanence and other qualities, which opinion we may fairly hope will be of value to our fellow countrymen.

Similar Committees Abroad.

Something of this kind has been done already in other countries. The German Association of Architects and Engineers in conjunction with the Concrete Association have drawn up a report; the American Institute of Civil Engineers in conjunction with various other bodies have appointed a committee which is at present engaged on similar work, and it is suggested that we should apply for copies of such information or interim reports as may be at its disposal; the French Government also is said to have appointed a committee to prepare a set of recommendations.

A general expression of opinion as to its value would not help other architects or engineers very much; we should therefore consider and report upon the following amongst other matters, as to which there is doubt:—

Permanency of the Construction.

(1) Whether such constructions are permanent or likely to deteriorate with time. The steel skeleton is said by all those who have studied the subject not to rust, and even when steel is embedded in a material such as coke-breeze concrete containing a proportion of sulphur there is said to be no rusting. As any reduction in the section of the metal by rusting might endanger the work, we should consider if it ever does rust, and under what circumstances, so as to advise upon any necessary precautions, or to reassure the doubters on this head.

Resistance to Fire.

(2) The resistance to fire. We shall have to consider what has been done in experimental tests such as those of the City of Hamburg Authorities in 1895, and of the British Fire Prevention Committee just made. Also the results of tests in actual fires in buildings such as the Baltimore fire, where the conditions were exactly those we have to provide against. We may thus be able to form definite conclusions of value to all interested.

Contracts.

(3) The method of contracting. There are about fifty different so-called patent systems, and it is usual to entrust the design of any proposed work to one of the firms who make a speciality of this class of construction, obtaining from that firm a guarantee of strength. This arrangement is probably quite desirable; but as a certain responsibility must always lie on the engineer or architect who accepts or recommends for acceptance any such design, it is desirable

for us to define as best we may the responsibility of the parties.

For instance, it may be made clear that the contracting firm undertakes all responsibility; you may consider it wise to require that the drawings should first be submitted to the architect or engineer, and should be signed by the contracting firm or by some responsible person on their behalf. Some firms try to make a secret of their system, and object to showing the drawings.

It may appear to you that to accept a plan for floor or roof or wall or column or bridge or water-tank (all matters of construction in which we are supposed to be skilled) without making ourselves acquainted with what is to be done is dangerously foolish; and if so, your opinion may have sufficient weight to settle that question. Captious interference we should all deprecate of course, but the engineer or architect must be in command, and must know, not only what is proposed to be done, but how it should be done. We can still leave ample freedom to the experts in the design of the work, in the choice of material and method of carrying out the work.

Materials.

(4) The materials also will no doubt be considered. These are—

- (a) The metal, iron or steel;
- (b) The cement;
- (c) The sand;
- (d) The aggregate, ballast or stone, &c.

For the steel and the cement we shall have the standard specification of the British Engineering Standards Committee, and must inquire if qualities of the standard kinds are suitable for reinforced concrete work.

As to the sand, you know how universally the qualities of good sand are given as clean and sharp. We have to review all that in the light of recent knowledge. In America many experiments have been made which show that cleanliness is not so all-essential as has been supposed, and that washing does not improve every sand. These results were arrived at by experiments on material not only seven days or twenty-one days' old, but were made on pieces of various ages up to three years. Certain work in that way is being done here, and when we have collected and considered the facts our opinion based on knowledge should be of value.

Next as to the sharpness. You may find that sharpness is not so important as variety in size of the grains of sand. Compactness and freedom from voids appear to play a most important part in the strength of mortar, and that freedom from voids may best be obtained by variety of size. These questions we should study with an open mind, free from ancient prejudice.

Then there is the aggregate of stone, gravel, coke-breeze, &c., what proportion to use, what material to use to get the best results in given cases. If we find that washing the sand may be saved, and that concretes of leaner mixture may be used than hitherto with equal safety, we shall have done some good.

Questions arise as to the mixing. We want to know what is the proper way to mix our concrete; how much water to use; whether the sand, gravel, and cement should all be mixed together and the water added, or whether the sand, cement and water should be made first into mortar and the gravel or stone added, as recommended by some. We want to know the value of mixing machines, and whether it is wise to allow a smaller proportion of cement, say 10 per cent. less, if the concrete is mixed by machinery, owing to the fact that it is better mixed. Into all these we must enquire, so as to be able to advise our brother architects and engineers.

Supervision of Work.

(5) Another subject is the carrying out of the work. Should we require that only

skilled men under skilled supervision be employed; that the work be kept wetted, be stopped in frosty weather; how long the centres should be kept up, &c.? All these can only be indicated as matters for your consideration and judgment, and upon which an authoritative pronouncement would be desirable.

Safe Stresses.

(6) One important question which we must consider is what are the safe stresses to allow in various cases. There is apparently no such general agreement upon the safe stresses and methods of calculation as we find in regard to steel or iron, and it is possible that in the present state of knowledge we cannot tell with sufficient accuracy what are the internal conditions in a non-homogeneous beam, to enable us to determine rules which are not open to criticism or improvement with the advance of experience.

Reinforced concrete is, however, being used, and there is need of rules—tentative though they may be—to guide us until we get formulæ which will command general assent. Much has been done in the way of experiment in recent years, so that we are in a much better position to test any of our theories by the results of actual work.

It may be found desirable to refer this part of our subject to a sub-committee of those amongst us who are specially qualified by reason of their mathematical attainments to pronounce upon it.

Our commission is limited to preparing suggestions and recommendations, and therefore any report that may be made will be in the way of advice and not as fixed and immutable rules.

By-laws.

How far our building acts and by-laws should be altered to permit of the use of reinforced concrete walls may also be considered, because as they stand they interfere with the reasonable use of the material.

There is a general feeling that our regulations as to walls should be relaxed in all buildings, at least in rural districts. The agitation for reform in this respect has not yet spread to urban districts, save in regard to the material we are studying; and it certainly seems that if the strength is increased by the use of a metal skeleton the thickness of a concrete wall may be correspondingly reduced.

We fortunately have with us municipal and county engineers and district surveyors whose experience in the working of these by-laws will be of value in restraining too much reforming zeal should we display it.

All the questions thus briefly reviewed are matters upon which the general body of architects and engineers and others interested would no doubt value the consensus of opinion of skilled and disinterested men who have studied the subject. Such an opinion will help the introduction of the material by giving those who hesitate to employ it through want of knowledge and fear of the responsibility, the assurance of the conditions under which it may safely be used, and give that confidence which is at present lacking. It will call attention to its advantages where it has any, such as road bridges over railways, which at present deteriorate rapidly with rust.

Obituary.

Mr. Alexander Shairp, C.E., of Oban, died suddenly last week. He executed considerable architectural work in the town, including the municipal buildings, the parish church, the "Oban Times" buildings, the Argyllshire Gathering Hall, the Memorial Hall, &c. He was engineer for a large part of the Corran Esplanade, and the intricate repairs of the North Pier, under the Town Council, were carried out under his direction.

OUR PLATE.

THE new post-office at Hull is at present in course of construction at the corner of Lowgate and Alfred Gelder Street. It is intended to take the place of the building erected about thirty years ago, which is now quite inadequate to meet the requirements of the post-office. The site was occupied until a short time ago by very old property; a portion of it was originally the site of Suffolk's Palace.

Some difficulty has been experienced with the foundations owing to the nature of the sub-soil on the site, and it has been necessary to enter into a rather unusual method of construction to provide for the heavy superstructure which is to be placed upon the ground. The foundations have consequently been constructed on the Hennebique ferro-concrete system, concrete piles being used and a concrete slab with beams and retaining walls carried upon the piles. This work has been completed by the Yorkshire Hennebique Contracting Co., and the site is now ready for the superstructure.

The perspective view of the building reproduced in this issue shows the elevations to Lowgate and Alfred Gelder Street, which elevations are to be carried out in Portland stone above the plinth; the latter, as well as the balustrade and the main entrance in Lowgate, to be in Peterhead granite.

The public office will be in the centre of the Lowgate front, and access to same will be obtained by two doorways. There will also be a public telephone call office adjoining the public office and accessible from the latter. The remainder of the ground floor is occupied by the rooms for the telegraph messengers and the sorting office for letters and parcels, this latter having an area of 9,000 ft. super.

The first floor will be occupied to a considerable extent by the postmaster and his clerical staff; and there will also be retiring accommodation for the sorting clerks and telegraphists, &c., and a dining-room with kitchen accommodation for the staff generally.

The second floor will accommodate the telegraph and telephone work and batteries. The telegraph instrument room will be 112ft. long by 40ft. wide and the telephone-room 63ft. long by 26ft. wide.

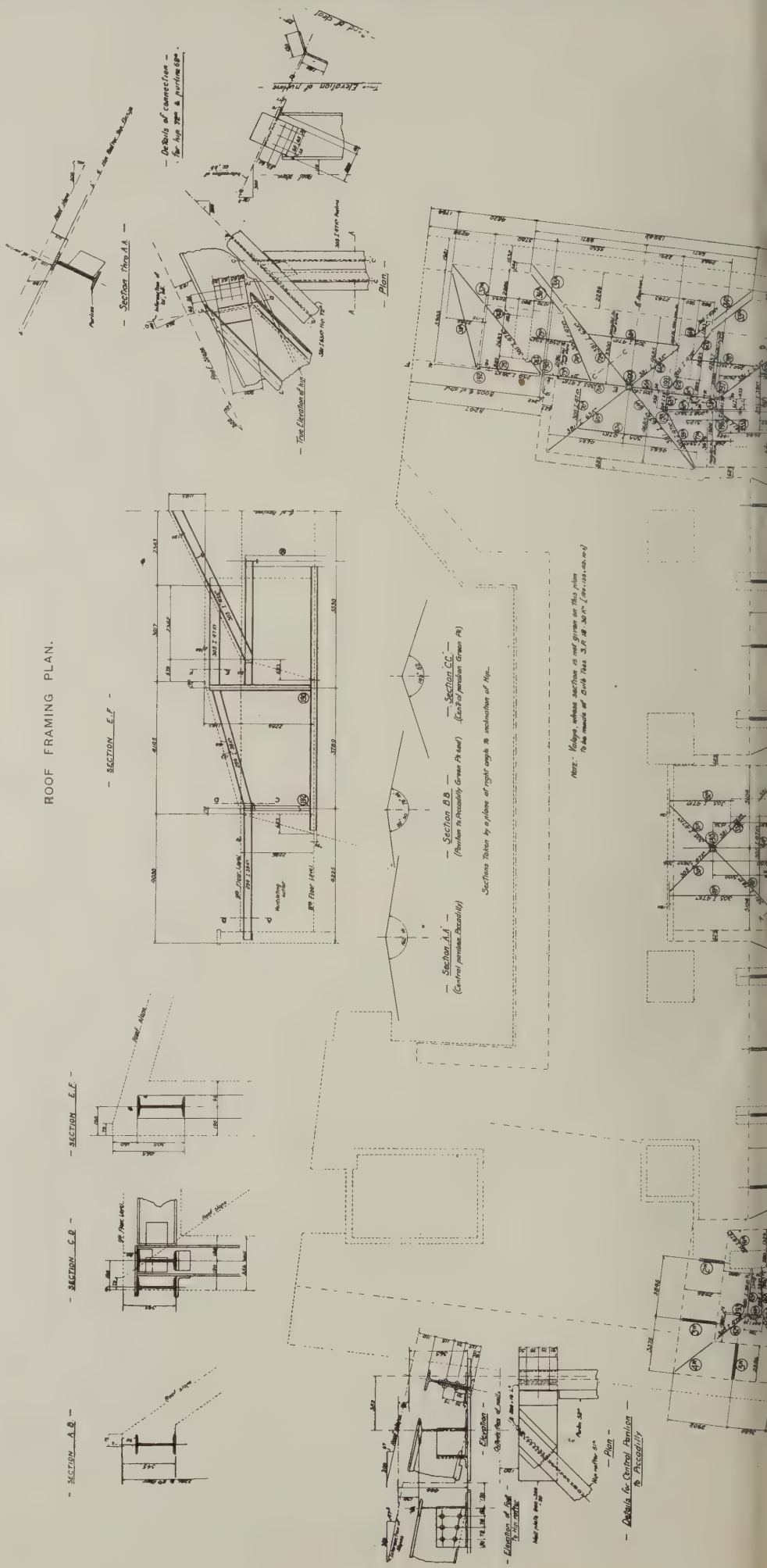
The basement will be largely utilized for the storage of baskets and general stores, including those of the engineers; the postmen will also have a retiring-room on the Alfred Gelder Street side.

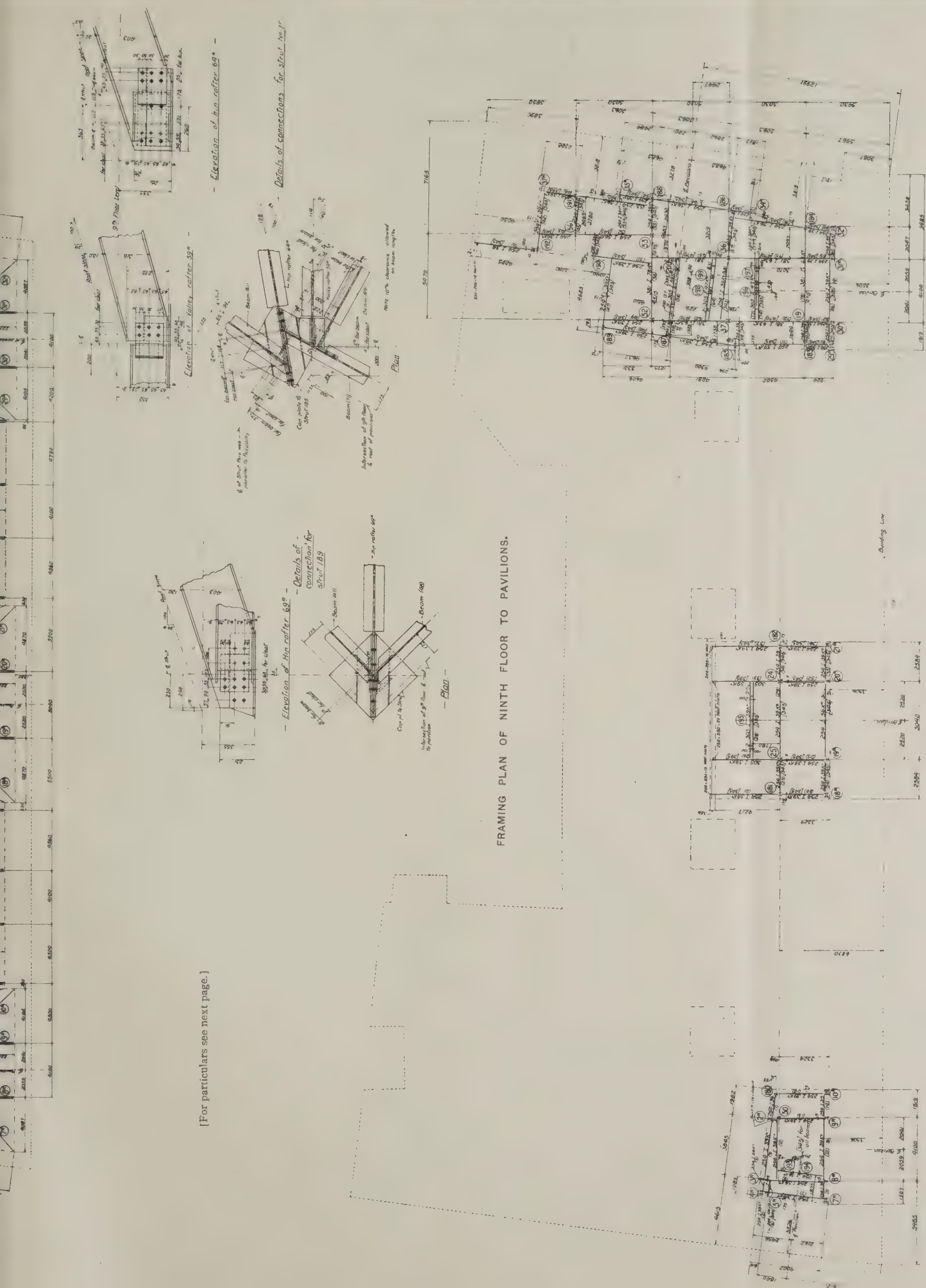
Ample space has been provided in the yard for the loading and unloading of mails and parcels. The entrance to same will be in Alfred Gelder Street.

The sanitary arrangements have been designed upon the latest principles, and the rooms throughout the building will have the walls lined with glazed bricks where occupied by any considerable number of the staff, so as to admit of frequent cleansing.

The building will be heated throughout with low-pressure hot water, and radiators will be provided so that the heat may be regulated. The ventilation of the various rooms has been carefully considered, and provision is being made for the admission of fresh air through the radiators, so that it will be warmed in winter as it enters the building. Lighting will be by electricity.

The contract for the superstructure has been secured by Messrs. Arnold & Son, of Doncaster, and it is anticipated that the building will be ready for occupation about the end of 1908. The total estimated cost, including fittings, is £53,000. The architect is Mr. W. T. Oldrieve, F.S.I., whose design is being carried out under the supervision of Mr. Walter Pott, of H.M. Office of Works.





[For particulars see next page.]

FRAMING PLAN OF NINTH FLOOR TO PAVILIONS.

NOTES ON COMPETITIONS.

Southwark Library.

It is a great relief to know and to be able to announce that after all a fully qualified assessor has been appointed by the Borough Council of Southwark to make a selection from the drawings submitted in the recent competition for a free library. This is a matter for congratulation and regret: congratulation that those who have sent in drawings will have justice meted to them; regret that so many have been debarred from competing through the action of the Competition Reform Society in issuing a notice of disapproval. The Society's action, of course, was rendered imperative by the original intention of the Council to have the drawings judged by a lay committee, assisted by the borough surveyor and an architectural assistant. Extreme measures were not resorted to, however, until after a personal interview between the honorary secretary of the Society and the clerk to the Borough Council, the result of which was, that all hope was abandoned of getting matters placed upon a more satisfactory footing. Nor was confidence restored when the council notified all intending competitors that it would be assisted by a fully qualified architect, for it was but a reasonable precaution to assume, in lack of evidence to the contrary, that the fully qualified architect and the professional member of the council's staff were one and the same person. It does not do to run any risks in these days of competitions that fail, as witness the recent flagrant case of Wallend and the many others that have been the subjects of remark in these columns from time to time. The unwisdom of the "go in and chance it" policy has been amply proved, and the perennial optimism which induces so many to enter the lists, blindly and gaily, under the most unfavorable conditions, is a matter for wonderment. However, all's well that ends well, and at the present stage, as regards Southwark, all's well. No doubt this desirable state of affairs has been largely brought about by the protests which the council has received from numerous sources. The result is encouraging. If concerted action is impossible on the part of would-be competitors, as it evidently is in the present incoherent state of the profession, individual action should at least be taken to induce a successful issue. The Southwark matter is now in the hands of Mr. A. W. S. Cross. There is little doubt he will perform his duties as conscientiously as at Greenwich and with a result as happy.

Acton Municipal Buildings.

It is much to be regretted that an unsuccessful competitor for the Acton Municipal Buildings, who has been conducting a somewhat active campaign against the assessor's award, should, at this the eleventh hour, consider it desirable to lay the matter before the council of the R.I.B.A. Whatever opinions may have been held about the award itself, there are surely but few who would wish to see the successful competitor unseated, now that his appointment has been made and his working plans far advanced. Time did not permit of the matter being discussed at the last meeting of the council, so at present it is in obscurity. To discuss it further here would be to prejudice the case, but it is impossible to refrain from wishing that the council had not been troubled with a matter which can only cause embarrassment.

Birmingham Council House Extension.

The report of Sir Aston Webb and Mr. E. Ingress Bell, the assessors appointed by the Birmingham Corporation in connection with the competition for the Council House extension scheme, was considered last week by the special Sub-committee of the General

Purposes Committee. It was announced that 124 sets of plans had been received in this preliminary competition. Eventually the assessors selected ten designs, the architects of which were found to be Messrs. Crouch, Butler & Savage and Messrs. Mansell, Mansell & Dixon, of Birmingham; Messrs. H. V. Ashley & Winton Newman, Greenaway & Newberry, Henry T. Hare, E. P. Howard, A. N. Prentice, Treadwell & Martin and Wills & Anderson, of London; and Messrs. Matear & Simon, of Liverpool. The preliminary designs are not to be publicly exhibited. The several architects are now preparing for the final competition.

The Peace Palace Competition.

In the competition for Mr. Carnegie's Temple of Peace to be erected at the Hague 217 entries have so far been received. No entry has been refused owing to the time limit having been exceeded. The designs will probably be exhibited in June.

Competitions Open.

The following is a list of competitions open:—

DATE OF DELIVERY.	COMPETITION.
May 5	BRANCH LIBRARY AT SUNDERLAND.—Limited to local architects. Premiums of £20 and £10. Particulars from Mr. John W. Moncur borough engineer, Town Hall, Sunderland.
" 8	ENLARGEMENT OF PARC GWYLLT ASYLUM, near Bridgend. Names to be sent in by this date to Mr. W. E. R. Allen, Glamorgan County Offices, Cardiff.
No date	DETACHED AND SEMI-DETACHED HOUSES AT CLIFTONVILLE, BELFAST.—Premiums £700. Particulars from R. J. McConnell & Co., 51, Royal Avenue, Belfast.
"	SCHOOL AT BEDMINSTER, BRISTOL, for 1,030 children. Limited to Bristol architects. Particulars from W. Avery Adams, secretary to the Bristol Education Committee, Guildhall, Bristol.
"	ALMSHOUSES AT WAREHAM. Particulars from G. C. Filler, North Street, Wareham, Dorset.
"	CHAPEL AND SCHOOLROOM AT MANSELTON, SWANSEA. Particulars from Mr. T. Roberts, 71, Brynhyfryd, Swansea.

R.I.B.A. ANNUAL REPORT.

THE report of the council of the Royal Institute of British Architects for the past year, to be presented to the annual general meeting to be held on Monday next, states that the present membership comprises 749 Fellows, 1,177 Associates, 46 Hon. Associates, 2,507 Probationers and 737 Students. The council announce that the negotiations for the purchase of the freehold garden site in Portland Place for new premises for the Institute have fallen through owing to the impossibility of settling questions of ancient lights in a satisfactory manner. With regard to the new County Hall for London, it is stated that the County Council have been recommended to institute a combined open and invited competition, to be judged by a jury of assessors. The Board of Architectural Education have appointed members to visit the various schools of architecture, and have agreed to grant the certificates issued at Liverpool University, University College and King's College, London, and the Architectural Association Day School. With regard to the Fellowship, which after the end of this year will be closed to all candidates who are not Associates or have passed the examinations qualifying for Associateship, the council express the opinion that it was unjust to the candidates and detrimental to the interests of the Institute that of the twenty-eight candidates nominated for election on March 5th twenty-two non-Associates should have been rejected after the poll demanded by private members. "As most of these non-

elected candidates are, by their age and position, precluded from sitting for an examination, they are thus debarred from membership."

During the past year the following grants have been made by the Council:—Cretan Exploration Fund 25 guineas, Artists' Benevolent Fund 20 guineas, Edinburgh Architectural Association (Architectural Refinements Exhibition) 10 guineas, Architects' Benevolent Society 20 guineas, British School at Athens 20 guineas, Architectural Association £100, Royal Architectural Museum 20 guineas.

For the forthcoming International Congress of Architects, to be held in London in July, the membership up to the present is 672, of whom 188 are ladies. The Executive Committee regard this as a sign that the movement will be largely supported. More than 20,000 circulars have been sent to architects at home and abroad, and the response from foreign countries has been most encouraging. In addition to the grant of £500 mentioned in last year's report, the Council have decided to give an invitation garden party to the Congress at the Royal Botanic Society's Gardens. The Society of Architects has made a donation of £100 to the Congress funds and the Architectural Association 25 guineas.

The financial accounts of the Institute show a considerable reduction of the balance in hand. The reason for this is that £785 was spent in connection with the Institute's opposition to the London Building Acts (Amendment) Bill, 1905, and £319 in connection with the drafting of the Architects' Enrolment Bill.

The Art Standing Committee report, in respect of the new Charing Cross station roof, that Mr. Flockhart had prepared sketch suggestions for the ends of the side walls, which it was considered should be treated in an architectural manner, as also the wind screen. A conference about these suggestions has taken place between Sir Benjamin Baker and Mr. Tempest, on behalf of the Railway Company, and the Art Standing Committee.

The Practice Standing Committee report that they are still considering the revision of the phraseology of the Institute scale of charges, particularly with regard to the ownership of drawings.

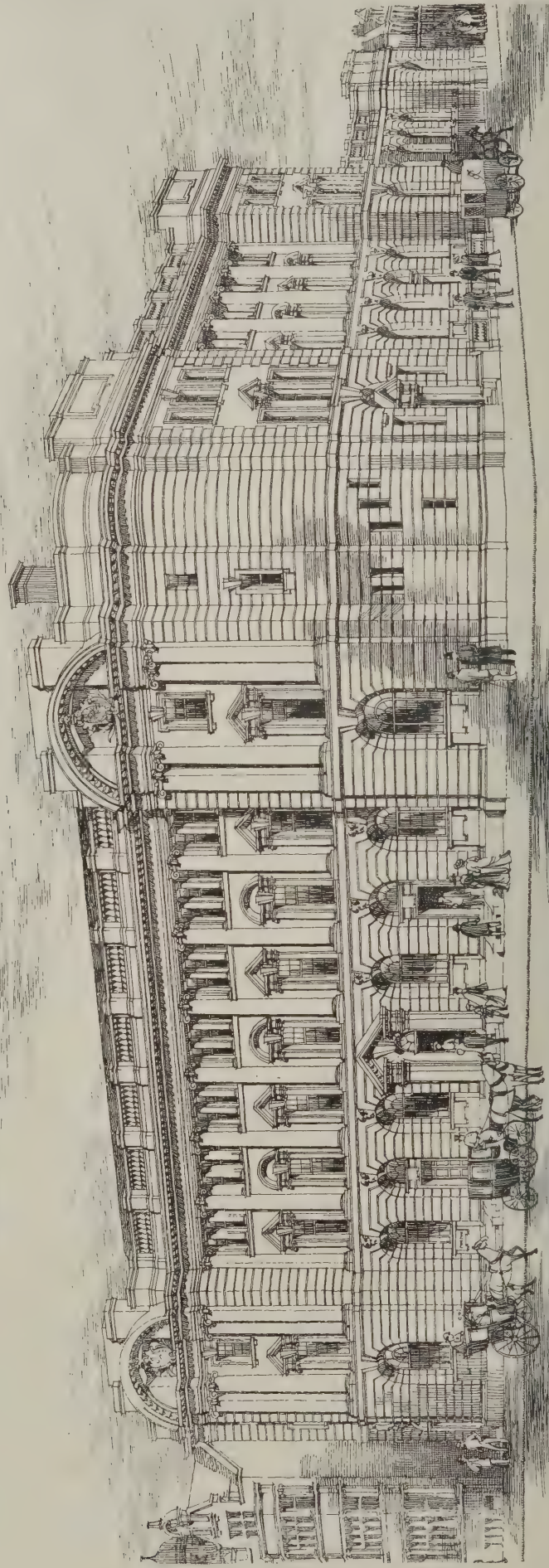
The Science Standing Committee report that they have drawn up a short description of the tests to be applied to Portland cement for insertion in specifications where only small quantities are used. The enquiry into the present method of applying Dr. Angus Smith's solution and other preparations for protecting iron has been carried out, and a series of experiments with iron drain pipes treated with different preparations is now being conducted. The committee have reported on the draft specification for structural steel drawn up by the Standards Committee. They have also been represented on the committee dealing with cast-iron pipes for heating and ventilating.

THE RITZ HOTEL.

THE inclusion of the two roof plans in this issue concludes our publication of the steel framing plans of the Ritz Hotel, Piccadilly. We have thus completely recorded the design of the steelwork, because this has been the first large building erected in London on the regular American steel-frame system, so as to afford English architects and engineers the opportunity of carefully studying a type of construction that is new to this country. The ninth-floor framing plan shows the bracing of pavilions at the ninth-floor level. The details show the connections between the roof beams over the pavilions. The other plan shows the framing to roofs, which were constructed on the Columbian system.

LIBRARY
OF THE
UNIVERSITY OF ILLINOIS

Supplement to
THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD,
Wednesday, May 2nd, 1906.



LIBRARY
OF THE
UNIVERSITY OF ILLINOIS

Enquiries Answered.

The querist's name and address must always be given, not necessarily for publication.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Correspondents are particularly requested to be as brief as possible.

Stress on Inclined Beams.

LONDON.—H. C. W. writes: "What are the conditions of the forces at either end of an inclined beam, uniformly loaded, bearing horizontally at supports? Does it act like an ordinary beam, or, if not, where does the change take place?"

An inclined beam has no tendency to slip in consequence of the slope of the major part if the ends have horizontal bearing. It simply acts approximately as an ordinary beam with the same clear span.

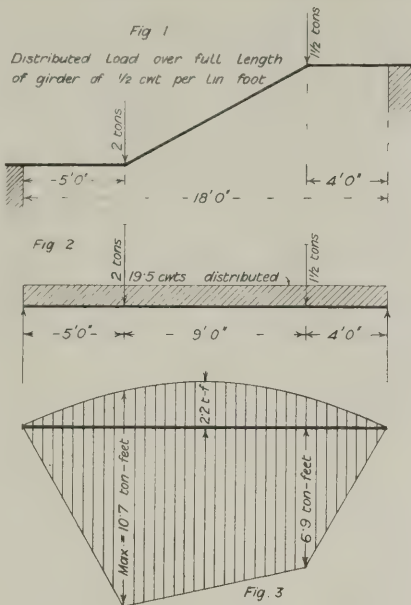
HENRY ADAMS.

Upkeep of Cottages.

LONDON.—A. J. T. writes: "A has sixteen leasehold cottages, each let at 8s. 5d. weekly. The conditions in the leases are of the ordinary character. The cottages have not been painted externally as set out in the lease (namely, once in every four years). Without notice the freeholder sends his surveyor to report upon the condition of the property. He makes his survey, and attached to the schedule, which is duly sent to A, is a charge of £2 2s. for solicitors' and surveyor's fees for each tenement, amounting to £33 12s. The solicitors for the freeholder state that they require A to pay £25 per house (£400 in all) as compensation to the freeholder for breach of covenant. The property, being weekly, it will be understood that the cottages are constantly being whitewashed and generally cleansed internally as the occupants leave, so that they may be fit for the new tenants. Last year £64 was spent on this work alone, and the average outlay under this head for the last eight years has been 18 per cent. In the schedule of dilapidations, which is of the usual character, A is called upon to paint both back and front walls of the whole of the cottages, and to paint all wood and ironwork; also to re-instate the front gates to the cottages (these, I may say, have never been in existence). The work has been duly carried out, and the cost amounted to £138. The only item yet to do is the interior cleansing of one of the cottages, the occupier of which refuses to admit the workmen; this cottage was cleansed and painted inside some four years ago. Can the fees of £2 2s. for each cottage and the £25 for the breach of covenant be legally enforced? What is your opinion as to A's liability to erect the iron gates?"

I can hardly imagine that the lease contains no stipulation obliging the lessor to first call upon the lessee to fulfil his obligations thereunder before he takes such action as you describe. Everything, of course, turns upon the actual wording of the lease, and I advise A to consult his solicitor before paying the sum demanded. Subject to the advice he may give A after perusal of the lease, I am of opinion that it is extremely unlikely that A can be called upon to do anything but put the property into repair in accordance with the lease. If he does this, and the matter does not go into court, the surveyor's and solicitors' fees cannot be obtained from him. A cannot, of course, be compelled to repair something which never existed, and therefore the claim for new gates may be ignored. Consult your solicitor at once.

F. S. I.



BENT STAIRCASE GIRDER.

Section for Bent Staircase Girder.

MANCHESTER.—RETLAW writes: "Having a girder of 18ft. span cut, cranked and loaded as shown in sketch, I shall be glad if you will show how I can determine the strength of girder (by diagram) and how I can determine the size of joint plates and the number of rivets required."

The particulars given are shown in Fig. 1, which may be replaced by the frame diagram Fig. 2. For the bending moment under the 2-ton load $5(2 \times \frac{1}{18} + 1'5 \times \frac{1}{18}) = 8'9$ ton-ft., and for the bending moment under the $1\frac{1}{2}$ -ton load $4(1'5 \times \frac{1}{18} + 2 \times \frac{1}{18}) = 6'9$ ton-ft. For the bending moment due to the distributed load of $\frac{1}{2}$ cwt. per lineal foot and the weight of girder say another $\frac{1}{3}$ cwt., making 1 cwt. per ft. run, the actual length being $5 + 10'5 + 4 = 19'5$ ft., the distributed load will be $19'5$ cwt. Then $\frac{WL}{8} = \frac{19'5}{20} \times 18 \div 8 = 2'2$

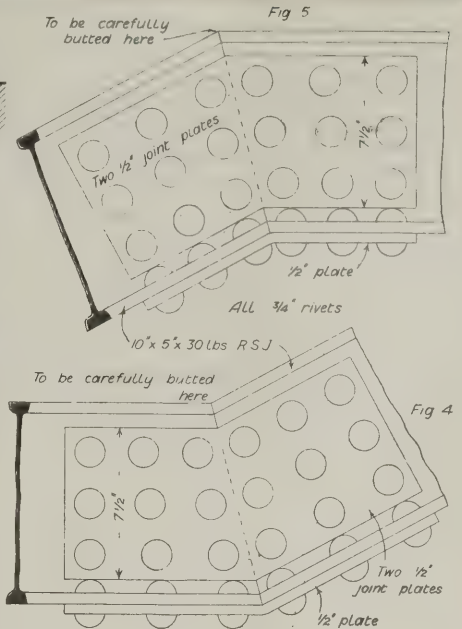
ton-ft. ordinate at centre of parabola. Putting these down to scale, as in Fig. 3, it is found that the maximum bending moment is 10'7 ton-ft. Then 8 times bending moment = tabular value of load carried by 1ft. run, or $8 \times 10'7 = 85'6$, which would be given by a British Standard Beam (B.S.B. 15) 9in. by 4in. by 21 lbs. if the joist could be left solid, but a joint plate will be required on the bottom flange as well as on the webs, and the rivet holes through the flange will take away some of the strength. It will therefore be necessary to adopt the next size larger, namely, B.S.B. 17, 10in. by 5in. by 30 lbs. The arrangement of joints will be as shown in Figs. 4 and 5.

HENRY ADAMS.

Architects' Fees.

BRISTOL.—J. B. writes: A client instructs an architect to prepare plans for alterations and additions to a house. The architect provides quantities and invites tenders, the lowest of which, amounting to £380, is accepted subject to amended plan and revised tender of £313. The architect charges, through the builder, £18 18s. for the bill of quantities, but in the revised tender increases his charge, through the builder, to £32, to come out of the first certificate. In addition to this the architect charges his client the usual fees for plans, and the client is unaware he has charged anything through the builder for quantities. Is this customary? If not, can the client recover any of the charges?"

For supplying bills of quantities the usual charges are "from a minimum of 1½ per cent. to a maximum of 2½ per cent. according to



the nature of the work, exclusive of lithography and copying." The schedule sanctioned by the Royal Institute of British Architects states that when an architect supplies builders with quantities on which to form tenders he should do so with the concurrence of his employer, and it is desirable, when practicable, that the architect should be paid by him rather than by the builder. It is however often stipulated in the contract that the builder should pay for the quantities. I do not understand the apparently excessive charge named in this case.

F. S. I.

Architect and R.I.B.A. Form of Contract.

MANCHESTER.—SQUARE writes: "When an architect is building for himself would it be right for him to use the R.I.B.A. form of contract, simply inserting his own name both as employer and architect?"

We think not. A special form of contract should be drawn up.

Thickness of Walls and Scantlings of Roofs.

ST. ANNES-ON-THE-SEA.—F. S. writes: "(1) How is the thickness of a wall arrived at under any conditions of loading? (2) How are the scantlings of roof timbers determined over all spans and distances of trusses apart? I have seen a few books giving the sizes of roof timbers, but they place the trusses at roft. apart; would not the trusses require strengthening if they were placed 12ft. 6ins. apart?"

The first question is too vague to be answered. If dwelling-house and warehouse walls are intended, the London Building Act may be taken as a guide. If church walls are referred to, the thickness depends upon their height and the construction of the roof. If retaining walls are meant, the nature of the soil and other circumstances will affect the answer. The scantlings of roof trusses are determined by a combination of calculation and judgment. If a table of scantlings gives the distance apart of the trusses as roft. they would of course be too light for 12ft. 6in. spacing. If d = the given distance apart and D = the proposed distance apart, then the scantlings due to the proposed span s may be made the same as for the span of $s \times \frac{D}{d}$. Example: King-post truss

$s = 24$ ft. span, $D = 12$ ft. 6ins. centres, $d = 10$ ft. centres: then the scantlings adopted may be those given for $s \times \frac{D}{d} = 24 \times \frac{12'5}{10} = 30$ ft. span.

HENRY ADAMS.

NEW LONDON BUILDINGS.

AT yesterday's meeting of the London County Council the Building Act Committee reported the following applications under the London Building Act, 1894, their recommendations as to consent or refusal being appended in *italics* :—

Building on the southern side of Bulwer Street, Wood Lane, Hammersmith, on the application of Macintosh & Newman, on behalf of E. J. Clayton. (*Consent.*)

One-storey shops in front of Nos. 110 and 112, Westbourne Grove, Paddington, on the application of J. A. L. Gimblett. (*Consent.*)

Facia addition to the projecting shelter in front of the Tivoli Music Hall, Strand, on the application of H. Tozer. (*Consent.*)

Bay windows, porches, wooden cornices and sham half-timber work to ten semi-detached houses on the north side of Burbage Road, Dulwich, on the application of W. Griffiths, on behalf of J. Watson. (*Consent.*)

Half-timber work and a projecting porch to a house on the northern side of Liskeard Gardens, Blackheath, on the application of A. M. Torrance, on behalf of N. McDougall. (*Consent.*)

Three external iron gangways, connecting the first, second and third floor levels of Nos. 9 and 10, Lensen Place, Finsbury, an external iron staircase at the eastern end of No. 8, Lensen Place, and two external iron staircases and landings connecting Nos. 8 and 9, Lensen Place, at the first and second floor levels, on the application of L. Tubbs & Welch. (*Consent.*)

Buildings on the site of Nos. 34 to 40 (even numbers), Boleyn Road, Kingsland, on the application of F. J. Staines. (*Consent.*)

Extension of the period within which the erection of buildings on a site on the south side of Kensington Road, Kensington, to abut also upon Palace Gate, was required to have been completed, on the application of Millard & Pryce, on behalf of the Royal Exchange Assurance. (*Consent.*)

Additions in front of Nos. 4, 6, 8 and 10, Loampit Vale, Lewisham, on the application of J. Webster, on behalf of A. E. Woollett. (*Consent.*)

Deviation from the plan approved on 7th November, 1905, for the erection of a projecting flue on the eastern side of the Savoy Hotel extension to project in Savoy Buildings, so far as relates to the erection of an additional flue, on the application of Colcutt & Hamp. (*Consent.*)

Retention of a showcase on the forecourt of No. 449, Holloway Road, on the application of the Holloway Press Co. (*Consent.*)

Covered way in front of No. 160, Knight's Hill Road, Norwood, on the application of Hammond & Son, on behalf of the Colour Type Co., Ltd. (*Refusal.*)

Buildings on the eastern side of Mare Street, Hackney, to abut upon Tudor Road, on the application of Crossman, Prichard & Co., on behalf of J. King. (*Consent.*)

Addition to a factory building on the north-western side of Leipsic Road, Camberwell, on the application of E. J. Strevens, on behalf of Captain Wood. (*Refusal.*)

Buildings on plots Nos. 8, and 9, Goldsmith's Row, Haggerston, to abut upon Goldsmith's Row, Dove Row and Hay Street, on the application of Woodrow & Helsdon, on behalf of D. Dear. (*Consent.*)

Two external iron and concrete balconies at workshop premises on the north-west side of George Street Mews, Holloway, on the application of J. Farrer, on behalf of Foxton Brothers. (*Consent.*)

Wood and Uralite addition to a saw mill, Rotherhithe Street, Rotherhithe, on the application of Burt, Boulton & Haywood, Ltd. (*Consent.*)

Wood and iron buildings of a temporary character at Lower King and Queen Wharf, Rotherhithe Street, Bermondsey, on the application of J. R. Wood & Co., Ltd. (*Consent.*)

Retention of a covered way of a temporary character over a portion of Capel Court, Bartholomew Lane, City, on the application of Joseph & Smithem, on behalf of the Alliance Assurance Co. (*Consent.*)

Extension of the period within which a new street for carriage traffic, to lead from Dartmouth Road to Sydenham Hill Road, Lewisham, was required to be clearly defined throughout by posts and rails or so otherwise as the Council might permit and thrown open to the public as a highway, on the application of Eastman Brothers. (*Consent.*)

Dwelling-house on the eastern side of an extension of Oakford Avenue, Wells Road, Sydenham, approved by the Council on 26th February, 1906, on the application of W. Wilkinson, on behalf of T. Covell. (*Consent.*)

New street for carriage traffic, to lead from Peckham Rye to Dewar Street, Camberwell, on the application of Worsfold & Hayward. (*Consent.*)

New streets for carriage traffic to lead from Manor Park to Manor Lane, Lee, Lewisham, and in connection therewith the widening of a portion of Manor Lane, on the application of G. A. Lansdown, on behalf of W. J. Scudamore & Son. (*Consent.*)

Street for carriage traffic to lead out of the eastern side of West End Lane, Hampstead, on the application of R. J. Worley, on behalf of the Midland Railway Co. (*Refusal.*)

Deviation from the plans approved on 19th December, 1904, in connection with the erection of a building known as Thorney Court, Palace Gate, Kensington, so far as relates to an alteration in the position of the building, on the application of Millard & Pryce. (*Consent.*)

Modification of the provisions of that section with regard to open spaces about buildings so far as relates to the proposed erection of a building on the southern side of Oxford Street, to abut also upon Davies Street, with an irregular space at the rear, on the application of W. A. Lewis, on behalf of Perry Brothers. (*Consent.*)

Modification of the provisions of that section with regard to open spaces about buildings so far as relates to the proposed erection of a building to abut upon Silver Street and Edge Street, Kensington, with an irregular open space at the rear, on the application of W. G. Hunt. (*Refusal.*)

Buildings on the eastern side of Richmond Road, Paddington, on the space at the rear of No. 112, Westbourne Grove, on the application of J. A. L. Gimblett. (*Refusal.*)

Retention of openings uniting Nos. 4 and 6 to No. 8, Lexham Gardens, Earl's Court, on the application of E. L. Wratten, on behalf of the Misses Brown & Charles. (*Consent.*)

Uniting of No. 45, Piccadilly, with a building on the eastern side of Albany Courtyard, on the application of G. D. Martin. (*Consent.*)

Conversion of No. 27, Belvedere Road, Lambeth, into two separate tenements, on the application of P. N. Ginham, on behalf of the Works Committee of the Council. (*Consent.*)

Current Market Prices

		£ s. d.		£ s. d.	
METALS.					
Standard Copper	... per ton	85	5	0	85 10 0
Do. Strong sheets...	do.	97	10	0	98 0 0
Lead, Soft Foreign	... do.	16	0	6	16 5 0
Do. English	... do.	16	5	0	16 10 0
Do. pipes	... do.	19	0	0	19 2 6
Do. sheets	... do.	18	10	0	18 12 6
Galvanised Corrugated sheets	... do.	12	7	6	12 10 0
Spelter G.M.	... do.	26	15	0	26 17 6
Angles, Scotland...	do.	6	15	0	7 0 0
Bars	... do.	7	15	0	8 0 0
Marked bars, Staffs	... do.	9	0	0	—
Common bars	... do.	7	5	0	—
Angles, M'boro.	... do.	6	10	0	6 12 6
Joists	... do.	6	7	6	6 10 0
Angles, Midlands	... per ton	6	12	6	6 15 0
Joists	... do.	7	0	0	7 2 6
Girders plates, Midlands	... do.	7	10	0	7 12 6
Angles, Foreign, c.i.f.	Thames	6	2	6	6 5 0
Tees	do. do. do.	6	5	0	6 10 0
Joists	do. do. do.	5	15	0	6 0 0
Channels	do. do. do.	6	0	0	6 2 6
Nails, Wire	do. do. do.	9	0	0	—
Tin, Foreign	do. do. do.	182	0	0	182 10 0
Do. English ingots	do. do. do.	181	0	0	182 0 0
Zinc, sheets, Silesian	do. do. do.	27	0	0	—
Do. do. Vielle Montaigne	do. do. do.	27	5	0	—

TIMBER.

SOFT WOODS.

Deals, Altappan, Yellow,	3rd, 4x9	per std.	8	5	0	—
Do. Gefle, Yellow,	1st & 2nd, 4x8	do.	10	10	0	—
Do. do. do. 1st & 2nd,	4x6	do.	9	10	0	—
Do. Blankaholm, Yellow,	1st, 4x7	do.	9	5	0	—
Do. Kem, Yellow, 1st,	3x9	do.	19	0	0	—
Do. do. do. 1st, 3x8	do.	14	5	0	—	
Do. do. do. 3rd, 3x11	do.	11	0	0	—	
Do. do. do. 3rd, 3x7	do.	10	10	0	—	
Do. Onega, Yellow,	2nd, 3x11	do.	17	10	0	—
Do. Narva, Yellow, 4th	3x11	do.	8	5	0	—
Do. Petschora, Yellow,	2nd, 3x9	do.	12	15	0	—
Do. do. do. Dry, 3rd,	3x9	do.	11	0	0	—
Do. Nederkalix, Yellow,	1st, 3x9	do.	12	0	0	—
Do. do. do. 1st, 3x9	do.	11	5	0	—	
Do. do. do. 2nd, 2x7	do.	9	0	0	—	
Do. Umba, Yellow,	2nd, 3x9	do.	15	15	0	—
Do. Batiscan, Bright	Spruce, 2nd, 3x9	do.	10	0	0	—
Do. Skutskar, Yellow,	1st & 2nd, 3x8	do.	11	5	0	—
Do. Gamleby, White,	Unsorted, 3x6	do.	8	0	0	—
Do. Pernoviken, Yellow,	1st & 2nd, 2x8	do.	9	5	0	—
Do. do. do. 1st & 2nd,	2x7	do.	9	15	0	—
Do. St. Petersburg,	White, 3rd, 2x7	do.	8	15	0	—
Do. Archangel, White,	1st, 3x9	do.	11	10	0	12 0 0
Do. do. do. 1st, 3x9	do.	11	15	0	—	
Do. do. do. 2nd, 3x11	do.	10	15	0	—	
Do. do. do. 2nd, 3x11	do.	10	15	0	—	
Do. Quebec, Spruce,	Unsorted, 3x9	do.	9	5	0	—
Do. do. do. do. 3x9	do.	9	10	0	—	
Do. do. do. 2nd, 3x7	do.	8	15	0	—	
Do. Montreal, Dry	Pine, 3rd, 3x9	do.	10	10	0	—
Floorings, Fredriksstad,	White, 1x5	per square	0	7	3	—
Do. do. Yellow and	White, 1x7	do.	0	8	3	—
Do. do. do. 1x6	do.	do.	0	7	9	—
Do. do. Yellow, 1st,	1x5	do.	0	9	6	—
Do. do. do. 2nd, 1x6	do.	do.	0	10	6	—
Do. do. do. 2nd, 1x5	do.	do.	0	9	9	—
Do. do. do. 2nd, 1x5	do.	do.	0	9	6	—
Do. do. do. 3rd, 1x6	do.	do.	0	9	3	—
Do. do. do. 3rd, 1x5	do.	do.	0	8	6	—
Do. do. do. 3rd, 1x5	do.	do.	0	8	3	—

Notes and News.

The new Nautical School at Portishead, of which Mr. Edward Gabriel, F.R.I.B.A., of London, is the architect, is to be opened on Saturday by H.R.H. Princess Christian. The key for the opening has been made by the Bromsgrove Art Guild.

Shakespeare and Old London.—Mr. T. R. Croger, F.R.G.S., F.Z.S., F.P.S., read a paper with this title before last Thursday's meeting of the Society of Architects. He cited a number of the buildings figuring as the scenes of great events in the poet's plays.

"A History of Architecture on the Comparative Method," by the late Prof. Banister Fletcher and Mr. Banister F. Fletcher, is to be translated into Russian by M. Robert Böker, of St. Petersburg, to whom the Russian rights of translation have been sold.

Building Collapse at Lewes.—On Thursday last a spacious timber shed which was being erected at Eastgate Wharf, Lewes, for Messrs. Parsons Brothers, Ltd., about 20ft. high and covering an area of goft. by 30ft., collapsed suddenly, and three men received injuries of a more or less serious nature.

Sheffield Master-Builders and Operatives.—The first meeting of the local conciliation board in connection with the building trade at Sheffield was held last week at the Builders' Exchange. Mr. A. J. Forsdike was appointed chairman of the newly-constituted body, Mr. T. Driver vice-chairman, Mr. J. L. Taffe secretary for the masters, and Mr. H. H. Diver secretary for the operatives.

Special Elections to Fellowship, R.I.B.A.—At the meeting of the council of the Royal Institute of British Architects held on April 23rd the following gentlemen, being presidents of allied societies, were elected Fellows:—Mr. H. S. Chorley (Leeds and Yorkshire), Mr. J. M. Monro (Glasgow Institute), Mr. Harbottle Reed (Devon and Exeter) and Mr. H. H. Thomson (Leicester and Leicester-shire).

The Northern Counties' Building Trades Exhibition was opened at the St. James's Hall, Manchester, on Wednesday last by Alderman Sir James Hoy, Mr. J. H. Woodhouse, president of the Manchester Society of Architects, being in the chair. The exhibition, which remains open until May 5th, contains about fifty exhibits of the usual character, and a small collection of architectural drawings. Among the local firms exhibiting are Messrs. J. & H. Patteson, who have on view a fine display of marble work.

Manchester Society of Architects.—At the annual general meeting of this Society held last Thursday the following officers and members of council were elected:—President, Mr. J. H. Woodhouse; vice-presidents, Mr. J. W. Beaumont and Mr. Edward Hewitt; hon. secretary and treasurer, Mr. Paul Ogden. Council (Fellows): Messrs. John Ely, J. B. Gass, W. C. Hardisty, C. H. Heathcote, J. D. Mould, F. P. Oakley, Isaac Taylor, G. H. Willoughby and P. S. Worthington; (Associates) Messrs. Godfrey Colles, A. E. Corbett and J. H. Gibbons.

Aberdeen Joiners' Dispute.—The trade committee representative of employers and operatives in the Aberdeen joinery trade met last week to consider the proposed alterations in the by-laws as regards overtime, outside men, &c. At one stage there was some hope of an amicable settlement being arrived at, but at the eleventh hour the operatives, failing to agree among themselves, declined to accept the concessions proffered by the representatives of the employers. Reference was made to arbitration, but that was not received with unanimity, and the meeting terminated without any decision being arrived at. A strike is not improbable. The existing by-laws are valid till June 1st.

Complete List of Contracs Open.

WITH a few exceptions, news of Contracts Open are not repeated after they have been published once in these columns, so that readers will find particulars in our previous issue of other contracts that still remain open.

Unless expressly stated to the contrary all deposits required for bills of quantities, &c., are returned on receipt of *bona-fide* tenders.

The words "Fair Wages Clause" inserted in certain paragraphs signify that persons tendering must conform to a fair-wages clause in the contract, which requires them to pay the rates of wages current in the district.

BUILDING.

May 3. Port Talbot.—*Erection of three shops and dwelling-houses* at Station Road. Plans, specifications and conditions of contract to be seen at the office of R. O. Clark, C.E., architect and surveyor, Station Road, Port Talbot, to whom tenders must be sent not later than 4 a.m. on May 3.

May 3. Abererch.—*New schoolroom* attached to Abererch C.M. Chapel, near Pwllheli. Plans, specification &c., are now open for inspection at the Deacon's Room, Chapel House. Tenders, sealed and endorsed "Tender for Schoolroom," to be delivered to R. Parry, Penbrynaudd, Abererch, not later than 4 p.m. on May 3.

May 3. Edinburgh.—*Alterations at public library, &c.*, in town house, Portobello, according to plan and specification, which may be seen at the Public Works Office, or at the office of Mr. Baxendale, registrar, Town House, Portobello, where copies of the specification may be had on deposit of £1 rs. by crossed cheque. The estimates must be sealed and marked "Tender, Portobello Library," &c., and sent to R. Morham, city architect, Public Works Office, City Chambers, Edinburgh, not later than May 3.

May 3. Glasgow.—*Works to be executed in the construction of a potato shed and warehouse on the site of the old City Poor-house to the east of Buchanan Street Goods Station, and of a portion of a bridge to carry Dobbie's Loan for the Caledonian Railway Co.* Drawings may be seen at the office of the Company's Engineer, Buchanan Street Station, Glasgow, where copies of the specification and schedule may be obtained on payment of £2 2s. Sealed tenders, endorsed "Tender for Buchanan Street Station Potato Shed Warehouse and Relative Works," to be lodged with J. Blackburn, secy., Caledonian Railway Co.'s Offices, 302, Buchanan Street, Glasgow, by May 3.

May 3. Sunderland.—*Erection of caretaker's house in connection with Harrison Buildings, in Silver Street.* Drawings and conditions of contract may be seen, and specification, schedule of quantities and form of tender obtained at the Borough Surveyor's Office, Town Hall. Sealed tenders, addressed "To the Chairman of the Health Committee," and endorsed "Tender for Caretaker's House, Harrison Buildings," must be delivered at the Town Clerk's Office, Town Hall, before noon on May 3.

May 3. Hastings.—*Repairs to two cottage homes, 100, Ashburnham Road and 59, Vicarage Road.* A copy of the specification of the work may be obtained on application at the Union Offices, 11, Wellington Square, Hastings. Tenders to be sent in to Arthur R. Inskipp, clerk, 11, Wellington Square, Hastings, not later than noon on May 3.

May 4. Norwich.—*Enlargement of Shelton and Hardwick School, for the Norfolk Education Committee.* Builders desirous of tendering should send in their names to A. F. Scott, architect, Castle Meadow, Norwich, at whose offices plans and specification can be inspected and bills of quantities obtained. A deposit of £1 rs. will be required. Tenders must be delivered by noon on May 4, addressed to "The Secretary, Norfolk Education Committee, 57, London Street, Norwich," and endorsed "Tender for Shelton and Hardwick School."

May 4. West Somerton.—*Enlargement of the School.* Builders desirous of tendering should send in their names to the Secretary, Norfolk Education Committee, 57, London Street, Norwich, at which office plans and specification can be inspected and bills of quantities obtained. Tenders must be delivered by 12 noon on May 4, addressed to "The Secretary," at the above address, and endorsed "Tender for West Somerton School."

May 4. Swansea.—*Erection of grand stand and ring on the occasion of the Horse Show.* Particulars may be obtained of the secretary, F. J. Parker, Plymouth Street. Tenders to be sealed and marked "Tender for Stand," and forwarded to the Secretary on or before May 4.

May 5. Arnside.—*Erection of a new house and alterations to No. 1, Beechmount, Arnside, for J. Airey.* Applications for quantities to be sent to R. Morton Rigg, architect and surveyor, Arnside, by May 5.

May 5. Burwardesley.—*Alterations and additions to the school buildings.* Plans and specifications can be seen at the office of H. Beswick, county architect, Newgate Street, Chester, and quantities obtained, on deposit of £1. Tenders, endorsed "Tender for Works at Burwardesley," to be sent to H. Grant Bailey, clerk, Crypt Chambers, Chester, on or before May 5.

May 5. Chelmsford.—*Erection of a pair of villas in Park Avenue.* Plans, specification and form of contract can be seen at the office of F. Whitmore, architect, 73, Duke Street, Chelmsford, to whom tenders, endorsed "Tenders for Villas, Park Avenue," must be delivered by May 5.

May 5. Ynysddu.—*Erection of four houses at Ynysddu, for W. H. Stone, Black Prince Hotel, Ynysddu, Mon.* Plans and specification can be seen at the above hotel. Tenders, sealed and endorsed, to be delivered to Mr. Stone, at the above address, not later than noon on May 5.

May 7. Cwmparc.—*Enlargement of Parc C.M. Chapel, Cwmparc, together with new assembly hall and classrooms.* Tenders to be delivered to Thomas Morgan,

Ardwyn, Cwmparc, on or before May 7, sealed and endorsed "Tender," with whom also plans and specifications may be seen, or at the office of R. S. Griffiths, M.S.A., architect and surveyor, Excelsior Buildings, Tonypandy.

May 7. Ashby.—*Erection of a new Wesleyan church at Ashby, Lincolnshire (near Frodingham).* Plans and specifications may be seen at the office of W. H. Buttrick, architect, 28, Wells Street, Scunthorpe, to whom tenders are to be sent not later than noon on May 7, sealed and endorsed "Tender for Ashby Wesleyan Church." Particulars may be had on receipt of a deposit of £2.

May 7. Crossgar.—*Erection of a dispensary and dispensary residence for the use of the medical officer of the Crossgar Dispensary District, in the townland of Crossgar, convenient to the village of Dromara, according to the plans and specifications prepared by W. W. Larmor, architect, and now deposited at Pcor Law Office, Workhouse, Banbridge, for inspection.* The Guardians desire that the materials used in the above works shall be as far as possible of Irish manufacture. The contractor must undertake to have the whole of the works completed on or before the October 31, 1906. Sealed tenders, addressed "To the Presiding Chairman," on the special form obtainable from this office, and containing the names and addresses of two solvent sureties willing to join with contractor in a joint and several bond for double the amount of the contract, will be received at the Poor Law Office, Workhouse, Banbridge, up to noon on May 7.

May 7. Lumphanan.—*Mason, carpenter, plumber, slater, painter and glazier works of a cottage to be erected near Lumphanan Station.* Plans and specification may be seen with Andrew Fraser, Rosedale Cottage, Lumphanan. Tenders will be received by Isaac Muirton, Corse, Lumphanan, up to and including May 7.

May 7. Southampton.—*Alterations and additions to warehouse "G," to convert the same into an ice store, for the Harbour Board.* Drawings, specifications and conditions may be seen upon application at the Harbour Board Office to E. Cooper Poole, A.M.I.C.E., engineer to the Board, and bills of quantities and form of tender obtained upon payment of £1. Sealed tenders, endorsed "Alteration to Warehouse 'G,'" to be delivered at the office of J. E. Pailthorpe, clerk to the Board, Harbour Board Offices, Town Quay, Southampton, not later than noon on May 7.

May 8. Hampton.—*Erection of porter's lodge at the Isolation Hospital, Uxbridge Road, Hampton Hill; five-stall public convenience at High Street, Hampton Hill; five-stall public convenience at Bell Hill, Hampton.* The drawings and specifications may be seen and forms of tender obtained of the Surveyor, upon application being made, accompanied by a deposit of £2. Fair wages clause. Sealed tenders, endorsed "Tender for Lodge, &c.," to be delivered to the clerk to the Council not later than 4 p.m. on May 8.

May 8. Maenclochog.—*Repairs and alterations to the Council school.* Drawings and specifications may be seen on application to the headmaster at the school, and also at the offices of the architect, D. E. Thomas, 17, Victoria Place, Haverfordwest. Tenders must be endorsed "Tender for Maenclochog Council School," and delivered to W. Davies George, clerk to the Education Committee, County Education Offices, 9, Quay Street, Haverfordwest, on or before May 8.

May 8. Nuneaton.—*Erection of a small-pox hospital at Bramcote, near Nuneaton.* Drawings and specification may be seen at the office of F. C. Cook, surveyor to the Council, Nuneaton, and bills of quantities obtained from him on deposit of the sum of £5 5s. Sealed tenders, endorsed "Tender for Small-pox Hospital," must be sent to F. S. Clay, clerk to the Joint Hospital Committee, Bridge Street, Nuneaton, by noon on May 8.

May 8. Alford.—*Erection and completion of a house, for the U.D.C., on the Council's property in Alford according to the plans and specification to be seen at the office of J. E. H. Sergeant, clerk of the Council, Alford to whom tenders are to be sent by noon on May 8.*

May 9. Glasgow.—*Excavations and masonry work, also cast-iron pillars and steel beams, wright-work, slater-work, plumberwork, plasterwork, and tile work in connection with buildings proposed to be erected in Hope Street.* Specifications and forms of offer may be had on application at the Office of Public Works, City Chambers, 64, Cochrane Street. Sealed offers, marked outside "Offer for Hope Street Improvement," must be lodged with A. W. Myles, town clerk, City Chambers, Glasgow, not later than 10 a.m. on May 9.

May 9. Shotley Bridge.—*Brickwork, slating, &c., required in the extension of the resort house at the Shotley Bridge Gasworks.* Plans and specifications may be seen at the Gas Office, Shotley Bridge, and the site viewed at the Works. Tenders to be sent to M. Richey, secy., Gas Office, Shotley Bridge, not later than May 9.

May 10. Royton.—*New public elementary school at Byron Street, Royton, near Oldham.* The plans may be seen and bills of quantities obtained at the office of the county architect, Henry Littler, 16, Ribblesdale Place, Preston, by payment of a deposit of £2. Tenders must be delivered before noon on May 10, sealed and endorsed, to J. W. Riley, Town Hall, Royton.

May 10. Newby.—*Enlargement of Newby Chapel.* Plans and specifications may be seen at Townhead, Newby, and estimates, sealed and endorsed, to be returned to Richard Green, Newby, by May 10.

May 11. Abernant.—*Rebuilding Bethesda Welsh Independent Chapel, Abernant, Aberdare, for the Trustees.* Plans and specification can be seen at the office of T. Roderick, architect, Ashbrook House, Clifton Street, Aberdare. Endorsed tenders to be sent to J. Barclay, 10, Windsor Terrace, Abernant, not later than May 11.

May 11. Taunton.—*Erection of a new classroom wing and corridors, and also a new corridor to connect this extension with the new chapel, at Taunton school.* The plans and specifications may be seen and bills of quantities obtained at the offices of F. W. Roberts, M.S.A., architect and surveyor, 2, Hammet Street, Taunton, to whom tenders must be delivered by the first post on May 11.

May 12. Redruth.—*Erection of banking premises at Penryn Street, Redruth, and shop premises adjoining same, for Barclay & Co. Ltd.* The drawings and specifications may be seen by appointment at the offices of the architect, C. Caldwell, Victoria Square, Penzance, to whom sealed tenders, endorsed "Tender for Banks," are to be sent by May 12.

May 14. Alford.—*Building a church hall at Alford, Lincolnshire.* Plans and specifications may be seen at Mr. Green's, chemist, Market Place, Alford, by appointment. Tenders must be received on or before May 14.

May 14. Marlpool.—*Council school to accommodate about 216 boys.* Persons desirous of tendering for the work may see the drawings, specification, agreement, &c., at the office of the Architect to the Committee, St. Mary's Gate, Derby, between 10 a.m. and 4 p.m., except on Saturday, when they will be on view from 10 a.m. to 12 noon. A copy of the bill of quantities, specification, conditions of contract and form of tender can be obtained at the Architect's Office upon payment of £1 rs. Sealed tenders, in envelopes provided for the purpose, endorsed "Tender for New Council School, Marlpool," must be delivered to George H. Widdows, A.R.I.B.A., architect to the Committee, County Education Offices, St. Mary's Gate, Derby, not later than 5 p.m. on May 14.

May 15. Sheffield.—*Erection of tenements on section 2 of the Crofts area.* Tenders for work required in connection with the above:—Excavator, bricklayer and mason, carpenter and joiner, slater, plasterer, plumber and glazier and painter. Specifications and plans may be seen and quantities obtained at the office of Charles F. Wike, C.E., city surveyor, Town Hall, Sheffield, on payment of £1 rs. Tenders, endorsed "Crofts Dwellings," are to be sent in not later than 9 a.m. on May 15, addressed to "The Chairman and Members of the Health Committee, City Surveyor's Office, Town Hall, Sheffield." Fair wages clause.

May 15. Patterdale.—*Alterations to St. Patrick's Church, Patterdale.* Plans, specifications and all particulars may be obtained on application to George Wason & Son, architects, St. Andrew's Chambers, Penrith. Tenders to be sent to the Rev. W. P. Morris, the Rectory, Patterdale, not later than May 15, endorsed "Tender for Church."

May 16. Epping.—*Construction of nurses' and infants' quarters at the Epping Workhouse.* Drawings can be seen and further particulars and bills of quantities obtained at the office of H. Tooley, A.R., A.B.A., Buckhurst Hill, upon a deposit of £1 rs. Applications for quantities must be made to H. Tooley before May 4. Tenders to be made on forms which will be supplied, and to be sent in the envelopes which will be provided, to R. D. Trotter, clerk to the Guardians, Epping, on or before 5 p.m. on May 16.

May 16. Uttoxeter.—*New Council school to accommodate about 532 children.* Builders desiring to tender for the work should apply to Graham Balfour, Director of Education, Stafford. Quantities will be supplied, for which a deposit of £1 rs. will be charged. The drawings and specification can be seen at the office of the Education Committee at Stafford.

May 16. Aberdeen.—*Mason, carpenter, glazier, slater, plumber, plaster, heating and iron works of alterations and additions at the north-east portion of the main buildings of the Royal Asylum.* The plans and conditions of contract may be seen with, and specifications and schedules of quantities obtained from, Kelly & Nicol, architects, 367, Union Street, Aberdeen. Sealed tenders are to be lodged with A. Scott Finnie, clerk and treasurer, 343, Union Street, Aberdeen, not later than May 16.

May 17. Walmersley-cum-Shuttleworth.—*Enlargement and improvement of the Turn-i-th-Lane Council School, Walmersley-cum-Shuttleworth.* The plans may be seen at the Council Offices, Ramsbottom, and bills of quantities obtained at the offices of the county architect, Henry Littler, 16, Ribblesdale Place, Preston, by payment of a deposit of £1. Tenders must be delivered before noon on May 17, sealed and endorsed, to W. Dilworth, Arden House, Summerseat, near Manchester.

May 18. Dundee.—*New school in the east end of the city, for the School Board.* Plans may be seen and schedules of quantities obtained on application to J. H. Langlands, architect of the Board, 31, Murraygate, Dundee. Offers must be sealed and marked "Tenders for New School," and lodged with John E. Williams, clerk, School Board Offices, Dundee, not later than noon on May 18.

(Continued on p. 242)

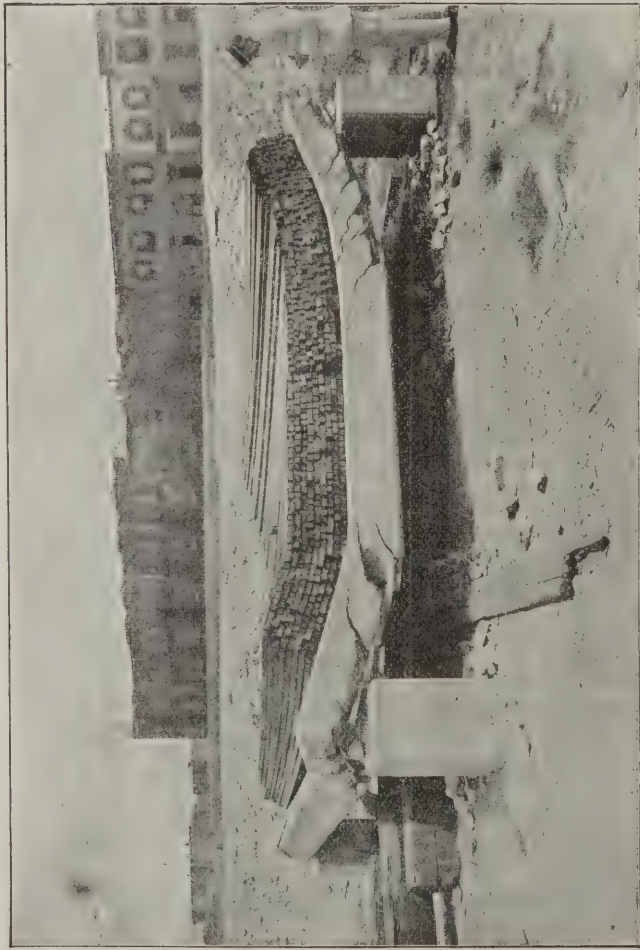


FIG. 2.—SHOWING FAILURE BY SHEAR.

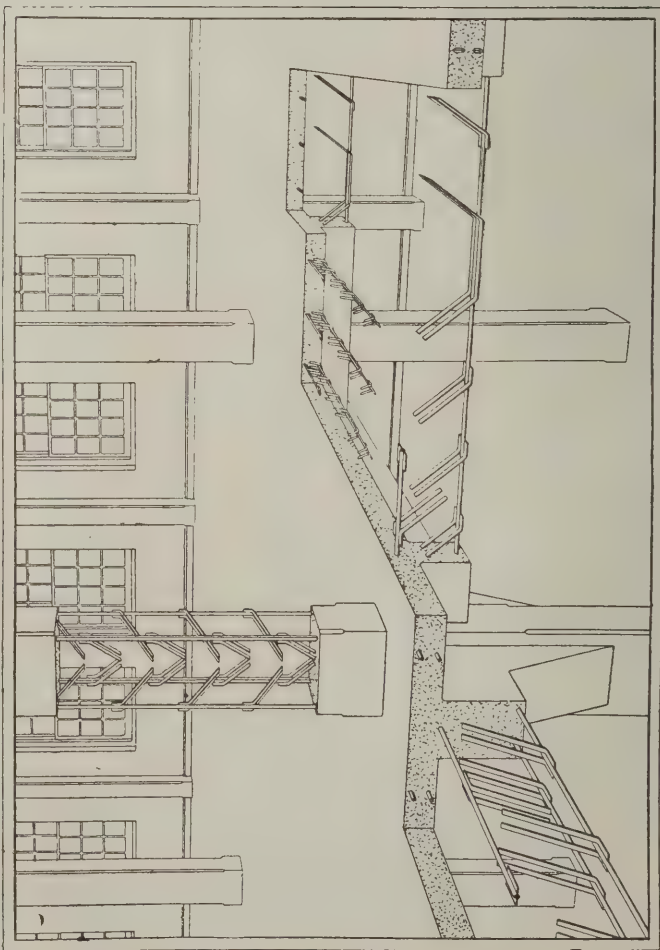


FIG. 7.—GENERAL VIEW OF KAHN SYSTEM OF REINFORCED CONCRETE.

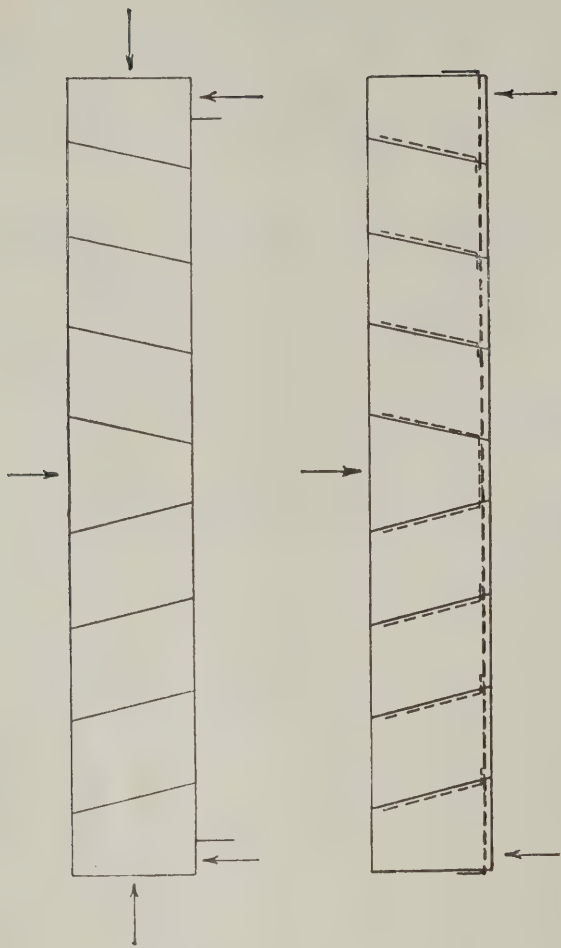


FIG. 4.—ARCH ACTION.

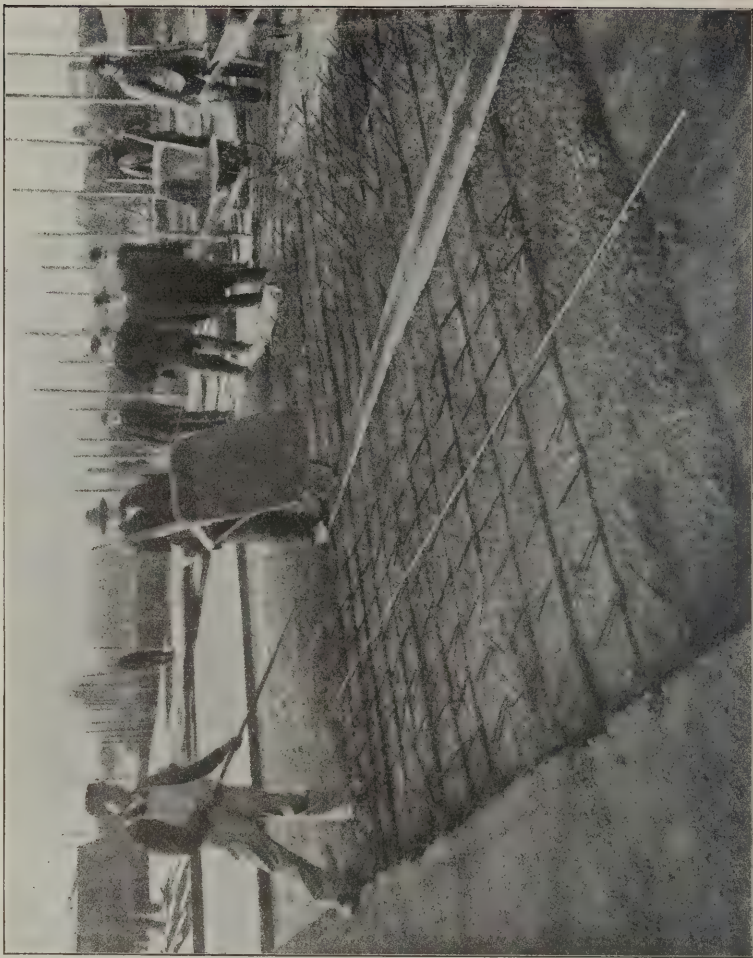


FIG. 8.—CONSTRUCTING KAHN FLOORS.

Tenders.

Addressed postcards on which lists of tenders may be stated will be sent post free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Fetter Lane, E.C. Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Aberdeen.—Accepted for the erection of a new public school at Kuthrieston, for the School Board. Mr. J. A. O. Allan, architect. Quantities by Mr. R. Addie, 129, Union Street.

Excavator—J. Gould.
Mason—E. Gould.
Carpenter—Hendry & Keith.
Slater—Merson & Stewart.
Plasterer—Sellar & Co.
Plumber—J. J. Johnston.
Painter and glazier—J. Mason & Son.
Blacksmith—G. Thomson.
Electric lighting—Pratt & Keith.

[Total, £14,319 16s.] [All of Aberdeen.]

Beauworth.—For the erection of a school, &c., at Beauworth, about six miles from Alresford Station on the London and South-Western Railway, for the Wiltshire County Council. Mr. W. J. Taylor, county surveyor, Winchester:—

C. Wright, Lee-on-the-Solent ... £2,021 15 1
Parnell & Son, Rugby ... 1,971 0 0
Crosby & Co., Farnham ... 1,969 0 0
Jenkins & Sons, Southampton ... 1,868 0 0
F. J. Eddolls, Alresford ... 1,823 1 6
Hale Brothers, Bishop's Waltham ... 1,717 0 0
Grace & Sons, Clatford, Andover ... 1,708 16 6
Annett & Sons, Andover ... 1,545 0 0

* Accepted.

Cefn Mawr.—For the erection of a new Baptist chapel in Cefn Street, for the English Baptist Mission (Mr. G. R. Morris, secretary). Mr. G. Martin Tune, architect and surveyor, Pontycysylltau, Llangollen:—

J. Carden, Rhosymedre ... £1,695
W. F. Humphreys, Cefn ... 1,210
J. T. Jones, Cefn ... 1,195

* Recommended for acceptance.

Cosby.—For works of repair, new vestry, &c., to Cosby church, seven miles from Leicester. Mr. H. Cayley, architect, Bank Chambers, Rothwell, Kettering:—

W. J. Bloxham, Banbury ... £1,599 0 0
R. Cosford, Northampton ... 1,580 0 0
H. Smith, Wolverley, Kidderminster ... 1,297 0 0
S. F. Halliday, Stamford ... 1,248 15 0
W. Lord, Narborough ... 1,215 10 0
G. Henson & Sons, Wellingborough ... 1,177 0 0
T. E. Banbury, Leicester ... 1,115 17 0
Bowman & Sons, Stamford ... 1,100 0 0
Heighton & Co., Cosby ... 1,093 15 0
W. Moss & Sons, Narborough ... 1,090 10 0
T. Herbert (late Cockram), Leicester ... 1,076 9 6
F. J. Bradford, Leicester ... 1,073 4 0
J. R. Cooke, Broughton Astley, Rugby ... 1,059 7 0
Scurr, Jowitt & Co., Barrow-on-Soar, Loughborough ... 1,035 10 0
J. & A. Agar, Syston, Leicester ... 1,016 0 0

* Accepted.

Eastney.—For the erection of St. Patrick's church hall and mission buildings in Eastfield Road. Mr. G. E. Smith, architect, Glendore, 145, Victoria Road North, Southsea:—

Wright & Hurst ... £2,987 0 0
McCarthy Brothers ... 2,962 0 0
W. Beaton ... 2,935 16 6
T. Pearce ... 2,929 0 0
S. Salter ... 2,759 0 0
J. Wright ... 2,698 4 10
M. K. Coltherup ... 2,695 0 0
T. W. Quick ... 2,689 0 0
J. Croad ... 2,650 0 0
J. Harding ... 2,642 0 0
G. H. Rowdell ... 2,600 0 0
E. & A. Spriggins ... 2,600 0 0
J. Crockerell, Victoria Road North, Southsea ... 2,556 0 0
H. Clark & Sons ... 2,549 0 0
W. W. Learmouth ... 2,500 0 0
H. Jones ... 2,440 0 0
H. H. Hall ... 2,374 0 0

* Accepted.

Gainsborough.—For the erection of an elementary school in Koper Road, for the Lindsey County Council Education Committee. Messrs. Scorer & Gamble, architects, Bank Street Chambers, Lincoln:—

H. Peake, Peterborough ... £8,125 0 0
Bowman & Sons, Stamford ... 7,497 10 0
E. Good & Sons, Hull ... 7,390 0 0
Halkes Brothers, Lincoln ... 7,378 0 0
B. Crooks, Woodhall Spa ... 7,260 0 0
F. Messom, Nottingham ... 7,126 13 6
J. Cooper & Sons, Nottingham ... 7,060 0 0
G. Longden & Son, Sheffield ... 6,990 0 0
W. Barton, Thorne, Doncaster ... 6,960 0 0
H. S. & W. Close, Lincoln ... 6,908 10 0
T. Cuthbert, Nottingham ... 6,745 0 0
C. Wright, Leicester ... 6,649 0 0
F. T. Salmon & Co., Cudworth ... 6,598 4 4
F. Scarborough, Lincoln ... 6,530 0 0
A. J. Elmes, Gainsborough ... 6,207 13 9
Sprakes & Sons, Doncaster ... 6,175 0 0
Moss & Sons, Loughborough ... 5,900 0 0

* Accepted.

Hereford.—For the erection of a pair of semi-detached villas on the Highfield Building Estate. Messrs. Groome & Bettington, architects and surveyors, Palace Chambers, King Street, Hereford:—

E. J. Davies ... £925 0 0
R. L. Friend ... 907 10 0
Davies & Co. ... 876 0 0
W. Powell ... 836 0 0
C. Cooke ... 810 0 0
J. T. Jones ... 770 0 0

* Accepted. [All of Hereford.]

Kingston-on-Thames.—Accepted for the erection of new elementary schools in Richmond Road, for the Town Council:—

F. G. Lawrence ... £10,237
[Thirty-six tenders received.]

London, S.W.—For the erection of a new wing to the Waste Land and Lygon Almshouses, Fulham Palace Road, Fulham, S.W., for the Trustees of the Fulham Waste Land and Lygon Almshouses Charity. Mr. Ernest Avern, architect, 13, Tyrerway Road, Fulham. Quantities by Mr. T. Woodbridge Biggs, 10, Clifford's Inn, E.C.:—

H. Haynes, Wembley ... £1,785 0 0
F. J. Lovell & Son, Marlow ... 1,680 0 0
F. G. Minter, Putney ... 1,641 0 0
Patman & Fotheringham, London ... 1,563 0 0
H. Terry, Fulham ... 1,560 0 0
W. Johnson & Co., Wandsworth Common ... 1,539 0 0
E. Swan & Son, Fulham ... 1,520 0 0
W. Lawrence & Son, Walthamstow ... 1,494 0 0
J. Barker & Co., London, W. ... 1,457 0 0
E. J. Clayton, London, W. ... 1,453 0 0
B. E. Nightingale, Lambeth ... 1,415 0 0
Cowley & Drake, Willesden Green ... 1,387 0 0
A. Brickell, West Kensington ... 1,358 0 0
F. G. Lawrence, Kingston-on-Thames ... 1,332 19 4
C. Gray, Shepherd's Bush ... 1,300 0 0
F. & G. Foster, Clifford Road, Norwood Junction ... 1,296 0 0

* Recommended for acceptance.

London.—For the supply of locks required at Long Grove Asylum:—

Chubb & Sons, Ltd., London ... £3,075 0 0
J. Gibbons, Wolverhampton ... 1,993 13 4
Hobbs, Hart & Co., London ... 1,868 12 6
C. G. Smith & Co., London ... 1,546 12 6

London.—For the installation of electric lighting and power (excluding generating plant) at Long Grove Asylum, for the London County Council:—

E. D. Triswell ... £25,117 0 0
W. Mackie & Co. ... 19,127 0 0
Edmundson's Electricity Corporation, Ltd. ... 17,048 0 0
New alternative tender ... 16,550 0 0
W. Dibbed, Southampton ... 17,027 1 0
G. Hartland, Bowden & Co., Manchester ... 16,814 0 0
J. O. Grant & Taylor ... 16,586 0 0
Tyler & Freeman ... 16,542 0 0
F. A. Glover & Co., Ltd. ... 16,500 0 0
W. H. Arundell, Maidenhead ... 16,300 0 0
W. G. Heath & Co., Plymouth ... 16,000 0 0
Strode & Co. ... 15,973 0 0
T. Hiscock Hounslow ... 15,935 13 6
Bailey, Grundy & Barrett, Cambridge ... 15,750 10 0
Strange & Son, Ltd., Tonbridge ... 15,654 0 0
G. N. Haden & Son, Tonbridge ... 15,427 0 0
Hooper, Neary & Co. ... 14,976 0 0
Dargue, Griffiths & Co., Liverpool ... 14,448 0 0
S. S. Cozens ... 14,217 0 0
J. E. Spagnoletti & Co. ... 14,000 0 0
H. A. Jackson & Co., Blackburn ... 13,995 0 0
Tamplin & Makovski, Redhill ... 13,883 0 0
Buchanan & Curwen ... 13,880 0 0
Sweet Brothers ... 13,855 9 7
T. Potter & Sons, Ltd. ... 12,995 0 0
The Army and Navy Auxiliary Stores ... 12,880 0 0
W. Fryer & Co. ... 12,769 0 0
W. J. Furze, Nottingham ... 12,700 0 0
W. Winn ... 12,675 0 0
Cox Walkers, Durlington ... 12,582 0 0
Besvan & Sons, Ltd. ... 12,495 0 0
R. Cort & Sons, Ltd. ... 12,336 0 0
Jackson Brothers ... 12,235 0 0
Bromley, Batstone & Kirk ... 11,600 0 0
Lea & Warren, London and Kettering ... 11,200 0 0

* Accepted. [Rest of London.]

Morley.—Accepted for the erection of a cotton-spinning mill, for the Morley Cotton Spinning Co. Messrs. T. A. Buttery & S. B. Birds, architects, Queen Street, Morley:—

Mason—J. Clegg & Son, Morley ... £5,390 0 0
Ironfounder—Newsome & Askham, Batley ... 2,722 0 0
Plasterer and Concretor—Bagnall Brothers, Wakefield ... 1,178 19 11
Joiner—Smith & Bland, Leeds ... 1,335 13 4
Plumber—G. A. Firth, Morley ... 194 0 0
Slater—G. Rogerson, Morley ... 24 5 0

Morley.—Accepted for the erection of a new woollen mill, for Mr. J. W. Appleyard. Messrs. T. A. Buttery & S. B. Birds, architects, Queen Street, Morley:—

Joiner—P. Rhodes, Leeds ... £2,100 0 0
Mason—I. Newton, Morley ... 1,190 0 0
Ironfounder—Morley Engineering and Pulley Co., Morley ... 315 14 0
Slater—J. Atkinson & Son, Leeds ... 229 18 6
Plumber—G. A. Firth, Morley ... 204 0 0
Plasterer—J. Iredale & Son, Birstall ... 56 13 8

Newport.—Accepted for the erection of the new Carnegie free library, Corporation Road, for the Corporation:—

J. H. Williams, Llanwrn, near Newport ... £2,000
Seascale (Cumberland).—For the erection of a residence for Mr. George R. Burnett. Mr. W. L. Mason, F.R.I.B.A., architect, Ambleside:—

D. Mackereth, Milson ... £2,739 0 0
H. Eillbeck & Son, Seascale ... 2,618 0 0
G. W. Bradley, Milson, Cumberland ... 2,597 0 0
J. Fyson, Gosforth, Cumberland ... 2,417 13 2
W. Gradwell & Co., Barrow-in-Furness ... 2,414 0 0
L. Ferguson, Willow Dene, Harrington ... 2,389 0 0
J. Laing & Son, Widdowburn Street, Carlisle ... 2,359 0 0

* Accepted.

Tamworth.—For certain new buildings and alterations to their premises in Orchard Street, The Leys, Tamworth, including the erection of butcher's and grocer's shops and sundry other works, for the Tamworth Industrial Co-operative Society. Mr. Francis B. Andrews, architect, 95, Colmore Row, Birmingham:—

W. Bishop, King's Heath, Birmingham ... £5,185 0 0
E. Williams ... 5,113 0 0
J. Smith & Sons, Birmingham ... 5,078 0 0
C. E. Shuttleworth, Tamworth ... 5,022 10 0
J. Barnsley & Son, Birmingham ... 5,002 0 0
H. Smith, Wolverley, Kidderminster ... 4,936 0 0
T. Elvins, Birmingham ... 4,895 0 0
Watson & Sons ... 4,880 0 0
W. Robinson, Birmingham ... 4,766 0 0
C. Clarkson & Sons* ... 4,718 0 0
B. Musson ... 4,677 0 0
Co-operative Builders, Kettering ... 4,271 0 0

[Rest of Tamworth.] * Accepted.

Thornley.—For the erection of a small-pox hospital near Thornley, co. Durham, for the Easington and Sedgfield Joint Smallpox Hospital Board. Mr. James Stones, architect and surveyor, Sedgfield:—

Sanderson & Bell, Coxhoe, co. Durham ... £3,553 13 0
T. Manners, Bishop Auckland ... 3,295 0 0
A. Metcalfe, Shildon ... 3,054 14 0
G. W. Lazenby, Ferryhill ... 2,835 0 0
S. & G. Colwill, Wingate ... 2,830 0 0
Makepeace & Vaux, Trimdon, co. Durham ... 2,550 0 0

* Accepted.

Wimbledon.—For slipper baths extension, for the Town Council. Mr. C. H. Cooper, surveyor:—

Parsons & Townsend ... £2,007 0 0
J. Barrett ... 1,913 0 0
G. Beloni ... 1,883 0 0
H. E. H. Buckingham, Ltd. ... 1,844 0 0
J. Burges & Sons ... 1,800 0 0
E. P. Bulled ... 1,773 9 5
F. & G. Foster ... 1,769 0 0
J. Garrett & Son ... 1,767 0 0
W. S. Sheppard ... 1,754 0 0
Martin, Wells & Co. ... 1,750 0 0
B. E. Nightingale ... 1,733 0 0
R. Dean & Co. ... 1,705 10 0
W. H. Hyde ... 1,685 0 0
F. G. Laurence, Kingston ... 1,540 1 8

* Accepted.

Wimbledon.—For external cleaning and painting, &c., at the Library buildings, for the Library Committee:—

R. H. Adams ... £93 15 0
Parsons & Townsend ... £70 0 0
H. E. H. Buckingham, Ltd. ... 60 10 0
J. Thursting ... 55 0 0

* Accepted. [All of Wimbledon.]

Wimbledon.—For the erection of ten villas at Chatsworth Avenue, for the Polytechnic Estate, Ltd. Mr. William C. Poole, architect, Wandsworth Common:—

Harbour & English, Southend-on-Sea ... £3,120
H. E. H. Buckingham, Ltd., Wimbledon ... 3,050
Hall & Jacobs, Sydenham ... 2,938
Workington.—For the whole or any of the trades required in altering and extending the Central Hotel, Workington for the Workington Brewery Co. Messrs. Oliver & Dodgshun, F.F.R.I.B.A., architects, Carlisle:—

T. Mackenzie, Maryport ... £3,757 14 4
H. Kilip, Harrington ... 3,179 9 0
T. Johnston, Workington ... 2,924 18 6
J. Shackley, Harrington ... 2,808 17 0
B. Hyde, Workington ... 2,707 18 3

* Accepted.

Coming Events.

Wednesday, May 2.

ROYAL ARCHAEOLOGICAL SOCIETY.—"Notes on Fonts," by Mr. Alfred Fryer, and "Excavations in Hayling Island," by Mr. Talfourd Ely, at 4 p.m.

INSTITUTION OF CIVIL ENGINEERS.—Mr. R. D. Hadfield on "Unsolved Problems in Metallurgy," at 8 p.m.

BUILDERS' FOREMEN AND CLERKS OF WORKS' INSTITUTION.—Ordinary Meeting at 8 p.m.

Thursday, May 3.

CHEMICAL SOCIETY.—Ordinary Meeting at 8.30 p.m.

WORSHIPFUL COMPANY OF CARPENTERS.—Mr. J. Bartlett on "Shoring, Timber Framing and Floors," at 7.30 p.m.

Saturday, May 5.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Visit to Newbattle Abbey, Dalkeith, N.B.

Monday, May 7.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.—Annual General Meeting at 8 p.m.

SURVEYORS' INSTITUTION.—Junior Meeting at 7 p.m.

SOCIETY OF ENGINEERS.—Mr. David Sommerville on "The Chemistry and Bacteriology of Potable Waters," at 7.30 p.m.

Thursday, May 10.

WORSHIPFUL COMPANY OF CARPENTERS.—Mr. J. Bartlett on "Shoring, Timber Framing and Floors," (continued), at 7.30 p.m.

Friday, May 11.

ARCHITECTURAL ASSOCIATION.—First Summer Visit, to All Saints' Church, Tooting.

Saturday, May 12.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Associates' Visit to St. Andrew Steel Works.

Monday, May 14.

SURVEYORS' INSTITUTION.—Ordinary General Meeting at 8 p.m.

Wednesday, May 16.

ARCHITECTURAL ASSOCIATION.—Annual Dinner, Georgian Hall, Gaiety Restaurant.

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The whole of the Concrete Fireproof Floors and Roofs of this building constructed on the Columbian System of Ribbed Steel Bars and Concrete, also the Vaults under the pavement around the entire building

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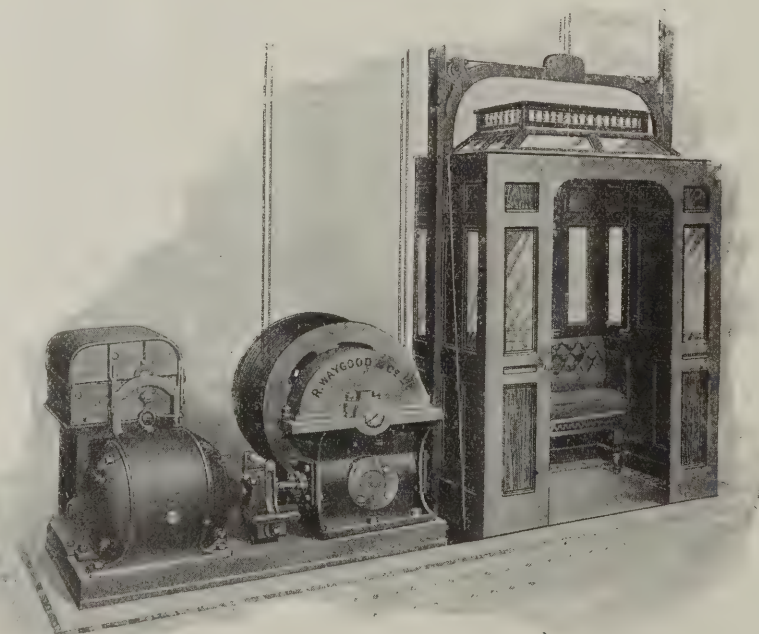
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REINFORCED CONCRETE.

The Kahn System.

IN this country we were tardy in adopting reinforced concrete, but now that we are waking up to its utility several firms well-known in America and on the Continent are bringing their systems over to take a share of the work. The Trussed Concrete Steel Co., who work the well-known Kahn system of America, have recently opened an office at Caxton House, Tothill Street, Westminster, and have issued a catalogue which is one of the best we have seen in connection with this branch of construction. It is, indeed, more than a catalogue; it is a useful treatise on the principles of reinforced concrete construction, and all professional men should study it. Formulae, tables, a specimen specification, and other information of practical use are included, together with illustrations of works executed on the Kahn system. There are several features in this system which require explanation as differentiating it from other well-known types. The basis is the patent bar, which is rolled in steel to the section shown in Fig. 1. The projecting wings on either side are sheared up to do the duty of stirrups in other systems; that is to say, they bond both the layers of concrete in which such work is brought up the required



FIG. 1.—CROSS-SECTION AND VIEW OF KAHN TRUSSED BAR.

thickness and reinforce members against shear.

The following is an explanation of the action of these bars in beams—the most important detail of reinforced concrete construction. Anyone who understands the theory of stresses in beams will know that the top of the beam acts in compression while the bottom is in tension. The lines of principal tensile stress curve upwards from the centre of the span towards the supports, while the lines of compressive stress are exactly the reverse, curving downwards from the centre of the beam at the top to the bottom of the beam at the supports. In the centre these lines are flat, curving sharply upwards and downwards at the supports; they cross each other at right angles. With the distributed load which beams are usually called upon to sustain the shear is greatest near the points of support. Now concrete is weak in tension and strong in compression, consequently when loaded heavily the concrete cracks inwards along the lines of compressive stress. As the loading becomes greater the shear force extends these cracks

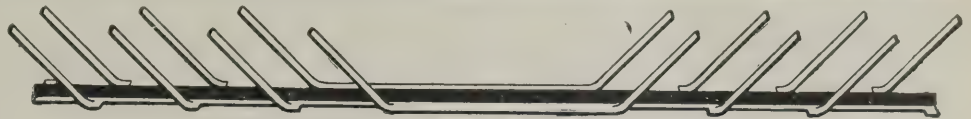


FIG. 5.—KAHN BAR WITH STAGGERED DIAGONALS.

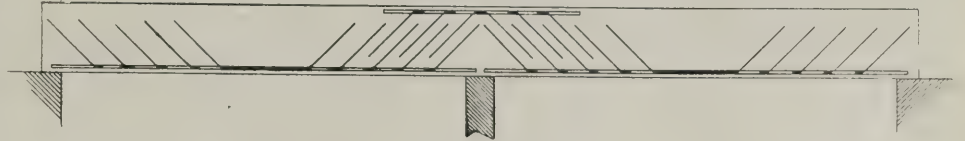


FIG. 6.—METHOD OF REINFORCING CONTINUOUS BEAM AT POINT OF CONTRAFLEXURE.

inwards along the lines of compressive stress, owing to the weakness of the concrete in tension. This is clearly shown in Fig. 2, which is a photograph of a beam tested by the United States Government War College. The vertical members of the Kahn bar cross these cracks at right angles, being bent upwards to an angle of 45 degs., and prevent the concrete opening by shear in this way.

In regard to this some theorists have reasoned that it is unnecessary to consider shear in a beam, but apparently this is based on the consideration of concentrated loads or small spans. Where a beam sustains distributed loads it is most important to reinforce

rigidly attached shear members. The importance of this point is considerable. This rigid connection allows the strength to be so much more easily calculated. We have not to depend upon the elastic limit of the steel, but can take a factor of safety of 4 on the ultimate strength.

Where beams are of considerable depth it will be apparent that if the bar were sheared, as shown in Fig. 1, the shear members could not be made long enough to extend to the top of the beam, but by staggering these, as shown in Fig. 5, they can be of any depth. The tension members require to be of greatest strength in the centre of the beam and can diminish towards the supports. Thus, in

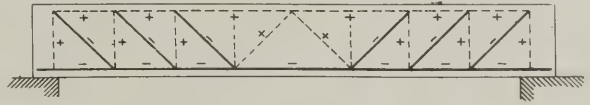


FIG. 3.—DIAGRAM SHOWING TRUSS ACTION.

against shear. This vertical reinforcement may be explained on the principle of truss action (see Fig. 3). The concrete acts, as shown, as the vertical compression member of a truss. Another way of looking at the action of the Kahn reinforcement is illustrated in Fig. 4, showing a flat lintel. The load tends to push the keystone down, which can only be done by pushing aside the voussoirs of the arch, and thereby causing a thrust on the skewbacks or wall, the last ordinarily supplying the horizontal resistance. If the wall be taken away this horizontal thrust can be supplied by a steel tension member turned up at the ends, with prongs connected thereto passing between the blocks. Now this brings us to the point in the Kahn system. It will be clearly seen that unless these prongs were rigidly connected to the tension bar at the bottom they would slip along with the voussoirs and not transfer the stress to the tension member. Tests have shown that loose stirrups have slipped along the bars when the beams have been tested to failure. Tests have shown about 33 per cent. increase of strength that comes by the use of

calculating the strength, the entire area of the section, including wings, must be taken.

With continuous beams the Kahn bar is placed reversed, as shown in Fig. 6, at the point of contraflexure. In columns the bars have the prongs bent in one direction, and extend inwards from the angles of the centre, as shown in the general view of the system in Fig. 7, thus forming practically a latticed column. These prongs take the place of the links or wire binding in other systems.

The Kahn bar is equally efficient in other conditions. It has been used extensively for footings, retaining walls, bridges, sewers, water-tanks, &c. It is obvious that the reinforcement being all joined together as a unit, it can be conveniently handled and put in position without risks of getting out of place, such as arise with careless workmen. Consequently the Kahn system is most economical. Fig. 8 shows the manner in which a Kahn floor is laid. There are no royalties with this system. For further particulars we would refer readers to the catalogue issued by the Trussed Concrete Steel Co.

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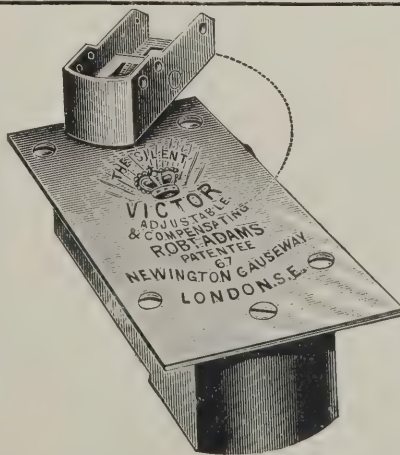
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Telephone: 829 Central.

(Continued from p. 239.)

May 17. Great Leighs.—Structural alterations, and building new classroom, to the Council School, Great Leighs. Plans, specifications and form of contract may be inspected at the office of the architect, Frank Whitmore, 73, Duke Street, Chelmsford, between 10 and 5, on any working day except Saturday. Builders desirous of tendering must send in their names and addresses to the architect on or before May 3, when copy of bills of quantities will be supplied to each applicant if references are satisfactory. Sealed tenders, endorsed "Tender for Great Leighs School Works," should be sent to J. W. Nicholas, secty., County Offices, Duke Street, Chelmsford, by May 17.

May 21. Lochgelly.—Mason, brick, joiner, plumber, concrete, plaster, slater, iron, steel and glazier works for proposed bakery premises, Lochgelly, for the Lochgelly Co-operative Society, Ltd. Plans and specifications may be seen, and all further information obtained, on application to James T. Scobie, architect, Dunfermline and Lochgelly. Schedules of measurements may be had from the Secretary on payment of £1 1s. The estimates to be lodged with the secretary, John Mitchell, on or before 10 a.m. on May 21, marked "Tender New Bakery Premises," on envelope.

No date. Glasgow.—Erecting a large number of villa residences on a building estate near Glasgow. Drawings and schedules and full particulars will be supplied by R. Anderson, 39, Victoria Street, Westminster, London, on deposit of £2 2s.

No date. Wimborne.—Erection of a pair of villas at Wimborne. Plans and specification may be seen at the offices of Charles Munckton, surveyor, Wimborne.

No date. Monmouth.—Erection of a residence in Redbrook Road, for H. F. Perkins, Hadnock Court. Intending contractors should send their names to Ernest G. Davies, M.S.A., architect, 7, Bridge Street, Hereford, and 25, Agincourt Square, Monmouth, when specification and form of tender will be supplied.

ENGINEERING.

May 3. Manchester.—Supply of a one ton hand Scotch derrick crane, 35ft. jib complete. To be delivered at Denton station (L. and N.W. Ry.). Tenders, endorsed "Tender for Crane," and addressed to the Chairman of the Waterworks Committee, Town Hall, Manchester, must be delivered not later than May 3.

May 4. Walsall.—Heating and hot-water supply, laundry alterations, &c., at Walsall and District Hospital. Plans and specifications can be seen on application at the hospital between 10 and 5. Tenders are to be sent to E. J. Brookes, chairman, Leicester Street, Walsall, before noon on May 4.

May 4. Northfleet.—Construction of a swimming bath, 80ft. by 30ft., at the rear of the Factory Club. Plans and specification may be seen at the Secretary's Office between 10 a.m. and 8 p.m., and tenders, marked "Tender for Swimming Bath," must be delivered to W. H. Steadman, secty.

May 5. Llanuwchllyn.—Erection of a steel girder bridge with masonry abutments, at Llanuwchllyn, in the county of Merioneth. Intending competitors may estimate for the whole work or for the masonry or steelwork only. Plans and specifications may be seen at the office of the County Surveyor, at Arthog, Dolgellay, to whom tenders are to be sent not later than May 5.

May 5. Talylyn.—Erection of a small girder bridge at Talylyn, in the county of Merioneth. Intending competitors may estimate for the whole structure, or for the masonry or steelwork only. Plans and specifications may be seen at the office of the County Surveyor, at Arthog, Dolgellay, to whom tenders are to be sent not later than May 5.

May 5. Standish.—Constructing a service reservoir near Prospect Hill, in Standish; also for 75 tons of cast-iron water mains, for the U.D.C. Drawings may be seen and copy of bills obtained on application to Heaton, Ralph & Heaton, engineers, Wigan, on a deposit of £1 1s. Sealed tenders, endorsed "Tender for Reservoir," to be delivered to J. H. Richards, clerk to the Council, Standish, by May 5.

May 12. Portsmouth.—Additions to the Stanshaw pumping station, with new engine pump and rising main in Simpson Road, Stanshaw. On payment of the sum of £2 2s. a lithographed copy of the specification, general conditions and bill of quantities, with form of tender, can be obtained on application to the Town Clerk, and any further particulars can be obtained at the Borough Engineer's Offices, at the Town Hall, Portsmouth. Tenders, marked "Tender for Stanshaw Pumping Station Rising Main, &c.," must be filled up, signed and returned with the bills of quantities, duly filled in, to Alexander Hellard, town clerk, Town Hall, Portsmouth, not later than 10 a.m. on May 12. Fair wages clause.

May 14. Edinburgh.—Arc lamp posts. The specification, form of tender and drawings can be obtained from the Electrical Engineer, Dewar Place, Edinburgh, on payment of a deposit of £2 2s. Tenders on the prescribed form, enclosed in sealed envelopes and endorsed on the outside "Tender for Arc Lamp Posts," must be sent to the Town Clerk, City Chambers, Edinburgh, not later than May 14.

May 14. Langley Moor.—Repairs to Esh Bridge. Contractors desirous of tendering for this work may receive particulars from G. G. Donkin, surveyor, Langley Moor, by appointment. Tenders to be delivered to J. G. Wilson, Durham, on or before May 14.

May 14. Manchester.—Extension of the refrigerating machinery and plant at Smithfield Market. Specification and form of tender may be obtained on application at the City Surveyor's Office, Town Hall, Manchester, on payment to the City Treasurer of £2 2s. All cheques or postal orders are to be made payable to the order of "The Corporation of Manchester." Tenders, enclosed in the official envelopes and addressed to the Chairman of the Markets Committee, to be delivered at the City Surveyor's Office not later than noon on May 14.

May 15. Clare.—Carting, excavating for and laying and jointing of about 3 miles of 4in. and 3in. cast-iron water-mains, including fixing valves, hydrants, &c., the erection of brick service reservoir, pumping station, and all works in relation thereto, for the R.D.C. Plans and specifications may be seen, and copies of the quantities and form of tender obtained from the engineers Sands & Walker, Milton Chambers, Nottingham, on payment of £2 2s. (by cheque). Sealed and endorsed tenders to be sent to S. L. Bigmore, clerk to the Council, Haverhill, Suffolk, on or before 10 a.m. on May 15.

May 15. Warrenpoint.—Construction of sea baths for the U.D.C., in accordance with plans and specifications prepared by Kaye, Parry & Ross, civil engineers and architects, 63, Dawson Street, Dublin. For the convenience of persons tendering for the above works bills of quantities, based upon the plans and specifications, have been prepared by Beckett & Medcalf, quantity surveyors, but their accuracy is not guaranteed. Copies of these bills can be obtained at the offices of the Architects on payment of £1. Tenders, enclosed in sealed envelopes, marked "Tender for Baths," and addressed to the Chairman of the Council, must be delivered at the Town Hall, Warrenpoint, on or before May 15.

May 15. Amptill.—Water supply: (a) Supply, delivery and laying of about 7 miles of 6in., 4in. and 3in. cast-iron water mains, with sluice valves, hydrants, air valves and water-level indicator; (b) construction of engine and producer-house and brick softening tanks at Crophill and a 150,000 gallon capacity service reservoir in Amptill Park; (c) supply, delivery and erection of suction gas plants, gas engines, air compressors, surface pumps, softening plant, and well, with air lifting plant at Crophill, for the U.D.C. Drawings, specification, conditions of contract and forms of tender may be seen on and after May 3 at the offices of the engineers, W. R. & W. Phillips, Luton, Beds, from whom copies of same can be obtained on payment of £2 2s. for each (a) (b) and (c) contracts, half of which sum will be returned on receipt of a bona-fide tender if the copies of plans and specifications are returned to the Engineers. Sealed tenders on the prescribed form and endorsed "Amptill Waterworks, Contract (a) (b) or (c) as the case may be, to be addressed to Alfred T. Trethewey, clerk to the Council, U.D.C. Offices, Amptill, Bedfordshire, and delivered by May 15.

May 16. Salford.—Supply and erection of a station meter (50,000 cub. ft. per hour capacity) at the Bloom Street Gasworks. The drawings may be seen and copies of the specification and form of tender obtained (for which a charge of £1 1s. will be made) on application to William W. Woodward, engineer, Gas Offices, Bloom Street, Salford. Sealed tenders, endorsed "Tender for Meter," addressed to the Chairman of the Gas Committee, Town Hall, Salford, to be delivered to L. C. Evans, town clerk, Town Hall, Salford, not later than 3 p.m. on May 16.

May 21. South Uist.—Repairing the tidal embankment at Strone Dearg, near Oaiburgh, South Uist, including erection of cofferdam and other wood framing. Construction of about 260 cub. yds. of concrete embankment with sluice ways, tidal flap valves, and other works. Schedules of quantities can be obtained from J. Wedderpoon, engineer, The Castle, Inverness, to whom tenders are to be sent by May 21. Contractors will be taken over the works on May 14 at 12.

IRON AND STEEL.

May 8. London, E.C.—Steel and cast iron bridge-work for the Bombay, Baroda and Central India Railway Co. Tenders must be made on a form, copies of which, with specification, can be obtained at the offices on payment of 12s. each (which will not be returned). Tenders to be sent to T. W. Wood, secretary, Gloucester House, Bishopsgate Street Without, London, E.C., by noon on May 8.

May 9. London, E.C.—Supply of 500 steel tyres for carriage and wagon wheels, for the Burma Railways Co., Ltd. Specifications and forms of tender can be obtained at the Company's offices, 199, Gresham House, Old Broad Street, E.C. For each specification a fee of 10s. will be charged, which will not be returned. Tenders, enclosed in sealed envelopes and marked "Tender for Steel Tyres," must be delivered not later than noon on May 9.

May 9. London, E.C.—Wrought-iron bars for the East Indian Railway as per specification to be seen at the Company's offices. Tenders are to be sent to C. W. Young, secty., Nicholas Lane, E.C., marked "Tender for Wrought-iron Bars," not later than noon on May 9. The Company reserves to itself the right to divide the order, also to decline any tender without assigning a reason. For each specification a fee of £1 1s. is charged, which cannot under any circumstances be returned.

May 15. London, S.W.—Unclimbable steel paling, for the Southern Mahratta Railway Co., Ltd., as per specification and drawing, which may be seen at the offices of the Company. The charge for the specification is £1 1s., which will not be returned. Tenders must be sent in, marked "Tenders for Steel Paling," addressed to E. Z. Thornton, secretary, 46, Queen Anne's Gate, S.W., not later than noon on May 15.

May 15. Clare.—Supply and delivery at Clare of about 170 tons of cast-iron water-pipes and specials, 4in. and 3in. diameter, and other works. Specification and bill of quantities may be obtained from the engineers, Sands & Walker, Milton Chambers, Nottingham, on payment of £2 2s. (by cheque). Sealed and endorsed tenders to be sent to S. L. Bigmore, clerk to the Council, Haverhill, Suffolk, on or before 10 a.m. on May 15.

PAINTING AND PLUMBING.

May 3. Ganarew.—Re-decorating Ganarew church. Specification may be seen and particulars obtained of H. Webb, Ganarew, to whom tenders must be delivered not later than May 3.

May 3. Haworth.—Painting required to be done to the whole of the property of the Haworth Industrial Co-operative Society Ltd. Specification and details may be had from the Secretary. Tenders to be in not later than 6 p.m. on May 3, endorsed "Painting."

May 3. London and Burton.—Painting, &c., as follows:—(1) Cleaning and painting at Poplar Goods Depot, London. (2) Cleaning and painting engine sheds, &c., at Burton. Specifications may be seen, quantities and particulars obtained on application at the Engineer's Offices at Derby. Sealed tenders to be forwarded by post to the Secretary of the Way and Works Committee, Midland Railway, Derby, not later than 9 a.m. on May 3.

May 3. Skipton and Ingleton.—Painting, &c., to buildings, &c., at Skipton and Ingleton, for the Midland Railway Co. Specification may be seen, quantities and particulars obtained on application at the Engineer's Office, Derby. Sealed tenders to be forwarded by post to the Secretary of the Way and Works Committee, Midland Railway, Derby, not later than 9 a.m. on May 3.

May 7. Stafford.—Painting bridges and fencing, also for the exterior painting of Elmhurst, Tillington, and the thirty-one municipal cottages, Crooked Bridge Road. Forms of tender and other particulars can be obtained on application to W. Blackshaw, borough engineer, Borough Hall, Stafford. Fair wages clause. Sealed tenders (in official covers) shall be delivered at the Town Clerk's Office, Martin Street, Stafford, not later than 10 a.m. on May 7.

May 9. Sunderland.—Painting and colouring the following schools during the Midsummer Holidays, viz.: Haswell and Station Town, windows inside and wood and ironwork outside only, Trimdon Foundry; Wheatley Hill, Wingate and Wingate Grange. Applications for specifications and forms of tender, stating for which school or schools same are required, may be obtained from C. Neate, district clerk, Haswell, Sunderland, to whom tenders must be returned by May 9.

May 10. London, S.E.—Whitewashing, cleaning and painting work at the Infirmary, East Dulwich Grove, S.E. The specification can be seen and all information obtained at the offices of the Steward of the Infirmary as above, between 10 and 4. Tenders, endorsed "Painting, &c.," should be addressed to the Guardians of the Southwark Union and delivered at the Union Offices, John Street West, Blackfriars Road, S.E., by 4 p.m. on May 10.

May 10. Peterborough.—Supply of lead pipe, plumbers' metal, and pig lead for twelve months for the Town Council. Further information and specification with forms of tender may be obtained on application at the City Engineer's Office, Market Place, where sealed tenders must be delivered on or before May 10.

May 14. London, S.E.—Cleansing, repair and painting of schools, to be executed during the summer vacation. Persons desiring to tender are requested to make written application to William Jacques, A.R.I.B.A., architect to the Education Committee, 2, Fen Court, E.C., for copy of specification and form of tender on or before May 5, which application must be accompanied by a deposit of £1 (cheques will not be accepted). Sealed tenders in the envelope supplied to be delivered at the Education Department, 95, The Grove, Stratford, E., not later than 5.30 p.m. on May 14. Fair wages clause.

May 22. Cardiff.—Painting the cab shelters of the Corporation. Further particulars may be obtained from the Head Constable, Chief Police Station, Cardiff. Tenders, endorsed "Painting Cab Shelters," must be delivered to the Town Clerk, Town Hall, Cardiff, before May 22.

No date. Exeter.—Painting. Persons willing to tender for repairs and painting at the United Almshouses, Parr Street, Exeter, are requested to send their names to C. E. Ware, 18, Bedford Circus, when copy of specifications will be supplied.

No date. Peterborough.—Iron fencing and painting at Old Fletton Cemetery. Particulars to be obtained from W. Mellows, solicitor, Queen Street, Peterborough, clerk to Burial Joint Committee.

ROADS AND CARTAGE.

May 3. Maldon.—Supply of broken granite and flints, Forms of tender may be obtained from the Borough Engineer. Tenders, endorsed "Tender for Road Materials," to be sent in to Thomas R. Swales, borough engineer and surveyor, Borough Engineer and Surveyor's Office, Maldon, on or before May 3.

May 3. Atherton.—Supply and delivery, free at the Atherton Lancashire and Yorkshire Station, of about 270 tons of 5in. by 4in. granite setts. Specification and form of tender may be obtained on application to F. H. Grimshaw, A.M.I.C.E., surveyor to the U.D.C., and sealed tenders, endorsed "Tender for Setts," are to be delivered to D. Schofield, clerk to the Council, Town Hall, Atherton, near Manchester, not later than noon on May 3.

May 5. Leeds.—Paving and flagging of the following streets:—Harold Grove, Back Harold Grove, Western Road, Western View, Western Grove, Western Mount, Western Street, Warrels Road and Stratford Street. Plans and specifications may be seen at the City Engineer's Office, Municipal Buildings. Tenders, on forms supplied, must be sent to the Town Clerk's Office on or before May 5, addressed to the Highways Committee and endorsed "Tender for Private Street Works."

May 7. West Ashford.—Broken granite, for the R.D.C. Supply of about 1,750 tons of either of the following:—Best blue Guernsey, Clee Hill, Aberdeen, Penlee, basalt, or Cherbourg quartzite, to be delivered at the railway stations at Charing, Northfield, Ashford, Pluckley, Headcorn and Great Chart Siding, in such quantities as the Surveyor shall from time to time order, for the year ending March 31, 1907. Further information and forms of tender can be obtained on application to A. Sims, surveyor. Sealed tenders, accompanied by

samples of the material, endorsed "Tender for Granite," addressed to the Chairman of the R.D.C., are to be delivered at the Union House, Westwell, Ashford, Kent, not later than May 7.

May 9. London, S.E.—Supply of granite spalls, to be delivered at the Workhouse, Gordon Road, Peckham. Forms of tender, with further particulars, may be obtained upon application at the Guardians' Offices, 29, Peckham Road, S.E., where tenders must be sent, marked "Tender for Granite," before noon on May 9.

May 9. Cardiff.—Forming, metalling, paving, kerbing and channelling the undermentioned streets at Roath, Splott and Canton:—Kimberley Road, Kimberley Lane North, Kimberley Lane South, Harrissmith Road, Harrissmith Lane West, Harrissmith Lane East, Mafeking Road, Roath Branch Lane East, Roath Brook Lane, Walker Road, Walker Lane, University Place, Eyre Street, Coveny Street, Coveny Lane, Haberston Lane and Brunswick Street. Separate tenders are required for (1) forming and metalling the carriageways; (2) paving, kerbing and channelling the footways. Drawings and specifications may be seen and forms of tender obtained at the office of W. Harpur, M.I.C.E., city engineer. Sealed tenders, endorsed "Tenders for Private Street Works," are to be delivered at the Town Clerk's Office on or before May 9.

May 10. Ware.—Sewering, levelling, paving, kerbing, metalling, channelling and making good Cross Street, Garland Road and Raynsford Road, for the U.D.C. Plans, sections, specification and copy of contract may be seen and forms of tender obtained at the office of the Surveyor to the Council, New Road, Ware. Tender, in sealed envelope, endorsed "Street Improvement," to be delivered to George H. Gisby, clerk to the Council, Town Hall, Ware, Herts, not later than 4 p.m. on May 10.

May 11. Cork.—Paving with compressed asphalt the carriage-way of Winthrop Street, in accordance with the specification and conditions of contract to be seen in the City Engineer's Office, Municipal Buildings, from 10 to 4 daily, where tender forms can be obtained. Tenders on any other forms than those issued from the City Engineer's Office will not be considered. Sealed tenders may be lodged in the Town Clerk's Office, Municipal Buildings, up to 4 p.m. on May 11, endorsed "Tender for asphaltizing Winthrop Street." The concrete bed will be laid and prepared to receive the asphalt by the Corporation. Fair wages clause.

May 14. Hambledon.—Supply of good materials for use on the roads in the district of Hambledon; also for carting materials on the various roads, for the R.D.C. Forms of tender and other information may be obtained of the surveyor to the Council, Samuel B. Hassell, Eastwood Road, Bramley. Sealed tenders, endorsed "Tender for —," must be sent to Ferdinand Smallpiece, clerk to the Council, 138, High Street, Guildford, on or before May 14.

May 15. Colwyn Bay.—Making-up of Upper Promenade Road, for the U.D.C. Plans, specifications, &c., may be seen and bills of quantities obtained on application to William Jones, A.M.I.C.E., engineer and surveyor, Council Offices, Colwyn Bay. Sealed tenders, endorsed "Upper Promenade Road Contract," addressed to J. Amplett, clerk, to be delivered at the Council Offices by noon on May 15.

May 15. Stockton-on-Tees.—Stone and other materials for the roads in the rural district. Full particulars and forms of tender may be obtained on application to W. Burton, highway surveyor, Billingham, Stockton-on-Tees, and tenders, marked "Tenders for Leading," must be sent to T. H. Faber, clerk, Stockton-on-Tees, not later than noon on May 15.

May 15. Stockton-on-Tees.—Supply of broken and unbroken whinstone and slag, for the R.D.C. Specifications and forms of tender may be obtained on application to W. Burton, highway surveyor, Billingham, Stockton-on-Tees, and tenders, marked "Tenders for Materials," must be sent to T. H. Faber, clerk, Stockton-on-Tees, not later than noon on May 15.

May 16. South Shields.—Laying-out, formation and construction of new roads across bents from Erskine Road continuation southwards towards borough boundary. General and detailed drawings may be seen and a copy of the form of tender, general conditions, specification, quantities, &c., and other information, obtained at the office of S. E. Burgess, M.I.C.E., borough engineer and surveyor, Chapter Row. Tenders on forms supplied (to be fully priced out in the schedule and totalled) must be delivered to the Town Clerks, Court Buildings, South Shields, not later than 4 p.m. on May 16, endorsed "Tender for Bents Roads."

May 19. Hoyland Nether.—Road materials for the year ending 31st March, 1907, for the U.D.C.:—Unbroken slag, broken slag, granite, blue limestone, tar macadam, whinstone. Also for brooms, picks, shovels, &c. The Council are also prepared to receive tenders for carting. All particulars and form of tender may be obtained on application to H. G. Keywood, surveyor, Town Hall, Hoyland Nether, near Barnsley. Sealed tenders, endorsed "Tender for —," addressed to the Chairman of the Highways Committee, must be delivered not later than May 19.

May 25. Levenshulme.—Sewering, draining, paving, curbing, flagging, channelling and completing the following streets and passages in the district:—Emley Street Extension, Gordon Avenue, passages rear of Delamere Road South, passage rear of Delamere Road and Stanhope Street, passages rear of Derby, Emley and Chipping Streets, passage rear of 1 to 23 and 2 to 24, Harrison Avenue, and passage rear of Randolph Street. Specifications, bills of quantities and further particulars may be obtained from the Council's surveyor, James Jepson, Guardian Chambers, Tiviot Dale, Stockport, on payment of £2 2s. Tenders, endorsed "Tender for Private Street Works," to be sealed and endorsed and delivered to J. Ogden Hardicker, clerk to the Council, Northern Assurance Buildings, Albert Square, Manchester, by May 25.

No date. Plympton St. Mary.—Making a road-way, about 600 yds. in length and 12ft. wide, from George

Lane to Lower Chaddlewood Farm, in the parish of Plympton St. Mary, for G. W. C. Soltau-Symons. Plans and specifications may be seen and further particulars can be obtained of G. W. Soltau, surveyor, 7, Courtenay Street, Plymouth.

SANITARY.

May 3. Cork.—Execution of the following works, according to specifications, which may be inspected at the Boardroom, Cork Workhouse, for the R.D.C.:—(a) Laying sewer at Dock Street, Passage West; (b) building wall to enclose reservoir at Plarney Waterworks. Each party tendering is required to give the names and addresses of two solvent sureties who are willing to join in a bond for the due performance of Contract. Tenders to be sent in to John Corter, clerk of council, Boardroom, Workhouse, Cork, by noon on May 3.

May 3. Leiston-cum-Sizewell.—Sewering of part of Snape Road. About 423 yds. of 9in. pipes with manholes, gullies, &c., in accordance with the drawings and specifications, which may be seen at the office of James Baldry, Snape Road, Leiston, surveyor. Tenders, sealed and marked "Sewering," to be sent to John Fry, clerk of the council, Saxmundham, by May 3.

May 4. Penrith.—Construction of about 2,500 yds. of 21in. stoneware main outfall sewer and contingent works, for the U.D.C. General conditions, specifications, bills of quantities and forms of tender may be obtained, and drawings inspected, at the Town Hall, Penrith, upon receipt of a deposit of £2 2s. Full information may be obtained from the engineers, Brierley, Holt & Co., of Blackburn and Blackpool, or from the resident engineer, J. J. Knewstubb, Town Hall, Penrith. Sealed tenders, endorsed "Penrith Sewerage—Contract No. 1," must be delivered to George Wainwright, clerk of the Council, Town Hall, Penrith, not later than May 4.

May 4. Manchester.—Sewering, draining and paving the following streets and passages, for the Corporation:—Buxton Street, from the passage adjoining No. 19, Buxton Street, to a point 34 yds. distant in a westerly direction, West Gorton, South Manchester. Sutton Street, from the end of the existing paving opposite No. 22 to the boundary wall at the end of such street, West Gorton, South Manchester. New Square, West Gorton, South Manchester. Passage behind 2 to 12, Buxton Street, and adjoining 2, 4 and 12, Buxton Street, West Gorton, South Manchester. Passage behind 25 to 33, Buxton Street, 2 to 12, New Square, and adjoining 2 and 12, New Square, West Gorton, South Manchester. Passage adjoining 19 and 21, Buxton Street, and 20, New Square, West Gorton, South Manchester. Draining, flagging, and curbing passage behind 7 to 13, Charles Street, and adjoining 2, Buxton Street, West Gorton, South Manchester; also the passage adjoining 22, Sutton Street, West Gorton, South Manchester. Forms of tender may be obtained on application to the Paving, &c., Department (Surveyor's Office), and must be returned to the Chief Clerk, Paving, &c., Department, Town Hall, Manchester, before 10 a.m. on May 4.

May 5. Heath Town.—Sewering, levelling, paving, kerbing, channelling and making generally of Tudor Street, for the U.D.C. The drawings may be seen and specification and form of tender obtained at the office of Berrington, Son & Martin, civil engineers, Lichfield Street, Wolverhampton, on payment of £2 2s. Tenders must be delivered to J. W. E. Stirik, clerk to the Council, Lichfield Street, Wolverhampton, enclosed "Tender for New Street," before noon on May 5.

May 7. Macroom.—Construction of sewerage works in the town of Macroom in accordance with plans and specification prepared by A. W. Barnard, C.E., to be seen at the office of the Clerk. Sealed tenders, addressed to the presiding chairman, and containing the names of two solvent sureties willing to enter into a bond with the contractor for double the amount of the contract for the due and faithful fulfilment of same, to be lodged in the tender box in the Council office up to 4 p.m. on May 7. A sum of £10 in cash to be lodged with each tender. (Cheques will not be accepted.) The contractor will be required to give preference to Irish-manufactured goods in all cases where procurable, prices being equal.

May 7. Surbiton.—Construction of a 9in. sewer, with manholes, flushing tanks, &c., and reconstruction of house drains at Oak Hill Grove, for the U.D.C. Tenders, made out on the form and sealed in envelopes supplied, must be delivered at the District Council Offices at or before 10 a.m. on May 7. Plans and specifications may be inspected and a copy of the surveyor's estimated quantities obtained on application to the Surveyor during office hours. The quantities will not be supplied until the plans and specification have been inspected.

May 8. Barnstaple.—Erection of new lavatory buildings and general alterations, and for plumbing work in connection therewith, at the North Devon Infirmary, Barnstaple. Application should be made at once to J. C. Southcombe, architect, Barnstaple, from whom plans, specifications and quantities may be obtained, and tenders to be sent to J. B. Symons, secy., on or before May 8.

May 11. Fleetwood.—Construction of the pumping station buildings, storage tanks, mains, screens, fences, &c., at Fleetwood. The drawings, prepared by George R. Strachan, M.I.C.E., may be seen, and copies of specification and bills of quantities obtained at the Clerk's office on payment of a deposit of £5. Sealed tenders, endorsed "Tender for Pumping Station, &c.," are to be delivered at the Clerk's office at or before 10 a.m. on May 11.

May 14. Acton.—Construction of 3½ miles of sewers, varying from 6ins. to 6ft. in diameter, 2½ acres of filter beds, and various works connected therewith, for the U.D.C. Instructions for tender and forms of tender, with the form of contract and schedules annexed, can be obtained and the drawings inspected at the offices of Sir Alexander Binnie & Sons, 9, Great George Street, Westminster, on payment of £2. Tenders, enclosed in a sealed cover and addressed in the manner provided in the instructions for tender, must be received at the offices of the clerk to the Acton U.D.C., 242, High Street, Acton, not later than May 14.

May 14. Cheshunt.—Works to be carried out at the sewage-disposal works in the parish of Enfield, for the Cheshunt U.D.C. The works comprise the construction of an add-on to the existing engine-house, a tank, No. 4 filters, the supply and erection of engines and centrifugal pumps in duplicate, the laying out of land, together with all necessary carriers, mains and other incidental works. Drawings and specifications may be seen at the office of the engineers, Pollard & Tingle, 31, Old Queen Street, Westminster, and at the offices of the Council. Form of tender can be obtained only from the clerk to the Council upon deposit of £5. Bills of quantities can only be obtained from the Engineers upon production of the form of tender. Sealed tenders, addressed to the Chairman of the Council and endorsed "Sewage-Disposal," are to be delivered at the Council's Offices, Manor House, Cheshunt, Herts, before 4 p.m. on May 14.

May 15. Maesteg.—Sewerage works. Contract No. 1: 333 lineal yds. of 9in. stoneware pipe sewer, 1,191 lineal yds. of 6in. stoneware pipe house connections, 493 lineal yds. of 4in. stoneware pipe house connections. Contract No. 2: 237 lineal yds. of 9in. stoneware pipe sewer, 1,117 lineal yds. of 6in. stoneware pipe house connections, 560 lineal yds. of 4in. stoneware pipe house connections. Contract No. 3: 452 lineal yds. of 9in. stoneware pipe sewer, 431 lineal yds. of 6in. stoneware pipe house connections, 222 lineal yds. of 4in. stoneware pipe house connections. Together with all the necessary manholes, inspection chambers, ventilating shafts, junctions, &c., relating to the three contracts. Plans, sections and specifications may be seen and copies of the bill of quantities and form of tender can be obtained from the engineer, Joseph Humphreys, C.E., Town Hall Chambers, Maesteg, Glam., on payment of a cheque for £2 2s. A charge will be made of 2s. 6d. for each separate copy of the bill of quantities of Contract No. 1, 2s. 6d. for copies of Contract No. 2, and 2s. 6d. for copies of Contract No. 3. On receipt of cheque (which should be a separate one to the £2 2s. cheque) copies will be sent. Sealed and endorsed tenders to be sent to Joseph Humphreys, C.E., engineer and surveyor to the Council, Town Hall Chambers, Maesteg, Glam., on or before 1 a.m. on May 15.

May 16. Salford.—3,500 sq. yds. of hard floor tiles, similar to the sample which may be seen at the Salford Sewage Works, Weaste. Forms of tender and particulars may be obtained at the Borough Engineer's office, Town Hall, Salford. Tenders, endorsed "Filter Tiles," addressed to the chairman of the River Committee, must be delivered to L. C. Evans, town clerk, Town Hall, Salford, by noon on May 16.

MISCELLANEOUS.

May 3. London, E.C.—Supply of the following stores, for the Great Indian Peninsula Railway Co.:—Miscellaneous articles and materials; fencing wire strand; Sheffield tools, &c.; fencing materials. Specifications and forms of tender may be obtained at the office on payment of the fee for the specification, which payment will not be returned. Tenders must be delivered in sealed envelopes, marked "Tender for Miscellaneous Articles," or as the case may be, addressed to J. I. Berry, secy., 48, Copthall Avenue, E.C., London, not later than 11 a.m. on May 3.

May 10. Melford.—Supply of the undermentioned materials, &c., for the R.D.C.:—Broken granite; glazed sanitary drain-pipes, 4ins. to 4½ins. diameter; blue Staffordshire bricks and kerbs; York stone kerb; Portland cement; granite concrete flags; flints; chalk; road grates and frames; team labour; tools; steam rolling. Forms of tender and other information may be obtained from W. Carver, C.E., surveyor, 3 Melford Road, Sudbury, Suffolk. Sealed tenders to be sent in not later than May 10, addressed to H. C. Canham, clerk, 68, Friars Street, Sudbury, Suffolk.

May 14. Hanley.—Works. Destructor works—clinker-crushing plant; mortar mill; steam engine; alternating current motor. All the above are for hiring terms per annum, with option of purchase by the Corporation. Sewers for the diversion of mine water, Etruria Canal Bridge to Bell's Mill Pool; two 12in. centrifugal pumps, for the sewage works. Private street improvement works:—Contract No. 364, Waterloo Street; contract No. 365, Commercial Road; contract No. 366, Eagle Street; contract No. 367, passages off Albert Street; contract No. 368, back Steadman Street; contract No. 369, back Bucknall Road North; contract No. 370, back Mulberry Street; contract No. 371, back Bucknall Road South; contract No. 372, back Homer Street West; contract No. 373, back Homer Street East; contract No. 374, back Seymour Street; contract No. 375, back Jasper Street. All as fully described in the minutes of the Council and on the plans. Specifications, bills of quantities and forms of tender may be obtained and plans inspected at the Borough Engineer's Office, Town Hall, Hanley. Fair wages clause. Separate sealed and endorsed tenders must be sent to Joseph Lobley, borough engineer and surveyor, Hanley, by May 14.

May 15. London, E.C.—Supply of the following stores, for the South Indian Railway Co., Ltd.:—(1) Steel rails (4½ lbs. and 50 lbs.), 1,742 tons, and fishplates for the same 85 tons; (2) cast-iron sleepers, 1,750 tons; (3) tie bars, gibs and cotters, 139 tons; (4) fishbolts, spikes and bearing plates, 98 tons; (5) iron wire fencing and steel pales, 32 tons; (6) general stores, comprising iron, steel, metals, oils and co'ours, electric stores and sundries; (7) locomotive stores, comprising copper and steel plates, tyres, axles, springs, and brass and steel tubes. Specifications and forms of tender may be obtained at the Company's offices. Tenders, addressed to the Company, marked "Tender for Rails," or as the case may be, must be left with Henry W. Notman, managing director, 55, Gracechurch Street, London, E.C., not later than noon on May 15. A charge, which will not be returned, will be made of 10s. for each copy of specifications Nos. 1, 2 and 6, and of 10s. for each copy of the others. Copies of the drawings may be obtained at the office of Sir George B. Bruce, 3, Victoria Street, Westminster, on payment of 5s. per sheet.

Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

DURING THE WEEK ending April 27th eighteen failures in the building and timber trades in England and Wales were gazetted.

J. TYSON, builder, Egremont. R.O. April 18th.

G. ARCHER, builder, St. Albans. R.O. April 18th.

N. W. HAINES, plumber, Swindon. R.O. April 21st.

A. SUCKLING, builder and contractor, Halstead. Adj. April 20th.

J. H. MEREDITH, builder, Hambledon. P.E., Southampton C.C., May 23rd, at 12.

BELL & TROUGHTON, builders and contractors, Lancaster. P.E., Preston Sessions Hall, May 4th, at 11.

W. DRAKE, builder and contractor, Poulton-le-Fylde. R.O. April 18th.

LANGTON & Co., builders' merchants, Brentford and Twickenham. Adj. April 19th.

C. STEARN & Co., builders, decorators and plumbers, Ipswich. P.E., Shirehall, Ipswich, May 18th, at 10.30.

J. BARRY & Son, builders and contractors, Scarborough. P.E., Scarborough C.C., May 22nd, at 12.

F. PHIPPS, builder, Foxcombe Hill, Oxford. Gross liabilities, £7,187; expected to rank, £2,834. Assets estimated to produce £691.

Rodin's "Le Penseur" has been presented to the city of Paris by a group of admirers, and is now placed on a pedestal immediately in front of the steps of the Panthéon.

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Savoy Hotel (26). Hotel Cecil (18). Carlton Hotel (5).
North British Hotel, Edinburgh. Caledonian Railway Co.'s Princes Street Station Hotel, Edinburgh, &c.

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THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

May 9, 1908. Vol. 23, No. 587.

6, Great New Street, Fetter Lane, E.C.

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Theory and Practice. WHAT do these terms comprise? What is their connection with the building trades? These questions seem to be little thought out by the majority of those engaged in the industry. Being an industry where most of those in it are engaged in the direct execution of works, they are accustomed to flatter themselves on being practical men, and sneer at the men of theory. It is evident that these "practical" men are ignorant of the meaning of the word. They are ready to admit that rule of thumb is undesirable and that a man should exercise his intelligence, as they call it, but they fail to recognize that immediately they go outside the former and resort to the latter, they are exercising theory. They look upon the man of theory as a dreamer, a man who goes to his imagination for his facts, and one who is divorced from the opportunity of proving his assumptions. However true this last unfortunately may be of many men of theory,

it would be absurd to sneer at theory because certain exponents betray insufficient acquaintance with facts. Theory is based on practice. It is the interpretation of fact. Theory is hypothesis to explain phenomena; it is method, an ordering, a scheme of established facts, and an exposition of their ascertained principles for the purpose of future practice. Without theory you can have little or no progress, but of course theory cannot go on alone; it must continually be put to the test and corrected and revised by reference to practical experience. The time has gone by when a man did a thing because his forefathers did it so before him. Nowadays he desires to know the why and wherefore, and the reason which he gives for his action is his theory. We all act on precedent, to a certain extent, but no one acts in all future circumstances just as he did before—to do that would be mere instinct, without reason. We could wish that there was a little more theory in the building trade, a little more science, a little more initiative, a little more progress, and a little more experimentation and invention. Scientific investigation always proceeds from the determination of empirical facts to their hypothetical generalization. The generalizations are stated as theoretical laws. The mistake that is often made by theorists and men of science comes in just here, for they suppose that these laws are finally established beyond dispute or modification. We know nothing absolutely. It is a necessity and a sign of progression that these theoretical generalizations should be constantly altering as fresh facts come to light, leading to new points of view. We admit that there is often a want of appreciation among theoretical men that the method by which investigation usually proceeds is to put the theory to the test by endeavouring to draw conclusions from the generalizations or laws, and then seeing if the facts or results agree with these conclusions. If they do not, the theory should of course be modified to fit the facts, not the facts distorted to fit in with the theory. The architect and engineer are primarily men of theory; they should be careful to see that their theory is consonant with fact. There are not enough tests carried out in connection with the building trades. We depend mostly upon a few unscientific and obscure tests that have been carried out by private individuals in the past, or on tests by foreign Governments and professional bodies in the United States, Germany and France. It is distinctly a disgrace that England should lag behind in this manner. It is true we have engineering laboratories in this country which occasionally test materials and forms of construction employed in building practice as well as engineering, but there should be several testing laboratories and professorships established for building construction pure and simple.

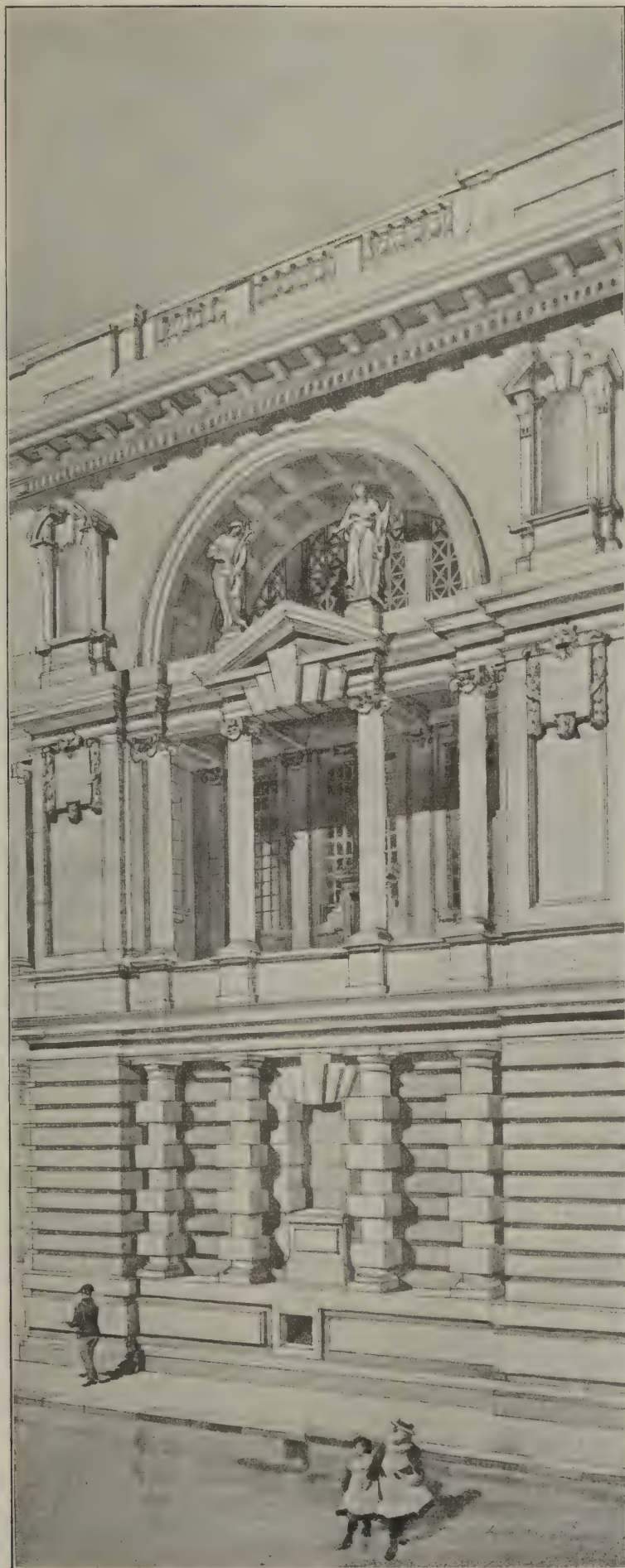
The Candid Art Critic. JUST now, with the critics only half-way through their Academy notices in the newspapers, the fact is borne in upon some of us that there is indeed a very great deal of bias in the majority of the criticisms. We are all creatures of circumstance, but it is surprising how unfair a critic can let himself become to those exhibitors who happen to be under the bin. It has been urged that to be interesting or forceful one must be a partizan of some sort, and doubtless the biblical stigma of the luke-warm has a just application; at the same time, as an actual example, one has only to go round the galleries at Burlington House, and to read the published notices of the exhibits there, in order to feel the truth of our accusation. As this is not a journal devoted to the exploitation of art in the form of oil paintings, we do not propose to give any lengthy list of instances illustrating our contention, though to do so would be easy. We simply make a plea for fairer criticism. There are pictures in this year's Academy which, because they are the work of eminent painters, are spoken about in the suavest manner, though some of them are foolish productions, far below the level of others by little-known men; while some exhibitors whose pictures have hitherto been of a very "popular" kind, puerile in subject and photographic in technique, never get the glimpse of a fair hearing; they suffer for their past sins! We call to mind one painter especially who, in our opinion, has hitherto won popular favour with views of fluffy mountains and the same familiar cattle—pictures which, we think, are the poorest stuff: yet any fair critic would be bound to admit that this year, in another subject, he has painted a really fine picture, though he is not likely to get that credit for it from the self-elected sages. We do not find fault with a man for keeping on in one phase, provided he gives us a reasonable variety: it is when his models are always the same, merely changed about from here to there, as though he had a stock lot of objects to display right and left and left and right—it is then he deserves to be shouted down: but because he has made a muddle in former years, that is no reason why he should not be accorded a fair hearing this year; he may forsooth have taken the well-administered precepts to heart, for which the kindly critic can take unction to his soul; but at present the critic does nothing of the sort, he just keeps on wallowing, wallowing and wallowing, and becomes as hackneyed as the objects of his satire; at the same time shutting out his genuine judgment of pictures by men who, because of the canons, he is supposed to admire. That is a false position, and we should like more often in art criticism to feel that the critic wrote what he really thought, not what he thought he ought to think, according to respectable precedent.



COTTAGES AT SOUTH MIMMS, HERTS. GEOFFRY LUCAS, A.R.I.B.A., ARCHITECT.
(Royal Academy Exhibition, 1905)



DESIGN FOR WORKMEN'S INSTITUTE SUTTON-IN-ASHFIELD, NOTTS. PERCY B. HOUFTON ARCHITECT.
(Royal Academy Exhibition, 1906.)



DETAIL OF A DESIGN FOR A PUBLIC BUILDING.
LIONEL G. DETMAR, A.R.I.B.A. ARCHITECT.
(Royal Academy Exhibition, 1906.)

ARCHITECTURE AT THE ACADEMY.

ONE year and another we have tried all the various ways of giving a notice of the architectural exhibits at the Academy, but the same difficulty presents itself: one has either to take a few of the outstanding exhibits and discuss them in detail, leaving the reader uninformed of what else there is to see, or to degenerate into a mere catalogue, taking drawing after drawing, which, to say the least of it, is a very dull method. A middle course seems to be the best way out of the difficulty, so we have followed that course in the present notice.

Everyone who has been to the Academy knows what a tiring job it is to go round looking at the scores of pictures on the walls, and we can assure our readers it is no less irksome for the writer of any notice of them. The architectural room of course only comprises what is comparatively a small collection, numbering fewer than 250, but even a detailed examination of each of these is no light task. The most cursory glance round the room, however, will at once pick out the most important and interesting scheme shown, namely, the rebuilding of Regent Street Quadrant, for which Mr. Norman Shaw is responsible. General satisfaction has been expressed that this work is not to be left to the mercy of any one or more architects of mediocre ability, however extensive their practice. The task of designing the Regent Street front of the new Piccadilly Hotel, as part of an intended scheme for the rebuilding of the Quadrant, is beset with many difficulties of a practical nature, and requirements of business firms, but Mr. Shaw, we think, has produced a fine scheme, though we take exception to the centre turret on the hotel roof (which is quite out of keeping with the fine square chimneys on either side), and we do not much care for Mr. Shaw's scrolls on the side wings: nor can we admire the heavily blocked columns. There can be no doubt, however, as the detail of the elevation shows, that the colonnade on the first floor, carried on the rusticated arches below, will have a noble effect when executed. We sincerely trust that the business firms in the Quadrant, many of whom we understand are contemplating new premises, will fall into line and accept this admirable scheme. In connection with it Mr. Shaw exhibits a very interesting plan for the re-modelling of Piccadilly Circus. We have a number of places in London where important streets converge, and there is no need to point out how hopelessly lacking in any sense of regularity the majority of them are; and Piccadilly Circus is perhaps the worst. Mr. Shaw proposes to put it into something like proper shape. His idea is to make a square of it, setting back the County Fire building on the north, cutting off a slice at the Monico corner, adding a new front to the London Pavilion, setting back the end between the Quadrant and Piccadilly, and putting Alfred Gilbert's Shaftesbury Memorial centrally in the space, with a square treatment around it relieved with shrubs. This scheme seems to us to be a good one and would be a notable improvement to the West End.

Turning to some of the other exhibits of a public nature, we see Sir Aston Webb's scheme for the Royal College of Science and Government offices at Dublin, about which there has been so much talk in Ireland. The general scheme is of a range of buildings around a quadrangle. Mr. T. Manly Deane is associated with Sir Aston Webb in this work, but we see little evidence of his existence: in any case the design shows nothing particularly noteworthy, though it is certainly an important work. Sir Aston Webb's detail of the new Admiralty building at the east end of the Mall is, however, very imposing and interesting, though, as classical

work, it does not compare with Mr. Reginald Blomfield's fragment of the new building for the United University Club in Suffolk Street, Pall Mall: this latter is indeed a very refined example of English Renaissance.

There is a considerable representation of designs for the Wesleyan Methodist Hall, Westminster—too many of them—no fewer than five remnants of the competition being shown on the walls, besides the accepted design by Messrs. Lanchester & Rickards.

Mr. Hare shows a very fine design for the Provident Institution building now being erected opposite St. Clement Danes Church in the Strand (one of the best designs he has produced); and Messrs. Ernest George and Yeates exhibit an excellent design for the Royal Exchange buildings. Mr. Belcher's detail of Winchester House, Old Broad Street—another block of City offices—is not very inspiring, least of all the figures dying away into the pilasters. Mr. Mountford is represented by his new town hall for Lancaster, a very dull building; Mr. Mallows, associated with Mr. Lacey, shows his excellent design for the Bournemouth town hall (already published in our pages); and among other municipal buildings there is also to be noted the Bradford town hall extension by the city architect, Mr. Edwards (with whom Mr. Norman Shaw has been associated); the Preston Sessions house, a good piece of modern Renaissance by Mr. Littler, though we think that the lanky tower would be greatly improved by having two or three stages taken off it; a poor drawing of Woolwich Town Hall, by Mr. A. Brumwell Thomas; a recuscitation of that foolish idea for building a county hall for London on a bridge across the Thames, by Mr. Ernest W. Twining; and the new municipal buildings at Tottenham, by Messrs. Tayler & Jemmett. Other good designs of a public character are Mr. Hare's Islington library, Messrs. Russell and Cooper's technical institute for Rochester, the proposed town hall at Dartmouth by Mr. Vincent Harris, new offices for the Frimley Urban District Council by Messrs. H. R. & B. A. Poulter, Messrs. Eden and Mount's second-premiated design for the Eton war memorial, the new assurance offices in Pall Mall by Mr. Norman Shaw and Mr. Ernest Newton (which combination of ability, however, has not produced anything particularly good), and Mr. Percy Adams's Women's Hospital, Soho Square—this last being a very delightful example of work. Mr. Percy Adams also shows two drawings of the King's Sanatorium, one of the north front and the other of the lodge: both of which are fine examples of brickwork design.

Church Work.

There is not a great deal of church work shown this year, but it includes a few designs of very interesting quality. One, however, which is not at all interesting we will say at once is Mr. Jackson's Giggleswick Chapel. Mr. Jackson has been responsible this year for the selections in the architectural room. He has exercised his prerogative very thoroughly, but we feel sure some of the rejected architects will smile when they look upon this design of his, and then think of those which have been thrown out by him.

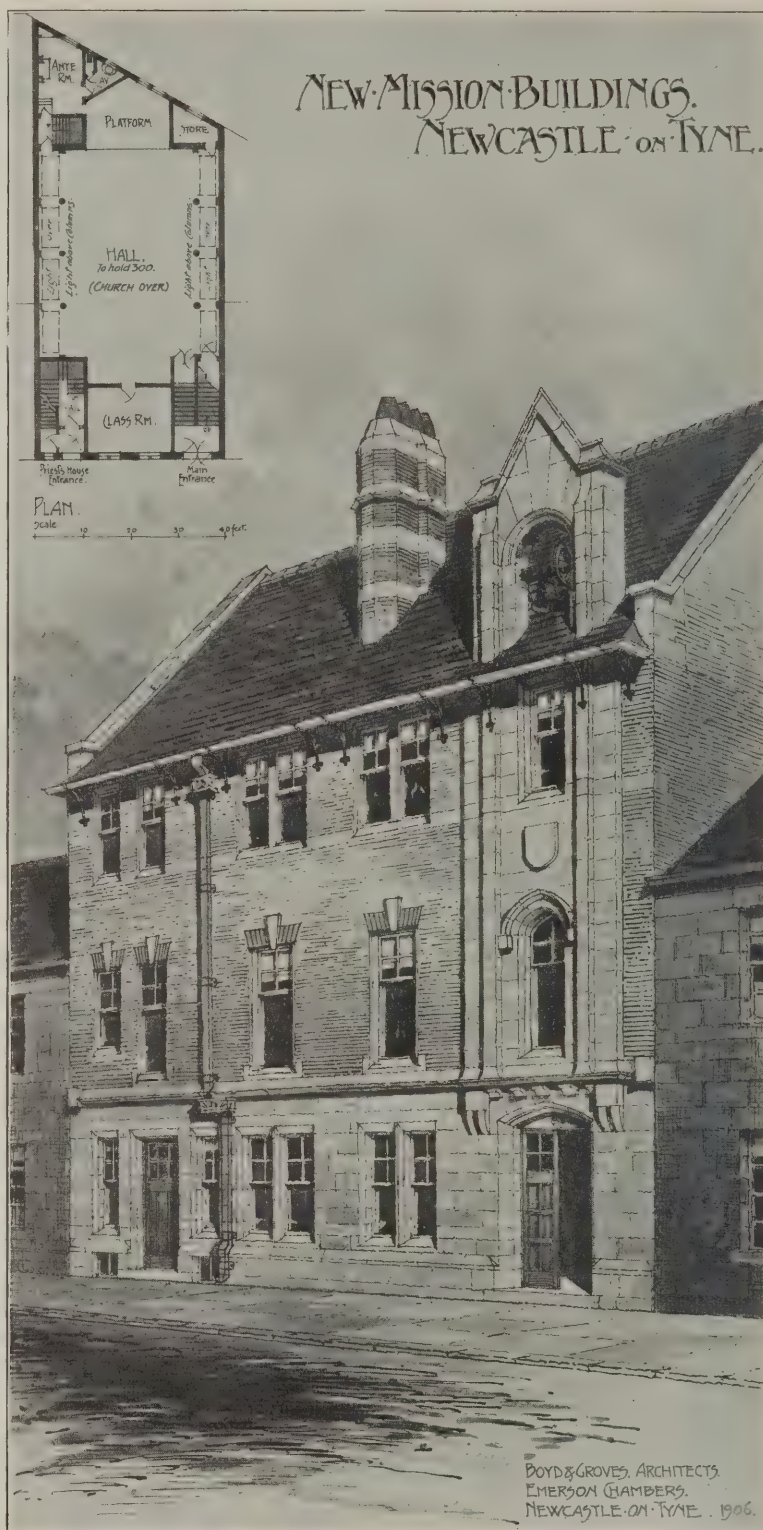
Mr. Bodley is not shown to much advantage this year, his only exhibit being a rather ordinary design for a monument to the late Marquess of Salisbury in Westminster Abbey; but Mr. Skipworth exhibits a very fine design for a church at Mirfield, Yorks., a design which we feel is not falsely rendered by the drawing. (We mention this because close by there is a design for a church at Johannesburg by Mr. Fellowes Prynne. The exterior is shown by a commonplace drawing, and the design looks a medley, devoid of dignity. The effect of the interior, however, as represented by a magnificent

drawing by Mr. Charles Gascoyne (this year's Owen Jones prizeman) is quite the reverse, being dignified in the extreme, and we cannot help feeling that this effect is more due to the draughtsman than to the design. It so happens that Mr. Gascoyne has made another drawing of a church interior, by Mr. Spooner, and though he has here followed out much the same sort of treatment as in Mr. Prynne's church—to the extent of introducing a similar speckly light on the east end, and the same sombre-hued people in the foreground (for which duplication he may perhaps be pardoned)—a close inspection of the design will show that it is a very much finer piece of work. It is indeed an excellent design.)

Mr. Gilbert Scott shows a huge drawing of a detail of the elevation of Liverpool Cathedral—good powerful Gothic, with very beautiful tracery in the windows, though we cannot honestly join in the panegyrics that have been written about the building. Mr. Scott also exhibits the design for a church at Bournemouth, reproduced in our centre plates this week, a design which is certainly strange and not altogether pleasing.

Messrs. Nicholson and Corlette are represented by a number of churches large and small in various places (including the one given in our centre plate this week), and they are all very good.

Mr. Ernest Newton shows his new spire for Bickley church, a good design, though



(Royal Academy Exhibition, 1905.)

not exceptional. Mr. Bateman exhibits a squatty church at Sutton Coldfield, and Mr. Temple Moore his poor design for All Saints, Tooting Graveney. Messrs. Buckland and Farmer are represented by an interesting church near Sutton, while Mr. Mileham shows a drawing of Epsom Church—splendid in feeling, with a noble tower that reminds one somewhat of Ely, though of course it is on nothing like so large a scale.

Domestic Work.

Turning now to the domestic work exhibited, this of course is a branch of work in which English architects particularly excel; consequently there are always a number of interesting houses shown. It is quite impossible to attempt any enumeration of them, because in very few instances do they present anything sufficiently novel to call for lengthy description; yet they are quite delightful examples of that design which seems to come so easily to us, though we have only to turn to American and continental types to see that the easiness is apparent only. There are not many large country houses exhibited, the majority of the domestic exhibits being of somewhat small houses and cottages. Mr. Arnold Mitchell shows a good-looking house at Harrow Weald; Mr. Walter H. Brierley a fine house in Leicestershire, comprising hunting-lodge, stables and cottages; Mr. Baggallay his design for the rebuilding of Shenley Hill, Herts; Messrs. Ernest George & Yeates their design for Busbridge Hall, Godalming; Mr. Weir Schultz a fine house at How Green, Hever, Kent; Sir Aston Webb new almshouses at the Hendre, Monmouth; Mr. Guy Dawber a village club at Sandon, Staffs.; Mr. Geoffrey Lucas the cottages shown on p. 244 of this issue; Mr. Maxwell Ayrton some delightful cottages in Oxfordshire; and Mr. C. R. Ashbee a row of cottages at Ellesmere Port, with an old-world air about them.

Mr. Alleyne Creswick exhibits a model of a house proposed to be built at Buenos Ayres, excellent in detail and arrangement, and quite the most interesting of the three models shown in the room, the other two being of Mr. Pomeroy's Belfast monument to the late Marquess of Dufferin and Ava, and Mr. Belcher's structure for Williamson Park, Lancaster—another of Lord Ashton's gifts. This last is rather disappointing, considering the subject and the scope it offered.

Among town house architecture Mr. Henry White is well represented, but quite the most remarkable design in this branch of work is Mr. J. Atwood Slater's for a town mansion. This is really a very clever piece of design, full of originality: it is rendered, too, by an oil painting, which makes the exhibit all the more remarkable. Mr. Slater has followed, if we may say so, in Prof. Beresford Pite's vein, and has enhanced the verticality of his design by moulded pilasters at the corners of the house, stopped off some little distance from the ground; but what the strange thing at the front corner is meant to represent, we find it impossible to say—perhaps a piece of sculpture, or a shrub mysteriously growing out of the wall; in any case, a very remarkable smudge on a remarkable design. It may be a sort of joke of Mr. Slater's, in which case he finds a rival in Mr. J. M. Swan, A.R.A., who shows in the sculpture section a confused mass of silver with a large crystal on the top. It is called "Polar Bears," and truly when one has looked at it from all sides up and down, for half an hour or so, the idea of a bear climbing around at the base, and another at the top, dawns on the beholder; but the exhibit leaves him with that idea only, and if the sculpture were labelled "lead ore" and put in a suitable place in the geological museum it might strike the visitor as being eminently appropriate.

THE ACADEMY BANQUET.

Decoration of the Houses of Parliament.

AT the banquet of the Royal Academy held on Saturday evening last the president, Sir Edward Poynter, and Sir H. Campbell-Bannerman both made reference to the scheme for the decoration of the Houses of Parliament with historic paintings. Sir Edward said he had often regretted that the efforts to revive this great scheme, which came to so abrupt an end, should have been fruitless, and that the spaces so liberally provided for pictures in the Palace at Westminster should still remain unoccupied, except for a somewhat monotonous wallpaper. He ventured to say that to encourage the higher forms of art was a task—he had almost said a duty—not unworthy of the Government of the country, and that there was no better way of doing it than by commissions for great works of decorative art to occupy important public positions. The Premier said he asked himself what were the relations between the Executive Government and the Royal Academy and the artistic world at large. They had certainly nothing to do with the Executive Government itself. He did not think that the Cabinet, as a rule, lent themselves to artistic treatment. We were all familiar with pictures of a Cabinet Council—a group of heads drawn, apparently, on different scales, set uncomfortably on unaccustomed shoulders, faces some of them looking with intelligent inquisitiveness at each other, some of them with a statesmanlike gaze into vacancy, while others were turned with an ingratiating look towards the artist, or the onlooker for whom the picture was taken. All these pictures he had seen were failures. . . . Then there were the buildings. It was desirable that a public building should be externally beautiful and internally convenient. Sometimes we put up a building which was one or the other, but he had never yet known a building which combined both those qualities.

With respect to the vacant spaces on the walls of the corridors of the Houses of Parliament, Sir Henry said that in his non-Chancellor of the Exchequer character he entirely agreed with the president. It was a most extraordinary thing that there should have been an abrupt interruption of that process of decoration, and that that interruption should have been allowed to continue for all these years. But, unfortunately, at present there was another thing that would stand in the way. What were they to do with the House of Commons? They wanted more accommodation in the House. They had an inconvenient number of members, who were inconveniently anxious to do the work that the constituencies had sent them there to do. That, surely, was the first thing to be attended to before they attacked the walls, for he believed the House of Commons was the only assembly of its kind in the world that could not sit down under its own roof.

Obituary.

Mr. Thomas Garner, whose name as a church architect was so much associated with Mr. Bodley (with whom he was in partnership for more than thirty years), died last week at his house in Oxfordshire, aged 66. Among the work produced during the partnership may be mentioned the church of the Holy Angels at Hoar Cross, Derbyshire, and Lord Windsor's Hewell Grange; while—as designs solely by Mr. Garner may be cited the reredos in St. Paul's Cathedral; St. Michael's Church, Camden Town; and most recently the new chancel to Downside Abbey, near Bath.

NOTES ON COMPETITIONS.

British Medical Association's New Premises.

The limited competition for the rebuilding of the British Medical Association's premises in the Strand has just been decided in favour of Mr. H. Percy Adams, F.R.I.B.A., who was one of six invited architects. We have not seen the selected design, but Mr. Adams has already given us such a number of excellent buildings that we have no doubt this will be one more to add to the list.

Greenwich Branch Library.

We are glad to see that at their meeting last week the Libraries Committee of the Greenwich Borough Council decided to recommend the payment of an extra £15.15s. to Mr. A. W. S. Cross for the considerable additional trouble to which he was put in assessing the 172 designs submitted in the recent competition for a branch library for the borough. When dealing with this competition a few weeks ago we took occasion to point out how very thoroughly Mr. Cross had done his work. His award dealt with each one of the designs sent in and was quite a model of its kind.

The Palace of Peace.

Last Thursday, at the Hague, the jury who will make the awards in the international competition for Mr. Carnegie's Palace of Peace held their first meeting. This country is represented by Mr. T. E. Colcutt, Holland by Dr. Cuypers, Germany by Herr von Ihne, Austria by Professor Koenig, France by M. Nenot, and America by Professor Ware, who is the president of the jury.

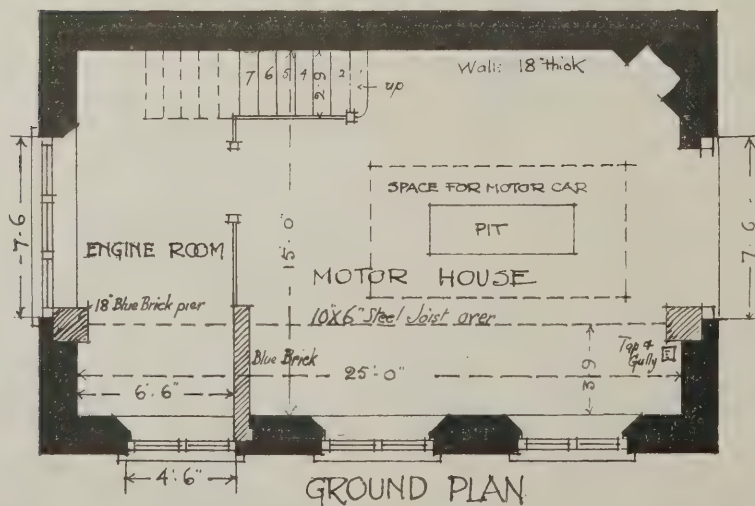
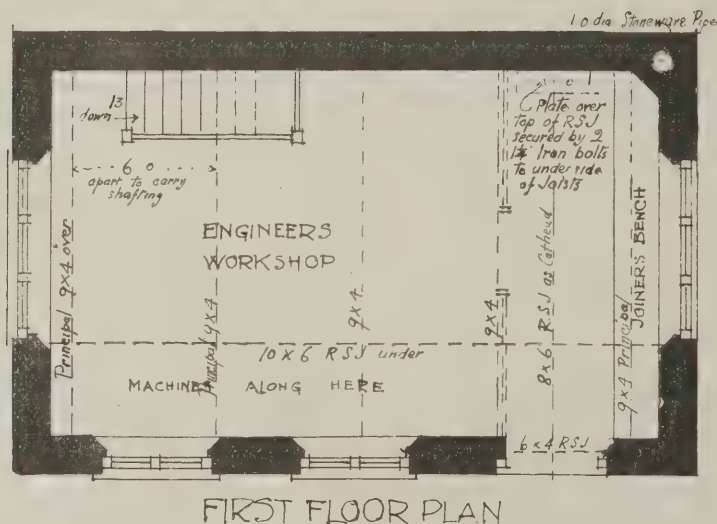
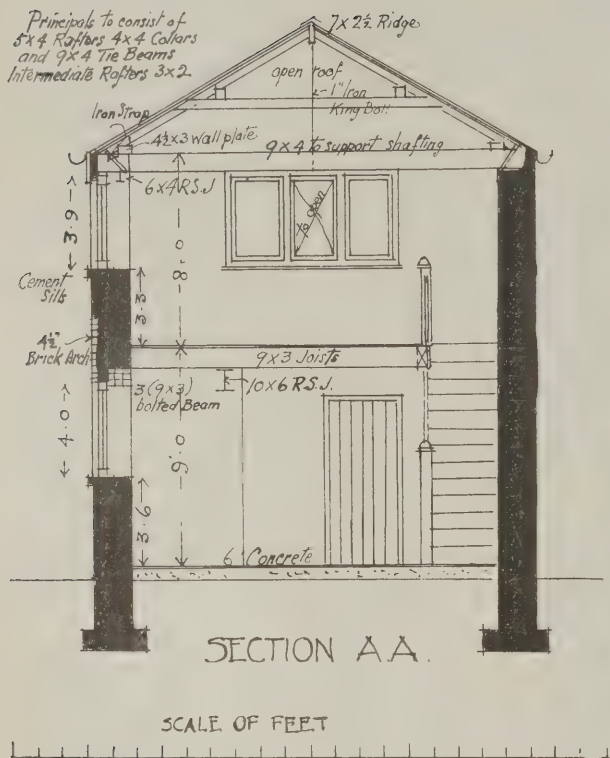
Another Cheap Competition.

With the particulars before us of the competition for a Congregational chapel at Manselton, Swansea, we expect this to be but another to add to the unsatisfactory list. A premium of seven guineas is offered for the best approved scheme—plans, sections, elevations, &c., "this amount to merge in liquidation of commission to be received in case (!) the successful competitor is engaged to carry out the work." Clause 2: "Each competitor is asked to state his terms for preparing detailed plans, specifications, and all other details of work usually done by an architect in carrying out and superintending the building." The chapel is to cost £2,200 and the schoolroom £800, and "a draft specification must accompany each scheme."

Competitions Open.

The following is a list of competitions open:—

DATE OF DELIVERY.	COMPETITION.
May 31	CHAPEL AND SCHOOLROOM AT MANSELTON, SWANSEA. Particulars from Mr. T. Roberts, 71, Brynhyfryd, Swansea.
July 2	SECONDARY SCHOOL FOR GIRLS AT AIGBURTH VALE, for the City of Liverpool Education Committee. Limited to architects in Lancashire and Cheshire. Particulars from the Town Clerk, Municipal Offices, Liverpool.
No date	DETACHED AND SEMI-DETACHED HOUSES AT CLIFTONVILLE, BELFAST.—Premiums £700. Particulars from R. J. McConnell & Co., 51, Royal Avenue, Belfast.
"	SCHOOL AT BEDMINSTER, BRISTOL, for 1,030 children. Limited to Bristol architects. Particulars from W. Avery Adams, secretary to the Bristol Education Committee, Guildhall, Bristol.
"	ALMSHOUSES AT WAREHAM. Particulars from G. C. Filliter, North Street, Wareham, Dorset.
"	VILLAGE INSTITUTE AT AYS-GARTH, WENSLEYDALE, to cost £500. Particulars from Mr. F. S. Graham, Aysgarth.



MOTOR-HOUSE AND ENGINEER'S WORKSHOP AT PORT ST. MARY, I.M.
PERCY H. TOPHAM, ARCHITECT.

MOTOR-HOUSE AND WORKSHOP.

THE motor-car having now established itself, provision for its housing and repair has to be made in connection with every modern house, especially in connection with large country houses, where the car is quite taking the place of the dog-cart and the brougham. In our issue for August 10th, 1904, we published an article giving some practical notes on the arrangement and fitting-up of motor-houses, with a plan and section of the pit generally provided for enabling the underside of the car to be got at for purposes of cleaning, inspection and repair.

On this page we give a photograph, with plans and section, of a motor-house and engineer's workshop which has been built at Port St. Mary, in the Isle of Man, from designs by Mr. Percy H. Topham, architect, of Monton Green, Manchester.

The aim has been to give as pleasing an appearance as possible consistent with the uses of the building and the materials employed. The walls are built of rubble stone-work quarried from the neighbourhood and finished with smooth stucco on the outside. The roof was made specially strong on account of the exposed situation, and also to bear the vibration of the shafting run across the principals, which had to be 6ft. centre to centre.

The floor consists of 9in. by 3in. red deal joists with 5in. tongued and grooved white deal floor boards, strengthened under the heavy machinery by a 10in. by 6in. rolled steel joist.

The motor-house on the ground floor has a height of 9ft. and the engineer's workshop on the first floor 8ft. to the tie-beam. At one corner of the motor-house a space is divided off for the engine (presumably a petrol engine) which will drive the shafting above.

Owing to the rocky foundation it was found possible to build without putting a bed of concrete under. The cost of the building was £185, the builders being Messrs. H. & A. Moore, of Port St. Mary, Isle of Man.

Views and Reviews.

Japanese Architecture.

The author of this book is a well-known architect who is noted for his sympathy with Gothic ideals, yet he has written extensively upon the subject of Japanese art—an art which has little in common with that of the West. We can hardly appreciate the architecture of Japan because we cannot enter into the feelings and methods of the Japanese. We have not the architectonic sense for Japanese architecture. The architecture of the West is mostly stone or brick, and timber building has never been so fully developed as in the Far East. This very fact prevents us easily assimilating and appreciating the architecture of Japan. Mr. Cram writes enthusiastically and eloquently of the beauties of the temples in language which we are accustomed to associate with our own canons of art, and consequently his analysis seems to be often far-fetched and inappropriate, but we have no doubt that to him, with the knowledge he possesses, no ambiguity exists. Whether he or others will be able to convince us of these wonderful unseen beauties we do not know. Japanese architects are painstaking, and they study the most minute thing, so that it requires a careful study of the most subtle curves and combinations to appreciate their work, just the same as with Greek art. Their buildings are simple almost to plainness in many cases, although the interiors of some of the temples are very rich, albeit very reserved. Often, especially in domestic work, the beauty comes by the use of colour and texture rather than form, although the latter is carefully studied and plainness does not mean want of thought. Japanese houses are of course totally different to our own, being designed to suit the ways of their occupants and the climate. The planning and construction are simple, and they afford very little for study. The Japanese have rules of conduct and habits which engender cleanliness and good health, but we should find their houses inadequate in sanitation and convenience, while in many respects they would offend against our sense of propriety. The book is well illustrated, but unfortunately the illustrations have not been printed in the best manner, and the photographs are not clear enough in detail. However, the book deserves the careful attention of all students of architecture.

"Impressions of Japanese Architecture," by Ralph Adams Cram. London: John Lane.

Perspective.

We have reviewed before "R's Method of Perspective," and probably this method is known to most architects and draughtsmen by this time. It is a most convenient method for practical work and saves an enormous amount of time and labour, giving quicker and better results than the old methods. It is easily understood from the first, but there are certain points of difficulty which this book has been written (by the author of "R's Method of Perspective," Mr. H. W. Roberts) to explain. R's method consists, we may say, in putting squared paper in perspective. The squares are marked off along the planes, both vertically and horizontally, ranged at different angles to the observer, and all one has to do is to put a sheet of paper on these diagrams and draw to scale outlines corresponding to those on the elevations and plans. Since Mr. Roberts first published his method he has had three years' experience with it, and has now threshed out the various minutiae that must arise in practice. This instruction book is the result. To anyone desirous of making ready perspectives it will be most useful, if not necessary.

"Architectural Sketching and Drawing in Perspective," by H. W. Roberts. London: B. T. Batford, price 7s. 6d. net.

NEW LONDON BUILDINGS.

AT yesterday's meeting of the London County Council the Building Act Committee reported the following applications under the London Building Act, 1894, their recommendations as to consent or refusal being appended in *italics*:—

Enclosing of a portico in front of No. 21, Hill Street, Berkeley Square, on the application of Keeble, Ltd., on behalf of Capt. H. S. Clay. (*Consent.*)

Porch to a proposed new church on the eastern side of Altenburg Gardens, Clapham Common, on the application of Kellie & Dickie, on behalf of the Rev. G. Grady. (*Consent.*)

Bay windows at Block B, The Pryors, East Heath Road, Hampstead, on the application of J. E. Yerbury. (*Consent.*)

Pair of semi-detached houses on the southern side of Netherhall Gardens, Hampstead, with projecting bay, porch and pent roof, on the application of C. H. Saunders, on behalf of Dr. J. R. Whait. (*Consent.*)

One-storey addition at the rear of the entrance lodge to St. Joseph's Home, Portobello Road, Notting Hill, on the application of W. Daniell, on behalf of the Sisters of St. Joseph's Home. (*Consent.*)

Porches in front of Nos. 159, 161, 163, 165 and 167, Hazellbank Road, Hither Green, Lewisham, on the application of Norfolk & Prior, on behalf of W. Rolfe. (*Consent.*)

Four projecting stone balconies at a building abutting upon Wigmore Street, Welbeck Street, St. Marylebone, on the application of Wallace & Gibson, on behalf of Debenham, Ltd. (*Consent.*)

Six houses on the eastern side of Knight's Hill Road, West Norwood, at the corner of Rothschild Street, on the application of Hall & Jacobs, on behalf of P. Stock. (*Consent.*)

Retention of a projecting balcony in front of Nos. 3 and 4, Sherwood Street, Finsbury, on the application of J. H. Smith. (*Consent.*)

Retention of a projecting iron sign in front of the New Theatre, St. Martin's Lane, Strand, on the application of W. G. R. Sprague, on behalf of Sir Charles Wyndham. (*Refusal.*)

One-storey shop in front of No. 12, Bective Road, Wandsworth, on the application of H. J. Cadwell. (*Consent.*)

Extension of the period within which the erection of additions in front of Nos. 49, 51, 53 and 55, Mansell Street, Whitechapel, were required to be commenced and completed, on the application of F. Selby. (*Consent.*)

Buildings on the south-eastern side of Fulham Road, Chelsea, to abut also upon College Street and Kimbolton Row, on the application of Elms & Jupp, on behalf of E. Bingham and T. Crapper & Co., Ltd. (*Refusal.*)

Projecting steps and balconies in front of St. Clement's Parish Room, Fulham Palace Road, Fulham, on the application of E. Monson & Sons. (*Refusal.*)

Advertisement board in front of the Greenwich Central Hall, London Street, Greenwich, on the application of G. G. Woodward, on behalf of the Rev. W. Spencer. (*Refusal.*)

Houses on the northern side of Fane Street, North End Road, Fulham, on the application of J. T. Brown, on behalf of W. Huxley. (*Refusal.*)

Retention of an iron and glass shelter in front of the Arlington Street entrance to the Ritz Hotel, Piccadilly, on the further application of J. P. Bishop, on behalf of the Building and Vendor Co., Ltd. (*Consent.*)

One-storey addition at the rear of the Plough public-house, No. 66, Coldharbour Lane, Brixton, at less than the prescribed distance from the centre of the roadway of Denmark Road, on the application of F. J. Eedle & Meyers, on behalf of C. Martin. (*Consent.*)

Retention of a wood and iron porch at Netherleigh, Manor Road, Forest Hill, abutting upon Piercefield Avenue, on the application of F. Penfold. (*Refusal.*)

Buildings on the site of No. 68, Spelman Street and Nos. 76, 78 and 80, Pelham Street, Whitechapel, on the application of J. R. Moore Smith, on behalf of J. Donn. (*Consent.*)

Building upon a site abutting on Blythe Road and Addison Gardens, West Kensington, on the application of Colonel E. Clarke, on behalf of F. Smiths. (*Consent.*)

Modification of the provisions of that section with regard to open spaces about buildings so far as relates to the proposed erection of a building on the south-west side of Camberwell New Road, Camberwell, adjoining the Athenæum public-house, with an irregular open space at the rear, on the application of Barlow, Roberts & Thompson. (*Consent.*)

Iron and glass covered way in front of block B, The Pryors, East Heath Road, Hampstead, on the application of J. E. Yerbury. (*Refusal.*)

Buildings on the north-eastern side of Maida Vale, St. Marylebone, on the application of V. S. Galsworthy, on behalf of the trustees of Harrow School. (*Refusal.*)

One-storey building at the Stepney Jewish School, Stepney Green, on the application of Joseph & Smithem. (*Refusal.*)

Building on the eastern side of Gwendolen Avenue, Putney, adjoining the Putney Wesleyan Church, on the application of Thomson & Pomeroy, on behalf of the trustees of the Putney Wesleyan Church. (*Refusal.*)

Retention of a roof over a yard at Potter & Clark's premises, Artillery Lane, Whitechapel, to abut upon Bell Lane, on the application of H. Line, on behalf of Potter & Clarke. (*Consent.*)

Modification of the provisions of that section with regard to open spaces about buildings so far as relates to a building on the north-eastern side of Lifford Road, Camberwell, with an irregular open space at the rear, on the application of E. E. Bird, on behalf of L. Whitehead & Co., Ltd. (*Consent.*)

Modification of the provisions of that section with regard to open spaces about buildings so far as relates to two buildings erected on the southern side of Battersea Rise, westward of No. 89, with irregular open spaces at the rear, on the application of H. Bignold. (*Consent.*)

Deviation from the plan sanctioned on November 19th, 1869, for the formation of a new street to lead out of the south side of Sydenham Road, Lewisham, so far as relates to an alteration in the position of the boundary at the north-eastern corner of the street, on the application of R. Appleby. (*Consent.*)

Deviations from the plans approved by the Council on January 31st, 1905 and August 1st, 1905, for the formation of new streets on the St. Quintin estate, St. Quintin Avenue, so far as relates to a slight deviation in the direction of street No. 1 (Highlever Road) and in the position of the boundaries of street No. 4, on the application of Trant, Brown & Humphreys. (*Consent.*)

Deviations from the plans approved on January 21st, 1902, and May 13th, 1902, under the provisions of section 76 of the London Building Act, 1894, in connection with block 2 of a factory building on a site on the west side of Tyssen Street, Dalston Lane, Hackney, such deviations being shown on the plans, dated March 1st, 1906, and April 14th, 1905, submitted in connection with the application of T. B. Whinney, on behalf of the Marconi Wireless Telegraph Co. (*Consent.*)

Plans, as amended, dated March 16th, 1906, and April 4th, 1906, submitted with the application of C. Thompson, on behalf of the County of London Electric Supply Co., Ltd., for the construction of a new roof over the switch-room at the company's generating station, The Causeway, Wandsworth. (*Consent.*)

Deviation from the plans approved on November 15th, 1904, for the erection of dwelling-houses, to be inhabited by persons of the working-class, on a site to the northward of the Rotherhithe Tunnel approach, between Rose Lane and Butcher's Row, so far as relates to an alteration in the setting-out of certain of the blocks, on the application of R. Robertson, on behalf of the Housing of the Working Classes Committee of the Council. (*Consent.*)

Conversion of No. 158, Farringdon Road, Finsbury, into a warehouse and stables without complying with the provisions of section 41 of the said Act, on the application of J. B. Pinchbeck, on behalf of J. May. (*Consent.*)

Addition to No. 13, Highgate Hill, Highgate, without the provisions of section 74 of the said Act being complied with, on the application of C. W. Callcott, on behalf of J. W. Galton. (*Refusal.*)

The Theatre and Music Hall Committee also reported the following:—

Drawings submitted by W. G. R. Sprague showing certain slight modifications proposed to be made in the grand saloon, balcony and balcony saloon at the new theatre to be erected at the corner of Shaftesbury Avenue and Rupert Street. (*Consent.*)

Enquiries Answered.

The querist's name and address must always be given, not necessarily for publication.

Preservative for Marble.

SUNDERLAND.—MASON writes: "Is there any preparation made for the purpose of preserving marble tombstones, &c., from the action of the weather?"

We suggest the use of any of the well-known colourless stone preservatives.

Building Line.

TAUNTON.—BUILDING LINE writes: "A and B are two old dwelling-houses and C is, and has been for years, a garden. B and C belong to the same owner, who wishes to come out to a building line marked $\times-\times$, but the authorities wish him to keep back to a proposed new building line. Can they compel the owner to set back? Sketch sent (not reproduced)."

In my opinion the authorities are exceeding their powers in this case. The correct building line is found by drawing a line from the front main wall of building A to the front main wall of building B, and it appears to me that the line you mark "owner's building line" is therefore the correct one. This by section 3 of the Public Health Act of 1888. F. S. I.

Size of Stanchions for Shop Front.

STRESS writes: "In altering a shop front it is proposed to support the girder solely by stanchions. These are to be 14ft. high, and the total load bearing on each is 46 tons.

Supplement to
THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD,
Wednesday, May 9th, 1906.



NEW CHURCH AT BOURNEMOUTH. G. GILBERT SCOTT, ARCHITECT.
(*Royal Academy Exhibition, 1906.*)



STUDY FOR A MODERN CHURCH. HUBERT C. CORLETTE, F.R.I.B.A., ARCHITECT.
(Royal Academy Exhibition, 1906.)

Notes and News.

A new Public Library at Blackpool is to be erected at a cost of £15,000.

The Derby Master-builders' Association held their annual dinner recently under the presidency of Mr. R. Weston.

A new Operating Theatre is being erected at the Royal Portsmouth, Portsea and Gosport Hospital. The architects are Messrs. Young & Hall, of London.

Mr. W. H. D. Caple, architect, of Cardiff, has been appointed by the magistrates of the city of Cardiff to assess the amount of compensation to be paid under the Licensing Act, 1904, for surrendered licences.

Scottish Building Trades Federation.—At the recent half-yearly meeting at Edinburgh Mr. James Leslie, of the Aberdeen Association, was appointed vice-president. The annual meeting was fixed to be held at Edinburgh in September.

A new Grammar School at Farnham, Surrey, has been built at a cost of £13,000 from designs by Messrs. Jarvis & Richards, of London, architects to the Surrey Education Committee. Messrs. Crosby & Co., of Farnham, were the builders. The school is of red bricks and has tiled roofs.

Messrs. Norton & Gregory, Ltd., the well-known photo-lithographers and drawing-office stationers, of Castle Lane, Buckingham Gate, S.W., announce that the business hitherto carried on by Mr. H. G. Carpmal as managing partner of Messrs. Allott, Jones & Notley, of Westminster, has been amalgamated with their own, and that Mr. Carpmal has joined the board of directors.

Exaggerated Rumours about Exeter Cathedral have been circulated recently. There has been a crack in the southern face of the south tower for a long time, and the Dean and Chapter requested Mr. Harbottle, their architect, to make a thorough examination of the foundations. This work has been in hand for some time, but up to the present Mr. Harbottle has not come across anything which gives any ground for anxiety.

"The Parliamentary Gazette."—Messrs. Howarth & Co., of 20, Rhodesia Road, S.W., send us a copy of the April number of this little book, which gives a list of members and short records of each day's proceedings in the House. Two more numbers will be issued during the present session, one during the Whitsuntide recess (price 1s.) and the other dealing with the whole session complete, and considerably enlarged (price 2s.), in September. The price of the April number is 1s.

South Wales Architects: Annual Dinner.—The annual dinner of the Cardiff, South Wales and Monmouthshire Architects' Society was held on April 27th at Cardiff, the chair being occupied by the president (Mr. J. H. Phillips). The toast of "The Royal Institute of British Architects" was given by Mr. D. Morgan and responded to by Mr. Seward in the absence of Mr. Dare Bryan, of Bristol. Mr. Ernest Runtz (London) proposed the toast of the Society. He said he was strongly in favour of some measure of legislation if they were to keep their status and improve the condition of building in this country.

The Bill for the Proposed London County Hall has been ordered to be reported to the House for third reading. Messrs. Holloway Brothers, Ltd., objected to the proposed compulsory acquisition of the land of which they have a lease for an unexpired term of seventy years, urging that without their premises the Council had more than sufficient room. The actual design of the building has not yet been settled, but the superintending architect to the Council has submitted a covering estimate of £1,056,000. The total expenditure, with £55,000 for the embankment, will be £1,711,000.

The Northern Architectural Association has just issued its annual report for the past session.

The Nave of Thorney Abbey, which was being repaired, collapsed without warning recently.

New Schools at Altrincham have been built and furnished at a cost of £13,200. Accommodation is provided for about 800 children.

The Ruins of St. Botolph's Priory, Colchester, are in imminent danger of collapse. It is expected that the town council will make an effort to preserve them.

Aberdeen Joiners: Strike Averted.—The Aberdeen joiners decided last week, by 183 votes to 137, to go to arbitration in the dispute between themselves and the masters.

St. Wilfrid's Church, Harrogate, will have cost £30,000 when completed. It is in the Early English style, Mr. Temple Moore, of London, being the architect.

The London Central Markets are to be thoroughly examined, so far as their iron and steelwork is concerned, by Mr. A. T. Walmisley, who will receive a fee of 300 guineas.

A Carnegie Free Library at Aberystwyth has been completed at a cost of £3,000. The architect was Mr. W. G. Payton, of Birmingham, whose design was selected in competition. The building is of local rubble stone with Greenhill stone dressings.

The Birmingham City Surveyorship, rendered vacant by the death of the late Mr. John Price, has attracted a large number of applicants. It carries a salary of £1,250 per annum. The appointment will probably be made on June 12th.

A Conciliation Board in connection with the building trades has recently been formed in York between the York Master-builders' and Contractors' Association and the several operative societies of bricklayers, carpenters and joiners, and stonemasons.

R.I.B.A. Annual General Meeting.—The annual general meeting of the Royal Institute of British Architects was held at 9, Conduit Street, W., on Monday evening. The chief business was the consideration of the annual report (given on p. 236 of our issue for last week).

A new Process of Making Bricks has been introduced by Messrs. Eastwood & Co. at their works at Conyer, near Sittingbourne. Bricks of good quality are now turned out by machinery in seven days, against three months under the old handmade process.

A Central Reference Library at Stepney has been erected at a cost of £6,000. The building, which was designed by the borough engineer, Mr. M. W. Jameson, includes on the ground floor a lecture-hall and reading-room for juveniles. On the first floor is the reference room, 60ft. long.

Lead Statues: A Suggestion.—Writing in the May "Burlington" on "Some Lead Portrait Statues," Mr. Lawrence Weaver makes an interesting suggestion as to the use of lead in certain cases. One may admit (he says) the coarser treatment that lead demands, and the absence of finely-modelled sinew and vein that bronze makes possible. Still, some modern bronze effigies of successful generals could well be spared, if in exchange we could summon from the vasty deep of the plumber's pot some long-melted lead statues of the eighteenth century, like the "William III." at Dublin. No one would affirm that good lead was less good than bad bronze, and if sometimes, where money was strictly limited, a better artist and a cheaper material were employed instead of a feeble artist and a costly material, our public places would not be the losers.

St. Stephen's Church, Clapham, is to be extended by the addition of an aisle. The cost will be £1,600.

A new Post-office at Stoke Newington is to be erected as close as possible to the present postal buildings in Brooke Road.

A new Free Church Hall at Stepps is being erected at a cost of £1,000. Mr. J. Gillespie, of Messrs. Purdie & Gillespie, of Glasgow, is the architect.

The Projected Subways for New York are estimated to cost £90,000,000, of which £60,000,000 is to be expended in the work of construction and £30,000,000 in the service equipment. Nineteen subway routes have been approved by the Rapid Transit Commission.

Painters' Cradles: A Fatal Accident.—At the Hammersmith Coroner's Court last week an inquest was held on the body of a painter named Frederick Jones, aged 40, who died in hospital from injuries caused by a fall from Hyde Park Mansions. He was working on a cradle at the top of the building and dropped 90ft. on to a bush, just missing the iron railings. One rope of the cradle had become unfastened and he was tipped out. The jury returned a verdict of "Accidental death," adding that it was advisable some means should be adopted to make it impossible for the hooks on cradles to slip.

Habitations Hygiéniques Confortables à Bon Marché.—Even France cannot keep out American "pushfulness." We see an advertisement in the "Matin":—"Pour les construire ou pour diriger soi-même les travaux, recueil de plus de cent types de dessins de tous styles et de tous prix, avec leur distribution intérieure. Envoi franco, contre mandat de 6 fr. 50, de l'ouvrage complet ou prière d'indiquer le prix de la construction désirée et il sera envoyé une planche spécimen contre 1 fr. 50 adressé à l'Union Générale d'Architecture, 148, rue de Grenelle, Paris (7e), qui répondra gratis à toutes questions d'architecture et de construction."

Olympia now the Greatest Covered Stadium.—Now that the organizers of the Royal Naval and Military Tournament have decided to give their annual display at Olympia, Kensington, the interior of the huge building has been entirely remodelled. Seating accommodation has been provided for 10,000 people, and it is claimed that it is the most colossal stadium to be found in any covered building in the world. It is constructed of steel trestles with timber platforms 2ft. 9ins. wide on the ground floor, with a rise of 12ins. from step to step, and 2ft. 6ins. wide on the gallery floor, with a rise of 1ft. 6ins. Upon these platforms chairs securely fastened are arranged in blocks. The New Olympia Co. have carried out these alterations at a cost of more than £10,000. The re-modelled building was first used for the wrestling match between Hackenschmidt and Madrali.

Addition to the Temple Library.—The important addition to the library of the Middle Temple, which has been in hand since last September, is nearing completion. The work has been carried out in Portland stone on Gothic lines, in keeping with the main structure, which was designed by Savage and opened by the King when Prince of Wales in 1861. On the entrance level is a new porch, with an inside screen of carved oak. The former entrance to the library from the top of the stairs has been blocked up and a new doorway under the large central window has been formed. Special rooms have been provided on this floor for the librarian and for Parliamentary papers, thus enabling two additional bays for reading to be formed in the library on the ground hitherto occupied. Messrs. Higgs & Hill are executing the alterations, under the supervision of Mr. H. J. Wadling, architect to the Middle Temple.

The new Victoria Station, where work has been in progress for three years, is to be formally opened for traffic on June 1st.

Sir Charles Holroyd, for many years Keeper of the Tate Gallery, has been appointed director of the National Gallery, in succession to Sir Edward Poynter.

York Architectural Society.—At the annual meeting held last Thursday Mr. Arthur Pollard, F.R.I.B.A., was elected president for the current session, Messrs. S. Needham and A. A. Gibson vice-presidents, and Messrs. W. E. Barry, A.R.I.B.A., T. W. Whipp, A.R.I.B.A., J. H. Rutherford, E. A. Pollard and A. Cowman elective members of council.

Springburn District Library, the eleventh to be completed under the Glasgow Corporation library scheme, was formally opened last week. The building is situated in Ayr Street and Vulcan Street, and provides room in the lending department for about 10,000 volumes. The general reading-room accommodates 80 persons, the ladies' room 34, and the boys' and girls' room 100 boys and 50 girls. The architect was Mr. W. B. Whitie, of Glasgow.

THE COLISEUM.

What Mr. Stoll said about the Architect.

AT the meeting of the shareholders in the London Coliseum, Ltd., held at Cardiff last Thursday Mr. Oswald Stoll (the chairman) made some statements about the architect (Mr. Frank Matcham) and the engineer of the new building in St. Martin's Lane which it is as well to give in full, as the abbreviated reports which have appeared are apt to be misleading. Mr. Stoll said: "Quite apart from the amount estimated in the prospectus, or numerous other amounts that, when carefully examined by the auditors, rightly came under this head, the architect's estimate in the prospectus having been exceeded by the architect and engineers by £67,000—that is 67 per cent.—is the main cause of our trouble. If we wanted £67,000 less to-day we should not have been in this position, and the proper conduct of the business throughout the year would not have been interfered with in the way it must necessarily have been, where Mr. Matcham had to rely upon the estimate of the engineer, which was also greatly exceeded. Mr. Matcham is not to blame. The only consolation we have is that the value for the money is there, in probably one of the finest theatrical buildings in the world. The directors were obliged to rely upon their experts in this expenditure, and the past experience of Mr. Matcham justified them in doing so. In my own mind I believe his long and painful illness was responsible for his miscalculations, owing to the piecemeal way in which he had to do the work—moreover, varying requirements of the London County Council necessitated expenditure which he did not contemplate. But as to the directors approving of the excess of expenditure, instructions to the solicitors and letters they wrote on the subject are on record to disprove that, and these were written at the time when it was thought his part of the work would cost only £15,000—not £50,000—more. I have no wish to depreciate Mr. Matcham, who is both an able architect and an honourable man. I should not hesitate to employ him again in such a concern, as he is at least equal to any other man who could be found; but every contract would have to be actually settled before a brick was laid. It is said that such a course, however desirable, is impossible from a practicable point of view in a concern of the magnitude of the Coliseum."

THE REGISTRATION BILL.

American Opinion.

AS our readers know, it is our custom, whenever occasion arises, to give outside opinions on various matters affecting the profession, and, following that practice, we have many times quoted American opinion on subjects dealt with by architects in this country. The latest occasion for this we find in the "American Architect" for April 14th, where extended notice is given to the Enrolment Bill of the R.I.B.A. Our contemporary says: "The manner in which the matter of registration of architects in England is being handled just now is in refreshing contrast with the wire-pulling methods followed in this country by the supporters of the architects' licence movement. The Royal Institute of British Architects, long opposed to the idea, was, last year, reluctantly brought to a point where it gave the proposal a qualified endorsement and undertook to give the matter considerate attention during the past winter, appointing a committee to investigate and report. This committee, in turn, placed the matter in the hands of a sub-committee, equally divided, as was the larger one, between those who favoured and those who opposed the plan, and this sub-committee then selected and invited to appear and give testimony before it twenty-four architects, twelve favouring and twelve opposing the plan, and, also, in equal numbers representing the metropolis and the provinces. These twenty-four gentlemen attended and set forth their ideas and opinions at twelve successive meetings. The sub-committee then conferred and reported to the larger committee, which in turn considered and reported to the Institute itself at a general meeting on April 3rd."

Proper Methods and Fraudulent Ones.

"That appears to us to be a proper and dignified manner of treating a vexed subject which deserves calm and considerate, not impassioned nor hysterical, discussion. It is grossly improper and unfair for a small group, or coterie, or society, to vote, possibly at a packed meeting, to support a license measure and thereupon hasten to the legislature with a crude and ill-considered bill which they seek to jam through as hastily and quietly as possible. If the measure be good and worthy, or if it be evil and obnoxious, it, in either case, affects the entire body of the profession, and when the demand comes from within it should be the voice of the majority of those who are to be affected that the lawmakers should listen to. If it comes from without, from the great general public seeking to defend itself, why then the profession, as the weaker of the two interested but opposing parties, must yield. So far as this country is concerned, we are convinced that the demand for a license law, so far as it comes from within the profession, is not a genuine, and certainly not a general, demand. We believe it is nothing more nor less than a hasty and ill-considered giving way to the great American peculiarity, the itch for formulating a new law without taking time to consider whether older laws do not already cover the point."

"In the case of architects, we believe that Existing Laws do Sufficiently Cover the Requirements."

since architects are common and not uncommon human beings, and, on the average, are desirable and law-abiding citizens. If the great public feels that the architect is more dangerous to its welfare than the merchant, the broker, the engineer or the mechanic, then it is proper to put him under a restraint that these others are not affected by. But we do not for a moment believe that the public feels in this way about the members of the architectural societies, the graduates of the architectural schools, and

the many men of merely practical training who, in years of faithful service, have proved their competence, and we do not believe the public feels there would be any justice in requiring these men, even if they can well afford it, to pay an annual license-fee, when the merchant, the broker, the engineer and the mechanic are allowed to follow their calling untaxed, or that there is any good reason for placing such a stigma on honourable men. The public can proceed against an unlicensed architect for manslaughter as successfully as against a licensed one, and an injured client can as hopefully expect to collect civil damages." How then is the public benefited by annoying the majority of architects?

The Evil of Licence Law.

"Our own belief is, that the evil done by those who can now practise as architects, but who would be barred from practice through the operation of a license-law, is really a negligible quantity, so far as public safety is concerned. The practitioner of blunted moral faculties, who, for gain, becomes the willing tool of real-estate speculators, may be able to pass with flying colours the severest examination that can be devised. How does a license protect the public from such a man? For such real evil as there is—and so far as the public is concerned, it is infinitesimally small—we believe that a cure should be found, not through special and obnoxious 'class legislation'—which may or may not prove to be unconstitutional, for the constitutions of the several States are by no means identical in their provisions—but simply through enforcing against the small body of malpractitioners the penalties already established by the general laws. Architects are not outlaws; they constitute a highly developed and liberally educated profession, and they should be considered and treated as other professional men are. The profession is coherent and respected: it would gladly feel itself self-respecting, if the champions of the license system would kindly allow it that privilege. If, perchance, its manners, morals and customs need amending or cleansing it should be allowed, encouraged, or, if need be, compelled to itself attend to such cleansing."

A Western View of the Architect's Licence.

A writer in "The Architect and Engineer of California" says: "The City Council of Oakland has passed an ordinance which levies a tax on almost all kinds of animals, including architects. The tax or license on a dog, which latter is allowed to run at large, is fixed at a less sum than the tax on architects, probably because it was thought that the dog is a more harmless creature. The tax on a stallion or a bull is about the same as that demanded from the poor dumb beast who daily bends his back over a drawing-board creating 'frozen music' and other Ruskinisms. Incidentally, many commercial pursuits were also taxed, but no other profession was included."

"The patriarchal fathers, when interviewed, informed a committee of architects that no tax had been levied on doctors or lawyers or dentists because they were governed by a State law which regulated the practice of their profession, and seemed very much surprised to know that the architectural profession was similarly controlled, but they could not revoke what they had decreed, and the law must stand. They, however, gave the committee to understand that the carpenter-architect, to whom the drawing of plans was incidental to his business, and to whom it was not an exclusive method of earning a livelihood, would not be considered as taxable. It is said that the councilmen contemplate adding an amendment to the law requiring that architects wear a leather muzzle during the hot months."

BUILDING BY-LAWS.

Alteration to the Bill in Committee.

ON May 1st the Standing Committee of the House of Lords met to consider the Public Health Acts Amendment Bill, the title of which was altered to the Public Health (Building By-laws) Bill. Important amendments were submitted by Lord Carrington, President of the Board of Agriculture, and, with one exception, were agreed to. In the first place, clause 2, exempting certain buildings from the operation of certain building by-laws, was limited to rural districts. The by-laws in question, as they stood in the Bill originally, were those regarding structure of walls, foundations, roofs, floors, chimneys or hearths, or the sufficiency of space to be provided about buildings, or the ventilation of buildings, on the deposit of plans and sections concerning these matters. The ventilation of buildings was struck out from the list, and "the space to be provided about buildings" was altered to "the space to be provided in front of buildings." The exempted buildings in the original clause were those sufficiently isolated, with the exception of public buildings or factories. These exceptions from exemption were extended to include workshops or workplaces.

A New Sub-section

was added to the clause to the following effect:—

Nothing in this Act shall exempt a building from the operation of any by-law so far as that by-law relates to purposes of health, and if any question arises under this provision whether a by-law relates to purposes of health or not, that question shall be decided by the Local Government Board, and their decision shall be conclusive.

Clauses 4, 5 and 6 were struck out of the Bill. These clauses had reference to wholesome sites and the construction of exempted buildings, to the prohibition of the occupation of buildings erected contrary to the provisions of section 4, and to the disallowance of by-laws and substitution of others by the Local Government Board.

Extension to Urban Districts.

A new clause was inserted giving the Local Government Board power to extend by order the provisions of the measure to urban areas, on the application of the local authority, or of ratepayers representing at least one-tenth of the ratable value of the area. The order might be revoked on a similar application. Clause 7 prescribed procedure for persons aggrieved by a local authority's by-law or refusal to approve plans submitted in pursuance of a by-law, and authorised application to a court of summary jurisdiction for an order requiring the local authority to dispense with a requirement or to approve a plan with or without such modifications as the court should think fit. This clause was amended so as to provide that the order of the court should in itself dispense with the requirement or approve the plan or a modification of it, an appeal being left, as in the original clause, to quarter sessions. Sub-sections were added to the clause providing that the dispensing order must state that the court is satisfied that the requirement may be dispensed with without prejudice to the public health, and without unduly impairing the stability of the building to which the dispensation relates, or the security from fire of that building and any adjoining building.

The amendment which Lord Carrington

agreed to withdraw at the request of Lord Hylton was proposed in sub-section (4) of clause 2, which defines the exempted buildings. The sub-section set forth that two dwelling-houses separated by a party division of fire-resisting material should for the purposes of the Act be deemed to be a single building. Lord Carrington having procured the substitution for "party division of fire-resisting material" of the words "party-wall of brick or stone or other incombustible material," proposed to add "not less than gins. in thickness." Lord Hylton urged that these words were not required, and they were not insisted upon.

The Bill, as amended, was ordered to be reported to the House, and the Committee adjourned.—"Times."

BOURNVILLE'S NEW SCHOOLS.

NEW elementary schools at Bournville, outside Birmingham, built at



"No Bill would be otherwise than disastrous to architecture considered as a profession only, to say nothing of architecture in its highest sense as a fine art."—ANTI-REGISTRATIONIST.

a cost of £30,000 by Mr. and Mrs. George Cadbury, have been opened. They consist of schools for 540 boys and girls; an infants' department is to be added later. A feature of the design is the reduction in the size of the classrooms as compared with past ideas, thus making for greater efficiency in teaching and improvement in hygienic conditions. This innovation was approved by the Education Department. The change cost the founders £600 more when compared with the cost of schools of the orthodox-sized classrooms. The schools are built on the central-hall plan, with twelve classrooms around. They are situate upon sloping ground in the centre of the village, and are dignified by a massive square tower, in which a carillon, consisting of twenty-two bells, is set. A fall in the land renders a basement necessary, and in this are placed technical arts and handicrafts rooms for the use of boys, and laundry and cookery rooms for the use of the girls. In the tower there is a library.

Law Cases.

Architect's Decision as Arbitrator upheld.

—At the Carnarvon County Court last week a case was heard in which Messrs. David Jones & Sons, builders, of Rhostryfan, claimed £48 from the trustees of a new chapel erected at Rhosgadfan. The work was carried out according to the plans and specifications of Mr. R. L. Jones, architect, of Carnarvon, at a cost of £1,150. There were general conditions attached to the contract, and one of the clauses provided that any dispute arising out of the contract should be referred to the architect, whose decision was to be final. The case for the trustees was stated to be that the architect, after allowing the builders for all reasonable time, declared them still liable for £100, but after consultation with the committee the amount was reduced to £48. Mr. R. L. Jones, the architect, said that the delay was due to plaintiffs' negligence, and he considered he had treated them most liberally. His Honour held that the case of *Dodd v. Churton* did not apply. The parties had elected to make the architect the arbiter, and he would not interfere with his decision. Judgment for defendants, with costs.

Drain Testing.—Mr. Charles Phillips, of Crouch End, once a building inspector in the employment of the Hornsey Borough Council, but now a builder on his own account, was summoned at Highgate recently for obstructing the local authority's surveyor and building inspector and refusing to allow them free access to a new house for the purpose of finally testing the drains before they were covered in.—The Bench convicted on both summonses, and fined Phillips £2 and £5 5s. costs and the Court costs on each, making a total of £15 6s.

"An Indivisible Area."—The Court of Appeal recently heard the case of *Hooper & Ashby v. Willis*. The appellants are a firm of builders' merchants at Southampton, with branch offices at Bournemouth, Poole, Branksome, Portsmouth and Guildford. The defendant entered their service in 1896, aged 19, and the agreement then made between them stated that defendant would not for a space of fourteen years after the termination of his employment carry on business as a builders' merchant, &c., at any place within thirty miles of either the town hall at Bournemouth or the Bargate at Southampton. The defendant remained in the employment of the appellants until August, 1903, when he discharged himself. He had since, appellants alleged, broken his agreement by carrying on business as a builders' merchant at Broadstone, which was within seven miles of the town hall of Bournemouth. Messrs. Hooper & Ashby accordingly commenced this action for an injunction to restrain him from continuing such business at Broadstone. Mr. Justice Kekewich, in the lower Court, was of opinion that the area within which the defendant was prohibited from carrying on business was larger than was reasonably required for the protection of the appellants' trade, and on that ground dismissed the action with costs. Appellants appealed. Their Lordships dismissed the appeal, taking the same view as the learned judge in the Court below, and holding that the area contemplated was larger than was reasonably necessary.

Complete List of Contracts Open.

With a few exceptions, news of Contracts Open are not repeated after they have been published once in these columns, so that readers will find particulars in our previous issue of other contracts that still remain open.

Unless expressly stated to the contrary all deposits required for bills of quantities, &c., are returned on receipt of *bona-fide* tenders.

The words "Fair Wages Clause" inserted in certain paragraphs signify that persons tendering must conform to a fair-wages clause in the contract, which requires them to pay the rates of wages current in the district.

BUILDING.

May 10. Leith.—*Laying a granolithic floor in sheds at Albert Dock, Leith.* Specification, form of tender, and other particulars may be obtained on application at the office of Peter Whyte, M.I.C.E., superintendent of the harbour and docks, Tower Place, Leith. Tenders are to be delivered to Victor A. Noel Paton, clerk to the commission, 31, Melville Street, Edinburgh, on or before May 10.

May 10. Newcastle-upon-Tyne.—*Erection of a new police-station at Walker.* Contractors desirous of tendering are requested to send in their names to the City Property Surveyor, Town Hall, Newcastle, on or before May 10.

May 10. Royton.—*New public elementary school at Byron Street, Royton, near Oldham.* The plans may be seen and bills of quantities obtained at the office of the county architect, Henry Littler, 16, Ribblesdale Place, Preston, by payment of a deposit of £2. Tenders must be delivered before noon on May 10, sealed and endorsed, to J. W. Riley, Town Hall, Royton.

May 10. Newby.—*Enlargement of Newby Chapel.* Plans and specifications may be seen at Townhead, Newby, and estimates, sealed and endorsed, to be returned to Richard Green, Newby, by May 10.

May 10. Edderton.—*Mason, carpenter, slater, plumber, lath and plaster and galvanized corrugated iron works of rebuilding Lidstone Lodge, Edderton.* Plans and specifications can be seen with A. Matland & Sons, architects, Tain, and offers can be lodged with them on or before May 10.

May 10. Warrington.—*Erection of a mission church, at Werrington, for the Rev. H. M. Fowler.* Builders should send in their names to R. Scrivener & Sons, architects, &c., Hanley, by May 10. Bills of quantities will be supplied.

May 10. Antrim.—*Erection of labourers' cottages in the rural district, in accordance with plans and specifications, which can be seen at the office of the Clerk of the Council, or at the office of the architect, W. D. R. Taggart, Scottish Provident Buildings, Belfast, as follows: One cottage at Ballyearl, Carnmoney, on the lands of Mr. W. Houston; one cottage at Killyfad, Randalstown, on the lands of John Fulton; one cottage at Annaghmore, Toomebridge, on the lands of B. O'Boyle; one cottage at Portlee, Toomebridge, on the lands of Mrs. McCann; one cottage at Portlee, Toomebridge, on the lands of John O'Boyle; two cottages at Ballynamullen, Toomebridge, on the lands of Felix Lavery; one cottage at Tamnaderry, Randalstown, on the lands of James Gilbert; four cottages at Cranfield, Randalstown, on the lands of James Charleton; two cottages at Cranfield, Randalstown, on the lands of Bernard O'Kane; one cottage at Cranfield, Randalstown, on the lands of Mrs. Hume; two cottages at Feehogue, Randalstown, on the lands of Lord O'Neill; four cottages at Lurgan West, Randalstown, on the lands of Lord O'Neill; one cottage at Ballygrooby, Kandalstown, on the lands of G. L. Young; two cottages at Craigmore, Randalstown, on the lands of J. H. Mulligan; two cottages at Ballymacilhoyle, Crumlin, on the lands of W. S. Thompson. Persons tendering may do so for any or all of the different blocks; but they must name the particular site or sites on their tender. Tenders are to be lodged with J. Clark, clerk of Council, Union Office, Antrim, not later than 10 a.m. on May 10.*

May 11. Aberbargoed.—*Additions and alterations to Caersalem Baptist Chapel at Aberbargoed in accordance with plans and specification prepared by James & Morgan, F.R.I.B.A., architects, Cardiff.* Plans and specification may be seen and further particulars obtained, either at the Architects' Office or at the Rev. D. F. Walters, Frondeg, Aberbargoed. Sealed and endorsed tenders to be sent to the Rev. D. F. Walters not later than May 11.

May 11. Abernant.—*Rebuilding Bethesda Welsh Independent Chapel, Abernant, Aberdare, for the Trustees.* Plans and specification can be seen at the office of T. Roderick, architect, Ashbrook House, Clifton Street, Aberdare. Endorsed tenders to be sent to J. Barclay, 10, Windsor Terrace, Abernant, not later than May 11.

May 11. Taunton.—*Erection of a new classroom wing and corridors, and also a new corridor to connect this extension with the new chapel, at Taunton school.* The plans and specifications may be seen and bills of quantities obtained at the offices of F. W. Roberts, M.S.A., architect and surveyor, 2, Hammet Street, Taunton, to whom tenders must be delivered by the first post on May 11.

May 11. Souterfell.—*Erection of new farm buildings at Souterfell, near Troutbeck, for John Bellas.* Plans and specifications can be seen at the office of W. Hall, Troutbeck, who will receive tenders, endorsed "Farm Buildings," up to May 11.

May 11. Sunderland.—*Alterations and additions to the men's bathroom in the main building at the Workhouse, Hylton Road, Sunderland, in accordance with the plan and specification to be seen on application to W. & T. R. Milburn, architects, 20, Fawcett Street, Sunderland.* Tenders, endorsed "Alterations and Additions to Bathroom," must be delivered to Robert Thompson, clerk to the Guardians, Union Offices, 17, John Street, Sunderland, before noon on May 11.

May 12. Redruth.—*Erection of banking premises at Penryn Street, Redruth, and shop premises adjoining same, for Barclay & Co., Ltd.* The drawings and specifications may be seen by appointment at the offices of the architect, C. Caldwell, Victoria Square, Penzance, to whom sealed tenders, endorsed "Tender for Banks," are to be sent by May 12.

May 12. Belfast.—*Erection of a new block of buildings, comprising shops and offices, at Arthur Street-Arthur Square and William Street South, Belfast.* Bills of quantities may be obtained from T. C. Hunter, Scottish Provident Buildings, on payment of a deposit of £2 2s. Plans and specification may be seen at the office of Blackwood & Jury, architects, 41, Donegall Place, Belfast, to whom sealed and endorsed tenders are to be sent on or before 10 a.m. on May 12.

May 12. Laugharne.—*Restoring Cliff House, Laugharne.* Plans and specification to be seen at Cliff House. Tenders to be sent to W. H. Dempster, Cliff House, Laugharne, on or before May 12, endorsed "Tender for Cliff House."

May 12. Newport.—*Building additions to Sirhowy and Argoed infants' council school, and carrying out repairs and improvements to Lower Rhymney and Middle Rhymney infants' council schools.* Plans and specifications may be seen either at the office of David Morgan (Messrs. James & Morgan, F.R.I.B.A.), architect, Charles Street Chambers, Cardiff, or at the office of C. Dauncey, Park Chambers, Tredegar. Quantities supplied for Sirhowy and Argoed schools. Separate sealed tenders, in separate envelopes for each school, endorse 1 respectively "Sirhowy School Tender," &c., to be delivered to C. Dauncey, County Council Offices, Newport, Mon., not later than, in the case of the Rhymney schools, May 12, and in the case of the Sirhowy and Argoed schools, May 15.

May 14. Alford.—*Building a church hall at Alford, Lincolnshire.* Plans and specifications may be seen at Mr. Green's, chemist, Market Place, Alford, by appointment. Tenders must be received on or before May 14.

May 14. Marlpool.—*Council school to accommodate about 216 boys.* Persons desirous of tendering for the work may see the drawings, specification, agreement, &c., at the office of the Architect to the Committee, St. Mary's Gate, Derby, between 10 a.m. and 4 p.m., except on Saturday, when they will be on view from 10 a.m. to 12 noon. A copy of the bill of quantities, specification, conditions of contract and form of tender can be obtained at the Architect's Office upon payment of £1 1s. Sealed tenders, in envelopes provided for the purpose, endorsed "Tender for New Council School, Marlpool," must be delivered to George H. Widdows, A.R.I.B.A., architect to the Committee, County Education Offices, St. Mary's Gate, Derby, not later than 5 p.m. on May 14.

May 14. Dublin.—*Erection of an electricity sub-station at Fairview, Dublin, in accordance with plans and specifications, and conditions of contract prepared by the city architect, which may be inspected daily (except on Saturdays) at his office, Municipal Buildings, Cork Hill, Dublin, between 11 and 4.* No tender will be entertained which is not on the prescribed form. Copies of bills of quantities and forms of tender may be obtained at the office of the City Treasurer, Municipal Buildings, Cork Hill, Dublin, on payment of £2. Tenders under seal, addressed to the "Chairman, Electric Lighting Committee," and endorsed "Tender for Electricity Sub-station, Fairview," to be lodged at the Electric Lighting Committee's office, 3, Cork Hill, Dublin, not later than 4 p.m. on May 14.

May 14. Nantyffyllon.—*New English Calvinistic Methodist Church at Nantyffyllon, near Maesteg.* Plans and specification may be seen and quantities obtained at the offices of Arthur Lloyd Thomas, A.M.I.M.E., architect and engineer, Church Street Chambers, Nantypridd. Sealed and endorsed tenders to be sent to D. E. Watkins, 24, Humphrey Street, Nantyffyllon, on or before May 14.

May 14. St. Austell.—*Erection of a residence at Truro Road, St. Austell, for E. Stocker.* Drawings and specifications may be seen at the office of the architect, B. C. Andrew, M.S.A., Biddick's Court, St. Austell, by whom sealed tenders will be received not later than noon on May 14.

May 14. Goldthorpe.—*Church.* Contractors desirous of tendering for the several trades required in the erection of a church at Goldthorpe, near Rotherham, are requested to send their names, along with a deposit of £1 1s., to Empsall & Clarkson, architects and surveyors, 7, Exchange Bradford, on or before May 14.

May 15. Sheffield.—*Erection of tenements on section 2 of the Crofts area.* Tenders for work required in connection with the above:—Excavator, bricklayer and mason, carpenter and joiner, slater, plasterer, plumber and glazier and painter. Specifications and plans may be seen and quantities obtained at the office of Charles F. Wike, C.E., city surveyor, Town Hall, Sheffield, on payment of £1 1s. Tenders, endorsed "Crofts Dwellings," are to be sent in not later than 9 a.m. on May 15, addressed to "The Chairman and Members of the Health Committee, City Surveyor's Office, Town Hall, Sheffield." Fair wages clause.

May 15. Fulneck.—*Erection of new laboratory block in connection with the boys' school at Fulneck.* The drawings, &c., may be seen, and quantities obtained from G. S. Nelson, architect, Sun Buildings, 15, Park Row,

Leeds, to whom tenders must be sent on or before 10 a.m. on May 15.

May 15. Wellington.—*School.* Builders willing to tender for Sunday school for the Primitive Methodist Trustees at Tan Bank, Wellington, Salop, must send their names and addresses to Elijah Jones, M.S.A., architect, 10, Albion Street, Hanley, Staffs. Quantities may be obtained up to May 10. Tenders to be in on May 15.

May 15. Patterdale.—*Alterations to St. Patrick's Church, Patterdale.* Plans, specifications and all particulars may be obtained on application to George Wason & Son, architects, St. Andrew's Chambers, Penrith. Tenders to be sent to the Rev. W. P. Morris, the Rectory, Patterdale, not later than May 15, endorsed "Tender for Church."

May 16. Epping.—*Construction of nurses' and infants' quarters at the Epping Workhouse.* Drawings can be seen and further particulars and bills of quantities obtained at the office of H. Tooley, A.R., A.B.A., Buckhurst Hill, upon a deposit of £1 1s. Applications for quantities must be made to H. Tooley before May 4. Tenders to be made on forms which will be supplied, and to be sent in the envelopes which will be provided, to R. D. Trotter, clerk to the Guardians, Epping, on or before 5 p.m. on May 16.

May 16. Uttoxeter.—*New Council school to accommodate about 532 children.* Builders desiring to tender for the work should apply to Graham Balfour, Director of Education, Stafford. Quantities will be supplied, for which a deposit of £1 1s. will be charged. The drawings and specification can be seen at the office of the Education Committee at Stafford.

May 16. Aberdeen.—*Mason, carpenter, glazier, slater, plumber, plaster, heating and iron works of alterations and additions at the north-east portion of the main buildings of the Royal Asylum.* The plans and conditions of contract may be seen with, and specifications and schedules of quantities obtained from, Kelly & Nicol, architects, 367, Union Street, Aberdeen. Sealed tenders are to be lodged with A. Scott Finnie, clerk and treasurer, 343, Union Street, Aberdeen, not later than May 16.

May 16. Guildford.—*Erection of eighteen cottages in Cline Road, Guildford, Surrey, in accordance with plans and specifications prepared by C. G. Mason, borough engineer, and T. J. Capp, architect, Stoke Road, Guildford.* Any person desirous of tendering must send in his name to the Town Clerk, accompanied with a deposit of £2, not later than May 16. Tenders, to be endorsed "Tenders for Workmen's Dwellings," to be sent in on a date which will be duly advised.

May 16. Glasgow.—*Mason and other works connected with alterations to be made on the tenement at the corner of Castle Street and St. James' Road belonging to the Corporation.* The plans may be seen, and copies of the specification, schedule of quantities and form of tender obtained, upon application at the office of the City Engineer, 64, Cochrane Street. Tenders, marked "City Improvements Department—Tenement, Castle Street and St. James' Road; Tender for Alterations," to be lodged with A. W. Myles, town clerk, City Chambers, Glasgow, on or before May 16.

May 16. Rhymney.—*Alterations and general renovation of Brynhytyrd C.M. Chapel, Rhymney.* Plans and specifications to be seen with B. Jones, 29, Plantation Street, Rhymney, to whom tenders are to be delivered on or before May 16. Sealed and endorsed "Tender for Chapel."

May 16. Lower Boswarva.—*Erection of farm buildings at Lower Boswarva, for T. R. Bolitho.* The drawings and specifications may be seen at the offices of Henry White, F.R.I.B.A., Keigwion, Hemaor, R.S.O., to whom tenders, endorsed, should be delivered not later than May 16.

May 16. Hull.—*Erection of a greenhouse, in the East Park, Holderness Road.* Drawings and specification may be seen at the City Architect's Office. Tenders, sealed and endorsed "Tender for Greenhouse, East Park," are to be addressed to the Chairman of the Parks and Burial Committee, and delivered to the Town Clerk's Office, Hull, before 10 a.m. on May 16.

May 16. London, S.W.—*Carrying-out fire-resisting and other works to a store building at the Fountain Fever Hospital, Tooting, S.W., for the Metropolitan Asylums Board, in accordance with drawing and specification prepared by W. T. Hatch, M.I.C.E., M.I.M.E., engineer-in-chief.* Drawing, specification, conditions of contract, and form of tender may be inspected at the Office of the Board, Embankment, London, E.C., and can be obtained upon payment of a deposit of £1. Tenders, addressed as noted on the form, must be delivered at the Office of the Board not later than 10 a.m. on May 16.

May 16. Heslington.—*Building a farmhouse, at Bridge House Farm, Heslington, for C. W. Wilson.* Plans and specifications may be seen, and other information obtained, by applying at the office of J. Stalker, M.S.A., architect, Kendal, to whom tenders (under cover) are to be handed in not later than noon May 16.

May 17. Walmersley-cum-Shuttleworth.—*Enlargement and improvement of the Turn-1-th-Lane Council School, Walmersley-cum-Shuttleworth.* The plans may be seen at the Council Offices, Ramsbottom, and bills of quantities obtained at the offices of the county architect, Henry Littler, 16, Ribblesdale Place, Preston, by payment of a deposit of £1. Tenders must

be delivered before noon on May 17, sealed and endorsed, to W. Dilworth, Arden House, Summerseat, near Manchester.

May 17. Great Leighs.—*Structural alterations, and building new classroom, to the Council School, Great Leighs.* Plans, specifications and form of contract may be inspected at the office of the architect, Frank Whitmore, 73, Duke Street, Chelmsford, between 10 and 5, on any working day except Saturday. Builders desirous of tendering must send in their names and addresses to the architect on or before May 3, when copy of bills of quantities will be supplied to each applicant if references are satisfactory. Sealed tenders, endorsed "Tender for Great Leighs School Works," should be sent to J. W. Nicholas, secty., County Offices, Duke Street, Chelmsford, by May 17.

May 18. London, W.—*Pulling down the existing temporary iron buildings, and erecting, on the site fronting to Allardyce Street, Brixton, a new parochial hall, gymnasium and classrooms, caretaker's house, for the Vicar and Committee of St. Paul's, West Brixton.* Drawings and specification may be seen at the offices of C. E. Hewitt, architect, 21, Old Queen Street, Westminster, S.W., from whom also bills of quantities may be obtained on payment of a deposit of £5. Sealed tenders, on the forms supplied, must be delivered to the architect before noon on May 18.

May 18. Dundee.—*New school in the east end of the city, for the School Board.* Plans may be seen and schedules of quantities obtained on application to J. H. Langlands, architect of the Board, 31, Murraygate, Dundee. Offers must be sealed and marked "Tenders for New School," and lodged with John E. Williams, clerk, School Board Offices, Dundee, not later than noon on May 18.

May 19. Leeds.—*Supply of about 11,000 tons of best Craven or Derbyshire lime, required for the purification of gas at the several gas works, during the twelve months commencing on July 1, 1906.* Forms of tender may be had on application to the General Manager, Gasworks. Sealed tenders, endorsed "Tender for Lime," addressed to the Town Hall, Leeds, to be delivered not later than May 19.

May 19. Blackford.—*Alterations and additions to the County School, Blackford.* Drawings and specifications can be seen at the school. Sealed tenders must reach the County Education Office, Weston-super-Mare, before noon on May 19.

May 21. Lochgelly.—*Mason, brick, joiner, plumber, concrete, plaster, slater, iron, steel and glazier works for proposed bakery premises, Lochgelly, for the Lochgelly Co-operative Society, Ltd.* Plans and specifications may be seen, and all further information obtained, on application to James T. Scobie, architect, Dunfermline and Lochgelly. Schedules of measurements may be had from the Secretary on payment of £1 is. The estimates to be lodged with the secretary, John Mitchell on or before 10 a.m. on May 21, marked "Tender New Bakery Premises," on envelope.

May 22. Aintree.—*Erection of buildings for electric sub-station and battery station at Aintree, for Lancashire and Yorkshire Railway.* Plans can be seen and form of tender, quantities, and specification obtained on application at the Engineer's Office, Hunt's Bank, Manchester. Tenders endorsed "Tender for Electric Sub-Station, &c., at Aintree," to be in the hands of R. C. Irwin, secty., Hunt's Bank, Manchester, signed, not later than 10 a.m. on May 22.

May 22. Huntingdon.—*Additions and alterations to the following Council schools viz.: Fenstanton School, Warboys Fen School, Somersham School (mixed department).* Plans and specifications can be seen at the office of the county, 36, High Street, Huntingdon. Tenders must be forwarded to S. G. Cook, clerk to the County Education Committee, County Education Offices, 36, High Street, Huntingdon, by 10 a.m. on May 22.

May 22. London, N.E.—*Adaptation of Springfield House and stables as refreshment-rooms, superintendents' and gardeners' quarters, bothy, &c., and the erection of conveniences for men at Springfield Park, Clapton, N.E., for the London County Council.* Persons desiring to submit tenders may obtain the drawings, specifications, form of tender and other particulars at the Architect's Department, 15, Pall Mall East, S.W., upon payment to the cashier of the Council at the County Hall, Spring Gardens, S.W., of the sum of 10s. 6d. Tenders must be upon the official forms, and the printed instructions contained therein must be strictly complied with. Fair wages clause. Each tender is to be delivered at the County Hall, in a sealed cover addressed to the Clerk of the London County Council, Spring Gardens, S.W., and marked "Tender for Adaptation of Springfield House, &c." No tender will be received after 10 a.m. on May 22. Any tender which does not comply with the printed instructions for tender may be rejected.

May 22. Plymouth.—*Erection and completion of a lodge, &c., at the New Cemetery, Egg Buckland.* Plans and specification can be seen and forms of tender and bills of quantities obtained on deposit of £2 in cash, to the Borough Engineer. Sealed tenders, accompanied by the fully priced-out bills of quantities, to be delivered at the Borough Engineer's Office, Municipal Offices, Plymouth, not later than 5 p.m. on May 22.

May 25. Hythe.—*Erection of a new Council school to accommodate 250 infants at Hythe, Kent.* The drawings and specification may be inspected at the office of the architect, A. Bromley, Radnor Chambers, Folkestone. Any person desiring to tender must send in his name to the architect, accompanied with a deposit of £1, not later than noon on May 11. Tenders, on the form supplied, to be delivered to R. Lonergan, 11, Cheriton Place, Folkestone, not later than noon on May 25.

May 26. Poulton.—*Works required in the erection of new schools at Poulton for the Wallasey U.D.C., in accordance with the drawings and specification prepared by Joseph Holt, A.R.I.B.A., 9, Albert Square, Manchester.* Copies of bills of quantities and general conditions, with form of tender, may be obtained from the architect's office on receipt of a deposit of £1 is. Sealed tenders marked "Tender for Poulton School," to reach H. W. Cook,

clerk and solicitor, Public Offices, Egremont, Cheshire, not later than May 26.

May 26. Penzance.—*New Wesleyan Church at Richmond, Penzance.* The plans and specifications can be seen at the office of H. H. Pezack, Public Buildings, Penzance. Sealed tenders, endorsed "Tenders for Richmond Church," must be sent to the Rev. G. C. Mayes, 13, Regent Terrace, Penzance, on or before May 26.

No date. Guildford.—*Alterations and repairs to premises in the Walnut Tree Close Road, Guildford.* Bills of quantities may be obtained on application to E. Goodham Nye, P.A.S.I., architect and surveyor, Jenner Road, Guildford.

No date. Leeds.—*Alterations and additions.* Builders wishing to tender for alterations and additions to tobacco factory for Wood Brothers, Water Lane, can obtain quantities from the architect, F. Musto, A.R.I.B.A., Greek Street Chambers, Leeds. Complete tenders or separate trades optional.

No date. Wigan.—*Erection of a composite iron and wood building for use as a temporary secondary school for girls.* Plans and specification may be examined to the Education Offices, Borough Courts and Offices, King Street, Wigan.

ENGINEERING.

May 10. Hamilton.—*Providing and erecting a steel tank at Greenhill and in laying cast-iron pipes and carrying out relative works.* Plans may be seen and copies of the specification and schedule obtained at the office of the engineers, J. & A. Leslie & Reid, C.E., 72a, George Street, Edinburgh, on payment of £1. Tenders, endorsed "Tender for Greenhill Tank," must be lodged with W. E. Whyte, district clerk, District Offices, Hamilton, not later than by the first post on May 10.

May 11. Penrith.—*Ventilation works at the dining hall of the Workhouse, for the Guardians.* Plans and specifications may be seen and other particulars obtained from J. W. Smith, clerk, Public Offices, Penrith, to whom sealed tenders, endorsed "Ventilation," must be sent on or before May 11.

May 12. Hull.—*Cartage of pipes, trench work, laying and jointing of about one and a half miles of 30in. water main.* Plan may be seen and copy of specification and form of tender may be obtained of F. J. Bancroft, city water and gas engineer, on payment of £1. Cheques and postal orders to be made payable to T. G. Milner, city treasurer, Hull. Tenders, endorsed "Tender for Laying 30in. Main," are to be addressed to the Chairman of the Water and Gas Committee, and delivered at the Town Clerk's Office not later than May 12.

May 12. Portsmouth.—*Additions to the Stamshaw pumping station, with new engine pump and rising main in Simpson Road, Stamshaw.* On payment of the sum of £2 2s. a lithographed copy of the specification, general conditions and bill of quantities, with form of tender, can be obtained on application to the Town Clerk, and any further particulars can be obtained at the Borough Engineer's Offices, at the Town Hall, Portsmouth. Tenders, marked "Tender for Stamshaw Pumping Station Rising Main, &c.," must be filled up, signed and returned with the bills of quantities, duly filled in, to Alexander Hellard, town clerk, Town Hall, Portsmouth, not later than 10 a.m. on May 12. Fair wages clause.

May 14. Edinburgh.—*Arc lamp posts.* The specification, form of tender and drawings can be obtained from the Electrical Engineer, Dewar Place, Edinburgh, on payment of a deposit of £2 2s. Tenders on the prescribed form, enclosed in sealed envelopes and endorsed on the outside "Tender for Arc Lamp Posts," must be sent to the Town Clerk, City Chambers, Edinburgh, not later than May 14.

May 14. Langley Moor.—*Repairs to Esh Bridge.* Contractors desirous of tendering for this work may receive particulars from G. G. Donkin, surveyor, Langley Moor, by appointment. Tenders to be delivered to J. G. Wilson, Durham, on or before May 14.

May 14. Manchester.—*Extension of the refrigerating machinery and plant at Smithfield Market.* Specification and form of tender may be obtained on application at the City Surveyor's Office, Town Hall, Manchester, on payment to the City Treasurer of £2 2s. All cheques or postal orders are to be made payable to the order of "The Corporation of Manchester." Tenders, enclosed in the official envelopes and addressed to the Chairman of the Markets Committee, to be delivered at the City Surveyor's Office not later than noon on May 14.

May 14. Edinburgh.—*Arc lamps for street lighting.* The specification and form of tender can be obtained from the Electrical Engineer, Dewar Place, Edinburgh, on payment of a deposit of £1 is. Tenders on the prescribed form, enclosed in sealed envelopes, and endorsed on the outside "Tenders for Arc Lamps," must be delivered at the Town Clerk's Office, City Chambers, Edinburgh, not later than May 14.

May 15. Bristol.—*Widening, straightening and deepening of the bed or channel of a part of the River Frome lying under a street called the Broad Weir.* The specification and drawings may be seen at the office of the City Engineer, 63, Queen Square, and a copy of the instructions for tender, a form of tender, general conditions and specification and bill of quantities, with an addressed envelope, may be obtained at the same office on deposit of a cheque for £3. Tenders must be made on the forms provided, and must be delivered at the office of the City Engineer, enclosed in the envelope provided, not later than 10 a.m. on May 15.

May 15. Dufftown.—*Piping and cementing works in connection with the purification scheme proposed to be carried out near the Malt Kiln Burn.* Plans and specifications may be seen with Donald M'Kay, burgh surveyor, Dufftown, who will meet intending offerors on the grounds, on May 12, from 10 a.m. till 5 p.m.; and sealed tenders will be received by the Town Clerk on or before May 15.

May 15. Clare.—*Carting, excavating for and laying and jointing of about 3 miles of 4in. and 3in. cast-iron*

water-mains, including fixing valves, hydrants, &c., the erection of brick service reservoir, pumping station, and all works in relation thereto, for the R.D.C. Plans and specifications may be seen and copies of the quantities and form of tender obtained from the engineers, Sands & Walker, Milton Chambers, Nottingham, on payment of £2 2s. (by cheque). Sealed and endorsed tenders to be sent to S. L. Bigmore, clerk to the Council, Haverhill, Suffolk, on or before 10 a.m. on May 15.

May 15. Warrenpoint.—*Construction of sea baths for the U.D.C., in accordance with plans and specifications prepared by Kaye, Parry & Ross, civil engineers and architects, 63, Dawson Street, Dublin.* For the convenience of persons tendering for the above works bills of quantities, based upon the plans and specifications, have been prepared by Beckett & Medcalf, quantity surveyors, but their accuracy is not guaranteed. Copies of these bills can be obtained at the offices of the Architects on payment of £1. Tenders, enclosed in sealed envelopes, marked "Tender for Baths," and addressed to the Chairman of the Council, must be delivered at the Town Hall, Warrenpoint, on or before May 15.

May 15. Amphyll.—*Water supply:* (a) Supply, delivery and laying of about 7 miles of 6in., 4in. and 3in. cast-iron water mains, with sluice valves, hydrants, air valves and water-level indicator; (b) construction of engine and producer-house and brick-softening tanks at Crophill and a 150,000 gallon capacity service reservoir in Amphyll Park; (c) supply, delivery and erection of suction gas plants, gas engines, air compressors, surface pumps, softening plant, and well, with air lifting plant at Crophill, for the U.D.C. Drawings, specification, conditions of contract and forms of tender may be seen on and after May 3 at the offices of the engineers, W. R. & W. Phillips, Luton, Beds, from whom copies of same can be obtained on payment of £2 2s. for each (a) (b) and (c) contracts, half of which sum will be returned on receipt of a bona-fide tender if the copies of plans and specifications are returned to the Engineers. Sealed tenders on the prescribed form and endorsed "Amphyll Waterworks, Contract (a) (b) or (c) as the case may be, to be addressed to Alfred T. Trethewey, clerk to the Council, U.D.C. Offices, Amphyll, Bedfordshire, and delivered by May 15.

May 16. Salford.—*Supply and erection of a station meter (50,000 cub. ft. per hour capacity) at the Bloom Street Gasworks.* The drawings may be seen and copies of the specification and form of tender obtained (for which a charge of £1 is. will be made) on application to William W. Woodward, engineer, Gas Offices, Bloom Street, Salford. Sealed tenders, endorsed "Tender for Meter," addressed to the Chairman of the Gas Committee, Town Hall, Salford, to be delivered to L. C. Evans, town clerk, Town Hall, Salford, not later than 3 p.m. on May 16.

May 16. Leigh-on-Sea.—*Laying the following gas-mains for the U.D.C.:—500 lineal yds. 8ins. diameter, 57 lineal yds. 7ins. diameter, 460 lineal yds. 4ins. diameter.* Plans and specifications may be seen and particulars obtained at the office of John W. Liversedge, engineer and surveyor. Tenders to be signed, sealed and delivered to the Clerk on or before May 16.

May 16. Croydon.—*Overhead equipment of tramways, in Whitehorse Road.* Plans may be seen and specification, general conditions, and form of tender obtained at the Electricity Works, Factory Lane, Croydon, upon payment of a deposit of £1 is. Tenders to be endorsed "Tender for Overhead Equipment," and sent to F. C. Lloyd, town clerk, Town Hall, Croydon, by 11 a.m. on May 16.

May 17. Exeter.—*Rebuilding Ventover Bridge, Teigngrace, for the County Council.* The plans, specifications and form of contract can be seen at the office of the Council at the Castle of Exeter, where tenders are to be sent on or before May 17.

May 19. Athy.—*Waterworks.* For the execution of the following contracts, for the U.D.C.:—Contract No. 1: Constructing reservoir and intake wells and carting and laying about 10½ miles of 6in. to 3in. cast-iron pipes, valves, &c. Contract No. 2: Supplying and delivering in Athy about 670 tons 6in. to 3in. cast-iron pipes. Contract No. 3: Supplying and delivering in Athy the requisite valves, hydrants, &c. Plans and specifications can be seen at the Town Hall, Athy, or at the office of the solicitor to the Council, Valentine Kilbride, 4, Dame Street, Dublin; also at the office of the engineer, James F. Reade, A.M.I.C.E., 9, Bridge Street, Westminster, S.W., from whom copies of schedules may be obtained on payment of £1 for each contract. Sealed tenders to be delivered to J. A. Lawler, clerk to the U.D.C., board-room, Athy, not later than May 19.

May 21. Edzell.—*Cutting 1,820 yds. of pipe tracks, carting and laying 6in. and 4in. cast-iron pipes.* Apply for schedules of quantities to Alexander Philip, district clerk, Brechin, with whom tenders must be lodged on or before May 21.

May 21. Lymington.—*Building a new brick and concrete bridge over the stream at Bull Hill, in the parish of Boldre, for the Lymington R.D.C.* Plans and specifications of the work may be seen at 38, High Street, Lymington, any day (Sunday excepted) between 10 and 1. Sealed tenders marked "Tender Bull Hill Bridge" on the cover, must be sent to J. Davis Rawlins, clerk, Lymington, on or before May 21.

May 29. Swansea.—*One 600-h.p. C.C. steam generator with condensing plant, exhaust pipes, valves, connections, &c., for the Corporation.* Copies of the general conditions, specification and forms of tender can be obtained from the borough electrical engineer, C. A. L. Prusmann, Strand, Swansea, on payment of £2 2s. Additional copies of the specification can be obtained at 10s. per copy, which amount will not be returned. Further particulars may be obtained on application to the Borough Electrical Engineer. Sealed tenders, endorsed "Contract No. 29," to be delivered at the office of J. Thomas, town clerk, Town Hall, Swansea, not later than noon on May 29.

(Continued on p. xxii.)

THE TIMBER TRADE.

London Market in April.

THE wood trade was very much at a standstill during April. At the beginning of the month it was said that nothing more would be done till after Easter: then came the holidays, but at the end of the month there was still no sign of any renewal of activity. In London, Messrs. Churchill & Sim report, this is instanced by a reduction in the deliveries of 2,000 standards from the docks and 500 standards overside from the very small figures of the same month last year. Nevertheless, it is becoming daily more evident that, apart from Russian and Swedish red deals in the lower qualities, practically all other sizes and classes of wood must gradually appreciate in price as the year draws on, and the supplies be barely sufficient to meet the most moderate estimates of requirements. An event of some moment to London importers occurred during the month in the offer of a reduction of the charges for the landing and storage of soft woods made to the trade by the London and India and the Millwall Dock companies. So far as this leads to any cheapening of the port, it is wholly to the good, but the proposal at present hardly looks as if it would compensate for the dislocation and inconvenience involved in shifting the centre of the wood business of London. Freights remain on about a normal basis, being kept very steady by the continuance of a prosperous general trade.

The abstract of dock stock, consumption, &c., for April, published by Messrs. Foy, Morgan & Co., is given in the table at the foot of this page.

Dock Stock.

The stock of wood in the public docks on April 30th was:—

	Pieces.
Foreign deals and ends - - -	742,000
Do. battens - - -	1,309,000
Pine deals and battens - - -	604,000
Spruce do. do. - - -	530,000
Boards, rough - - -	2,612,000
Do. prepared - - -	4,992,000

totalling 10,789,000 pieces, as against 13,601,000 in 1905, 15,457,000 in 1904, and 14,591,000 in 1903.

In other kinds the stock was as follows:—

	Pieces.
Foreign wainscot logs - - -	417 pieces.
Do. oak timber - - -	540 loads.
Do. fir timber - - -	1,404 do.
Do. Oregon pine, &c., spars and masts - - -	5,097 do.
Colonial oak timber - - -	1,083 do.
Do. birch timber and planks - - -	3,073 do.
Do. elm and ash timber - - -	595 do.
Do. yellow pine - - -	232 do.
Do. red pine - - -	64 do.
United States pitch-pine timber - - -	12,175 do.
Do. do. deals - - -	15,000 pieces.
East India teak - - -	6,542 loads.

Deliveries.

The deliveries have been—

	First four months. Pieces.	April. Pieces.
Foreign deals and ends - - -	1,103,000	246,000
Do. battens - - -	1,814,000	407,000
Pine deals and battens - - -	346,000	81,030
Spruce do. do. - - -	395,000	84,000
Boards, rough - - -	1,824,000	377,000
Do. prepared - - -	4,516,000	1,040,000

totalling 9,995,000 pieces for the first four months and 2,235,000 for April.

The deliveries direct from ship to craft have been—

	First four months. P.s.h.	April. P.s.h.
Deals and battens - - -	10,018	2,955
Boards - - -	3,544	953
Total - - -	13,562	3,908

Soft Woods.

Swedish Deals and Battens.—The demand continued quiet throughout the month both in London and for fresh business from abroad. Prices remained steady, and in London the very scanty stock of deals led to some little improvement in price in the few cases that they were enquired for. Prices for prepared boards went no higher during the month.

Norwegian Boards.—The arrivals of prepared boards were more numerous than they were at this time last year, and prices perhaps eased a little here and there in the absence of immediate demand during the holidays.

Russian Deals.—A very quiet demand and no change in prices (except for a little improvement on the few deals that were wanted as they became harder to find) about sums up the course of the market for wood in London from the Russian ports during April. There was very little further negotiation for fresh supplies.

Finnish Battens.—The demand has been feeble, but prices have remained quite steady.

Prussian Timber.—There was a normal arrival in April, and fir timber has come to a good market. Prices are certainly a point up in sympathy with the cost of pitch-pine. The demand for foreign oak timber leaves something to be desired. The trade was a very small one here during the month.

Canadian Timber.—Demand was lacking in London both for pine and spruce deals during April, and prices had in consequence a tendency to fall away, which is quite at variance with the outlook for the cost of further supplies. For most of the hardwoods and for yellow-pine timber the tendency has been in the same direction, oak alone remaining fairly steady in price when of regular quality.

There is no change visible in the prospects for sawn timber, and this market remains quite steady at the high rates previously attained to. The consumption is being rather restricted, but with the small supply available, the stock necessarily remains in very moderate compass, and at the same time the endeavours made to substitute other timber for pitch-pine are not proving very successful. For pitch-pine planks the London market responded rather freely to the situation during April, and a considerable rise in price has been established here and made effective.

Hardwoods.

East India Teak.—Messrs. C. Leary & Co. report that the imports for April were the heaviest for a long time past, but although the demand was not very active, prices were not affected nor are they at present likely to become so to any material extent, as it is not probable that shipments will continue on the scale of April. For planks the tone at first was dull, leading sellers to make some small concessions in price; buyers, however, took advantage of the opportunity to cover their requirements, so that values, as in March, quickly regained their former levels. Quotations, according to specifica-

tion, are for timber £12 10s. to £19, for flitches £16 to £20, and for planks £13 10s. to £19 10s. per load on c.i.f. terms. The arrivals of timber were 598 loads from Burmah, 251 loads from Bangkok and 188 from Java.

American Oak.—There is no improvement in the market for quartered; prices range from 2s. to 4s. 9d. per cubic foot. In plain the stock of planks is unusually light and fresh supplies meet with a ready sale at advanced prices. The demand for boards is weaker; prices range from 1s. 2d. to 2s. 9d. per cubic foot.

American Whitewood.—A steady market, but buyers do not respond readily to the advanced prices asked by shippers; values of first quality are 2s. 6d. to 3s. 6d. per cubic foot, for clear saps 1s. 10d. to 2s. 1d., for medium 1s. 8d. to 1s. 10d., for culls 1s. 2d. to 1s. 3d.

Mahogany.—The market continues to be very poorly supplied with all descriptions, and, as sales have been considerable, stocks are steadily declining. Prices are very firm, and any improvement in trade would soon bring higher rates.

Trade and Craft.

Boilers.

A very complete catalogue of boilers for all kinds of work has been issued by Messrs. Lumby, Son & Wood, Ltd., of Greetland, Halifax, a firm which has had very considerable experience in this class of apparatus, having been engaged in the manufacture of boilers for a period of nearly fifty years. Their new works comprise a site of five acres, and give employment to about 400 workmen. Machinery of the most modern type has been installed. The catalogue in question includes a great number of types of boilers for hot-water heating, these being of the "Solar" cast-iron type; while a great number of varieties of radiators—single, double and treble-column—are shown. Steam boilers occupy another section, together with calorifiers, steam-heaters, bath-boilers, &c. Special attention is directed to the firm's patent "Pioneer" boiler for low-pressure steam heating, which effects a great economy in fuel and requires the minimum of attention. All these boilers have double jackets of extra thickness so as to prevent the outer casing becoming too hot. Manhole covers, valves, strong-room and fireproof doors, and safes are also illustrated in the catalogue.

Ventilating Appliances.

A number of patent ventilating appliances are manufactured by the Acme Ventilating and Heating Co., of 35, Tarleton Street, Liverpool. One of these is the "Acme" patent concealed roof ventilator for fixing in line with the slates below the ridge, another is the "Acme" exhaust louvre ventilator, another the "Acme" ridge cap exhaust ventilator. The firm also supplies numerous varieties of ventilators for rooms, besides Tobin tubes, wall inlets, &c. Another speciality of the firm is a regulating window ventilator, comprising a series of glass slats in holders fixed to a frame arranged to be opened and closed by a single cord or chain.

ABSTRACT OF STOCK, CONSUMPTION, &c., IN LONDON DOCKS, FOR APRIL.

S.C. Dks. and M. Dks.	Deals (Fir).	Battens (Fir).	Pine.	Spruce.	Pitch-pine Deals.	Deals and Battens in Aggregate.	Rough Boards (All Countries).	Flooring.	Floated Timber.
	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Loads.
Public dock stock - - -	657,793	1,377,723	601,664	529,279	15,842	3,182,302	2,611,470	4,992,601	19,000
Monthly public dock consumption - - -	1204,245	442,232	80,478	84,940	4,232	816,128	380,169	1,040,474	2,506
Overside stock - - -									
Overside consumption (averaging of dock):—									
98 per cent. Sawn } 63 " Planed }	2,1761	433,387	73,868	83,241	—	795,657	372,566	635,499	—
Duration of supply at same rate of consumption - - -	1'63 months.	1'57 months.	3'78 months.	3'15 months.	3'74 months.	1'97 months.	3'47 months.	2'94 months.	7'58 months.

Current Market Prices

FORAGE.

	£	s.	d.	£	s.	d.
Beans per qr.	1	17	0			
Clover, best per load	3	17	6	4	5	0
Hay, good do.	3	10	0	3	12	6
Sainfoin mixture do.	3	5	0	3	15	0
Straw do.	1	8	0	1	14	0

MISCELLANEOUS.

Bricks Stocks, d/d to job	per 1,000	1	14	0		
Do. Flettons on rail ...	do.	1	4	0		
Do. Pressed Wire Cuts, d/d to job	do.	1	16	0		
Do. Blue brindled wire cuts ...	do.	1	1	0		
Do. do. wire cuts ...	do.	1	5	0		
Do. do. pressed facings ...	do.	1	17	6		
Coke Breeze, into carts at gasworks ...	per load	0	2	0		
Do. d/d to job ...	do.	0	4	0		
Sand per yard	0	7	6			
Ballast do.	0	6	6			
Granite Chippings ...	do.	0	10	6		
Do. do. 2in. ...	do.	0	11	6		
Cement per ton	1	11	6			
Lime do.	1	4	0			
Granite Broken, 1 1/2 in. ...	do.	0	15	6		
Do. do. 2in. ...	do.	0	15	0		
Do. do. 2 1/2 in. ...	do.	0	14	6		
Do. Kerb, Norwegian, 6x12 and 12x6 in river ...	per foot	0	1	2		
Do. do. do. circular ...	do.	0	1	5		
Do. do. do. 12x8 in river ...	do.	0	1	5		
Do. do. do. circular ...	do.	0	1	8		
Glass, English Sheet, in crates of stock sizes, Do. do. do. 3rds ...	do.	0	0	6		
Do. English patent plain rolled plate in stock crates ...	do.	0	0	2		
Do. do. do. 1 1/2 in. ...	do.	0	0	2 1/2		
Do. do. do. 2 in. ...	do.	0	0	2 1/2		
Castor Oil, French ...	per cwt.	1	1	10	1	2
Colza Oil, English ...	do.	1	5	6		
Copperas per ton	2	0	0			
Lard Oil per cwt.	2	15	0	2	17	0
Lead, white, ground, carbonate ...	per ton	16	0	0		
Do. red do.	15	0	0	0	19	0
Linseed Oil, barrels ...	per cwt.	1	2	9		
Petroleum, American ...	per gal.	0	0	6 1/2	0	0
Do. Russian ...	do.	0	0	5 1/2	0	0
Pitch per barrel	0	8	0			
Shellac, orange ...	per cwt.	9	9	0		
Soda, crystals ...	per ton	3	2	6	3	5
Tallow, Town ...	per cwt.	1	7	0	1	7
Tar, Stockholm ...	per barrel	1	5	0		
Turpentine per barrel	2	6	7 1/2			

METALS.

Standard Copper ...	per ton	83	10	0	83	15	0
Do. Strong sheets ...	do.	97	0	0	97	5	0
Lead, Soft Foreign ...	do.	16	0	6	16	2	6
Do. English ...	do.	16	0	0	16	15	0
Do. pipes ...	do.	19	0	0	19	2	6
Do. sheets ...	do.	18	10	0	18	12	6
Galvanised Corrugated sheets ...	do.	12	7	6	12	10	0
Spelter G.M. ...	do.	26	10	0	26	15	0
Angles, Scotland ...	do.	6	17	6	7	0	0
Bars do.	do.	7	17	6	8	0	0
Marked bars, Staffs ...	do.	9	0	0			
Common bars do. ...	do.	7	5	0			
Angles, M'boro. ...	do.	6	10	0	6	12	6
Joists do. ...	do.	6	7	6	6	10	0
Angles, Midlands ...	do.	6	10	0	6	12	6
Joists do. ...	do.	7	0	0	7	2	6
Girders plates, Midlands, Angles, Foreign, c.i.f. Thames ...	do.	7	10	0	7	12	6
Tees do. do. do. ...	do.	6	0	0	6	2	6
Joists do. do. do. ...	do.	6	2	6	6	5	0
Channels do. do. do. ...	do.	5	15	0	6	0	0
Nails, Wire do. do. do. ...	do.	6	0	0	6	2	6
Tin, Foreign ...	do.	9	0	0			
Do. English ingots ...	do.	185	10	0	186	0	0
Zinc, sheets, Silesian ...	do.	184	0	0	184	10	0
Do. do. Vielle Montaigne ...	do.	27	0	0			
Do. do. do. ...	do.	27	5	0			

TIMBER.

Soft Woods.

Deals, Blankholm, Yellow, 2nd, 4x11 ...	per std.	9	15	0		
Do. do. do. 2nd, 4x9 ...	do.	9	15	0		
Do. do. do. 2nd, 3x11 ...	do.	9	5	0		
Do. do. do. 2nd, 3x9 ...	do.	9	15	0		
Do. do. do. 2nd, 2 1/2 x9 ...	do.	9	15	0		
Do. do. White, 1st, 3x9 ...	do.	9	15	0		
Do. do. do. 2nd, 3x9 ...	do.	9	5	0		
Do. Nederkalix and Lulea, Yellow, 1st, 4x9 ...	do.	11	15	0		
Do. do. do. 1st, 3x7 ...	do.	10	0	0		
Do. St. Petersburg, Yellow, 1st, 3x11 ...	do.	16	0	0		
Do. do. do. 1st, 3x11 ...	do.	12	10	0		
Do. do. do. 1st, 3x9 ...	do.	11	15	0		
Do. do. do. 1st, 2 1/2 x7 ...	do.	12	5	0		
Do. Mariehill, Yellow, 4th, 4x9 ...	do.	11	0	0		
Do. do. do. 4th, 3x7 ...	do.	9	10	0		
Do. Bure, Yellow, 2nd, 4x9 ...	do.	9	15	0		
Do. Keret, Yellow, 1st, 3x9 ...	do.	18	15	0		
Do. Riga, White, 3rd, 3x9 ...	do.	8	5	0		

Deals, Mesane, White, 1st, 3x11 ...	per std.	14	5	0		
Do. do. do. 1st, 3x9 ...	do.	11	15	0		
Do. Kovda, Yellow, 3rd, 3x9 ...	do.	11	10	0		
Do. Sandarne, Yellow, 4th, 3x7 ...	do.	10	0	0		
Do. do. do. 5th, 3x7 ...	do.	9	0	0		
Do. Skutskar, Yellow, 1st & 2nd, 3x7 ...	do.	11	15	0		
Do. Skelleftea, Yellow, Unsorted, 3x5 ...	do.	8	15	0		
Do. Råfö, Yellow, 3rd, 2 1/2 x7 ...	do.	9	15	0		
Do. Archangel, Yellow, 1st, 3x9 ...	do.	18	15	0		
Do. do. do. 4th, 3x9 ...	do.	9	15	0		
Do. Quebec, Spruce, Unsorted, 3x9 ...	do.	9	5	0		
Do. do. do. 2nd, 3x7 ...	do.	8	15	0		
Do. Marsonis, Spruce, Unsorted, 3x9 ...	do.	9	5	0		
Do. St. John, Spruce, Unsorted, 1st, 2nd & 3rd, 3x6 ...	do.	7	15	0		
Do. do. do. 1st, 2nd & 3rd, 3x5 ...	do.	7	10	0		
Do. do. do. 1st, 2nd & 3rd, 3x4 ...	do.	7	10	0		
Do. do. do. 1st, 2nd & 3rd, 3x3 ...	do.	7	10	0		
Battens, Pernoviken, Yellow, 1st & 2nd, 2 1/2 x6 1/2 ...	do.	8	5	0		
Do. Nederkalix, Yellow, 1st, 2x8 ...	do.	10	0	0		
Do. do. do. 3rd, 2x9 ...	do.	7	15	0		
Do. Mesane, Yellow, 3rd, 2x9 ...	do.	11	0	0		
Do. Mo, Yellow, 2nd, 2x7 ...	do.	9	10	0		
Do. Raumo, Yellow, Unsorted, 2x7 ...	do.	9	10	0		
Do. Transgund, Yellow, 1st & 2nd, 2x6 ...	do.	8	10	0	8	15
Do. Abo, Yellow, Unsorted, 2x6 ...	do.	8	10	0		
Floorings, Norrköping, Yellow, 1st & 2nd, 1 1/2 x5 1/2 ...	per square	0	11	9		
Do. Fredrikstad, Yellow, Unsorted, 1 1/2 x7 ...	do.	0	11	6		
Do. do. do. 1x7 ...	do.	0	10	3		
Do. do. do. 1x5 1/2 ...	do.	0	9	9		
Pine, Dantzic and Memel ...	per load	4	10	0	5	0
Pine, Quebec, Yellow ...	do.	4	0	0	7	5
Do. Pitch, American ...	do.	2	16	0	5	0
Laths, log, Dantzic ...	per cu. fath.	4	0	0	6	0
Ash, Quebec ...	per load	4	2	6	7	10
Birch, New Brunswick ...	do.	2	17	6	4	5
Do. Quebec ...	do.	3	2	6	6	0
Box, Turkey ...	per ton	6	0	0	20	0
Cedar, Cuba ...	per ft. sup.	0	0	3	0	4
Do. Honduras ...	do.	0	0	75 1/2		
Do. Tobasco ...	do.	0	0	5 1/2		
Do. Brazilian ...	do.	0	0	4 1/2		

HARD WOODS.

Elm, Quebec ...	per load	4	5	0	8	10	0
Jarrah, plank ...	per ft. cu.	0	2	6	0	3	0
Mahogany, Average Price for Cargo, Honduras ...	per ft. sup.	0	0	4 1/2			
Do. Tobasco ...	do.	0	0	5 1/2			
Oak, Wainscot ...	per log.	2	12	6	7	0	0
Teak, Indian, logs ...	per load	8	10	0	19	0	0
Do. do. planks ...	do.	11	10	0	20	0	0
Whitewood, American, logs ...	per ft. cu.	0	1	3	0	1	6
Do. do. planks and boards ...	do.	0	1	3	0	3	6

Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

DURING THE WEEK ending May 4th seventeen failures in the building and timber trades in England and Wales were gazetted.

H. JONES & Son, builder, Everton. R.O. April 24th.
R. J. PARKER, contractor, London, N. R.O. April 23rd.
W. BODDY, builder, Scarborough. Adj. April 26th.
C. E. NICHOLLS, builder, Baslow. Deficiency £506.
T. FENNEY, builder, Middleton-one-Row. R.O. April 26th.

S. PINNEGAR, plumber and house decorator, Wotton-under-Edge. R.O. April 28th.

W. PREECE, senior, house decorator, Ledbury. Adj. April 27th.

G. YOUNG & Co., builders Chiswick. R.O. April 24th.

J. KNIGHT, builder, Beeston. P.E., Nottingham, June 1st, at 10.30.

N. W. HAINES, plumber, Swindon. P.E., Swindon C.C., May 23rd, at 2.30.

H. BECKETT, bricklayer, late builder, Beverley. R.O. April 26th.

F. BEAZANT, builder, Chippenham. Liabilities £163; assets £79.

C. A. WATSON, builder and contractor, Spalding. Liabilities £1,325; assets £373.

H. F. WHYMARK, builder and contractor, Tufnell Park. Liabilities £22,000; estimated surplus £1,500.

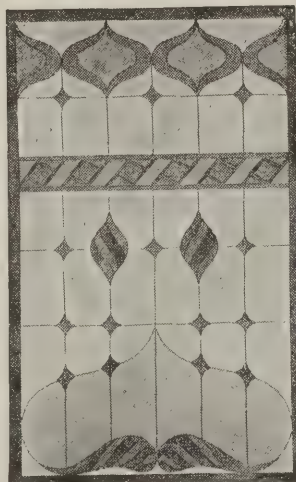
G. ARCHER, builder, St. Albans. First meeting, Peahen Hotel, St. Albans, May 9th, at 12. P.E. St. Albans C.C., May 22nd, at 10.30.

S. BATES & Co., builders and joiners, Droydsden. First meeting, O.R.'s, Manchester, May 9th, at 3. P.E., Ashton-under-Lyne Town Hall, May 24th, at 12.

G. CLACY, carpenter and builder, Reading. First meeting, Queen's Hotel, Reading, May 10th, at 12. P.E., Assize Courts, Reading, May 10th, at 2.

SHAWCROSS & ORR, painters and plumbers, Ashton-in-Makerfield. First meeting, O.R.'s, 19, Exchange Street, Bolton, May 9th, at 3. P.E., Wigan C.C., May 15th, at 2.15.

"CLOISONNE GLASS"



WEATHER RESISTING.

Production 1905—25,000 square feet.

The
CLOISONNE GLASS
CO.

40^E Berners St., Oxford St.,
Branch Office:—
25, Old Queen Street,
Westminster, S.W. London, W.

Prices from 3/- per square foot.

KIRKPATRICK BROS.,
Manchester Granite Works,
Trafford Park, MANCHESTER.

Architectural and Monumental Work in all the British and Foreign Granites
HIGHEST WORKMANSHIP. PUNCTUAL DELIVERY.

(Continued from p. 255.)

June 16. Johannesburg.—*Watering cars and spare parts.* Supply and delivery, after erection for inspection at makers' works, of three electric watering cars for use on the Council's tramway system, together with various spare parts for the cars. Tenders are to be made for delivery f.o.b. at any port suitable for shipment to South Africa, but separate prices must also be given for (a) delivery of the cars and spare parts at the car sheds, Johannesburg, (b) the erection of the cars complete in Johannesburg. Tenders are to be addressed to the Town Clerk, Municipal Offices, Johannesburg, and must reach him not later than June 16. The general conditions, specification, and form of tender may be seen on and after May 10 at the offices of the Council's consulting engineers, Mordey & Dawbarn, 82, Victoria Street, S.W., and may be obtained from them on payment of £5 5s. Further copies of the general conditions, specification and forms of tender may be obtained from the Consulting Engineers on payment of 10s., which will not be returned.

IRON AND STEEL.

May 10. Hollingburn.—*Supply of a galvanized riveted steel closed top oil tank,* with a capacity of 500 gallons, to be delivered and fixed at the Headcorn Sewerage and Sewage-disposal Works, for R.D.C. A specification may be seen at the Clerk's Office, between 9 and 6 (Saturday 9 and 1). The Council further invite separate tenders for the supply of "Rocklight" oil, to be delivered and pumped into the storage tank at the works in 400 gallon lots, for a period of three months. Sealed tenders for the above, marked outside "Oil," must reach H. J. Bracher, clerk, 33, Earl Street, Maidstone, not later than 10 a.m. on May 10.

May 12. Hull.—*1,250 tons of 30in. cast-iron pipes and special castings.* Copies of specification, drawings and forms of tender may be obtained of E. J. Bancroft, city water and gas engineer, on payment of £1. Cheques and postal orders to be made payable to T. G. Milner, city treasurer, Hull. Tenders, endorsed "Tender for 30in. Pipes and Specials," are to be addressed to the Chairman of the Water and Gas Committee, and delivered at the Town Clerk's Office not later than May 12.

May 12. Manchester.—*Supply, delivery and erection of a cast-iron water tank with steel girders* for supporting same, also the taking down and reconstruction of an existing water-tank at the Bradford Road Station. Specification and bill of quantities can be obtained from C. Nickson, superintendent, Gas Department, Town Hall, Manchester. Drawings may be seen on application to J. G. Newbigging, M.I.C.E., Rochdale Road Station. Sealed tenders, addressed to the Chairman of the Gas Committee, and endorsed "Tender for Cast-iron Tank, &c.," must be delivered at the Gas Offices, Town Hall, Manchester, not later than noon on May 12.

May 13. Leeds.—*About 11½ miles of mild steel pipes* (4,620 tons in weight), varying from 32 ins. to 35 ins. in diam., delivered at Birstwith (Ripley Valley), Wormald Green and Ripon Stations, North-Eastern Railway. Plans may be seen and specification and form of tender obtained at the office of C. G. Hensell, M.I.C.E., waterworks engineer, Municipal Buildings, Leeds, on payment of a deposit of £5. Tenders, properly endorsed "Tender for Steel Pipes from Kettleing to Kirkby Malzeard," to be received at the Town Clerk's Office, Town Hall, Leeds, not later than 10 a.m. on May 18.

May 21. Edzell.—*610 cast-iron water-pipes 6in. and 4in. in diameter, sluice valves, &c., for the Edzell Water District Sub-Committee.* Apply for schedules of quantities to Alexander Philip, district clerk, Brechin, with whom tenders must be lodged on or before May 21.

June 9. Johannesburg. *Supply and delivery of 20,000ft. 3in., 12,000ft. 1in., 7,000ft. 3in., and 2,000ft. 4in. galvanized iron water piping, for the Central South African Railways.* Forms, &c., may be obtained from the Chief Railway Storekeeper, Germiston, and the Railway Storekeepers, Pretoria and Bloemfontein. Tenders to be sent to the Secretary, Tender Board, Railway Headquarters Offices (P.O. Box 4,570), Johannesburg, by June 9.

PAINTING AND PLUMBING.

May 10. London, E.—*Distempering and painting works at the Children's Homes, Stifford, near Grays, Essex, for the Guardians of Stepney Union.* Specification and form of tender, &c., can be obtained on application to T. G. Stacey, clerk, Guardians' Offices, Barnes Street, Commercial Road, E., to whom tenders must be delivered by 4 p.m. on May 10.

May 10. Alcester.—*Painting and decorating the central stores and warehouses of the Alcester Co-operative Society, specification of which may be obtained of the Secretary.* Tenders to be sent in sealed envelopes, addressed to the Committee, Co-operative Stores, Alcester, not later than May 10.

May 10. London, S.E.—*Whitewashing, cleaning and painting work at the Infirmary, East Dulwich Grove, S.E.* The specification can be seen and all information obtained at the offices of the Steward of the Infirmary as above, between 10 and 4. Tenders, endorsed "Painting, &c.," should be addressed to the Guardians of the Southwark Union and delivered at the Union Offices, John Street West, Blackfriars Road, S.E., by 4 p.m. on May 10.

May 10. Peterborough.—*Supply of lead pipe, plumbers' metal, and pig lead for twelve months for the Town Council.* Further information and specification with forms of tender may be obtained on application at the City Engineer's Office, Market Place, where sealed tenders must be delivered on or before May 10.

May 12. Wigan.—*Cleaning, pointing, painting, &c., of the interior of the three chapels at the Wigan Cemetery.* Specification can be obtained at the office of the Borough Engineer, King Street West. Tenders, endorsed "Painting at Cemetery," to be delivered to Harold Jevons, town clerk, Wigan, not later than noon on May 12.

May 12. Manchester.—*Painting the galleries at the Royal Institution, Mosley Street.* Apply to the City Architect, Town Hall, before May 12.

May 12. Brymbo.—*Painting, &c., at the Workmen's Institute.* For particulars apply to W. H. Phoenix, High Street Brymbo. Tenders to be in by May 12.

May 14. London, S.E.—*Cleansing, repair and painting of schools, to be executed during the summer vacation.* Persons desiring to tender are requested to make written application to William Jacques, A.R.I.B.A., architect to the Education Committee, 2, Fen Court, E.C., for copy of specification and form of tender on or before May 5, which application must be accompanied by a deposit of £1 (cheques will not be accepted). Sealed tenders in the envelope supplied to be delivered at the Education Department, 95, The Grove, Stratford, E., not later than 5.30 p.m. on May 14. Fair wages clause.

May 15. Aldershot.—*Painting of the public lamp columns of the town.* Specification may be seen and all particulars obtained upon application at the Surveyor's Office. Tenders, endorsed "Lamp Column Painting," to be sent to W. E. Foster, clerk, Municipal Buildings, Aldershot, on or before May 15.

May 16. Swanley.—*Cleaning and painting works at White Oak School, Swanley, Kent, in accordance with specification prepared by W. T. Hatch, M.I.C.E., M.I.M.E., engineer-in-chief, for the Metropolitan Asylums Board.* Specification, conditions of contract and form of tender may be inspected at the Office of the Board, Embankment, London, E.C., and can be obtained upon payment of a deposit of £1. Tenders, addressed as noted on the form, must be delivered at the Office of the Board not later than 10 a.m. on May 16.

May 16. London, N.E.—*Cleansing certain wards, &c., at the Infirmary, High Street, Homerton, N.E., for the Hackney Guardians.* Specification, conditions of contract, and form of tender can be obtained of the Clerk between 10 a.m. and 4 p.m. Sealed tenders, endorsed "Cleansing Infirmary," must be delivered to Frank R. Coles, clerk to the Guardians, Clerk's Office, Sidney Road, Homerton, N.E., by 2 p.m. on May 16.

May 17. Preston.—*Painting the tramway poles and section boxes.* Particulars may be obtained from the General Manager, Power Station, Holmrook Road, Preston, to whom sealed tenders, endorsed "Tender for Painting Tramway Poles," must be delivered not later than noon on May 17.

May 22. Cardiff.—*Painting the cab shelters of the Corporation.* Further particulars may be obtained from the Head Constable, Chief Police Station, Cardiff. Tenders, endorsed "Painting Cab Shelters," must be delivered to the Town Clerk, Town Hall, Cardiff, before May 22.

May 23. Bootle.—*Painting the railings, gates, &c., in Derby Park.* Specification may be seen, and forms of tender obtained, at the office of the Borough Engineer. Sealed tenders, and endorsed "Painting, Derby Park," must be sent to J. Henry Farmer, town clerk, Bootle, not later than 10 a.m. on May 23.

May 24. Rainhill.—*Work and materials required at the main building of the County Asylum, as well as of all other properties and buildings which are described in a specification, which may be seen on application to the Clerk.* Arrangements will be made to allow tradesmen who are desirous of tendering to view the work required at 10.30 prompt on the mornings of Wednesday and Thursday, 9th and 10th inst. Tenders must be delivered at the office of J. Gornali, clerk and steward, not later than 5 p.m. on May 24, marked "Painting."

May 24. Bootle.—*Cleaning and painting at the Museum Rooms, Central Library, Oriol Road.* Specification may be seen, and forms of tender obtained, at the office of the Borough Engineer. Sealed tenders, and endorsed "Painting at Museum," to be delivered to J. Henry Farmer, town clerk, Town Hall, Bootle, not later than 10 a.m. on May 24.

ROADS AND CARTAGE.

May 10. Blyth.—*Tar-macadamizing Market Street and portion of Bowes Street (about 2,600 sq. yds.), for the Cowpen U.D.C.* Plans and specifications may be seen and form of tender obtained at the offices of R. Grieves, surveyor, Seaforth Street, Waterloo, Blyth. Sealed tenders, endorsed "Tender for Street Work," must be delivered not later than 4 p.m. on May 10.

May 11. Edinburgh.—*Six street watering carts* capable of containing about 400 gallons. Further particulars may be had from the Inspector of Cleansing, 331, High Street. Offers, marked "Watering Carts," to be lodged with the Town Clerk not later than May 11.

May 14. East Preston.—*Supply of flints in the parishes and in the quantities named below, at per cub. yd., for the R.D.C.* Tenders must state whether the flints are hand-picked, or dug from pits; also whether broken or not:—Angmering, 180 cub. yds.; Burham, 160 cub. yds.; Clapham, 120 cub. yds.; Clymington, 250 cub. yds.; Durrington, 650 cub. yds.; Ferring, 150 cub. yds.; Ford, 120 cub. yds.; Goring, 500 cub. yds.; Houghton, 70 cub. yds.; Lyminster, 550 cub. yds.; Patching, 50 cub. yds.; Poling, 160 cub. yds.; Rustington, 250 cub. yds.; South Stoke, 75 cub. yds.; Tortington, 100 cub. yds.; Warningcamp, 120 cub. yds. Tenders to be made only on forms to be obtained from A. Shelley, clerk, Town Offices, Littlehampton, by May 14, clearly marked on outside, "Tender for Flints."

May 14. Dover.—*Street watering and carting.* Specifications and forms of tender may be obtained at the office of the Borough Engineer, Maison Dieu House, Biggin Street, Dover. Tenders, endorsed "Tender for Street Watering, &c.," may be sent to Wollaston Knock, town clerk, Town Clerk's Office, Castle Hill House, Dover, on or before May 14.

May 14. Romford.—*Supply of 800 tons of best-quality blue Guernsey granite broken to 2in. cube and 200 tons of best quality blue Guernsey granite broken to 1½in. cube, also 40 tons of Rhenish Basalt stone broken to 2in. cube, for the R.D.C.* Specification and form of tender

may be obtained from George Lapwood, highways surveyor, Victoria Chambers, Romford. Sealed tenders (endorsed "Tenders for Granite, &c."), together with samples of granite and stone proposed to be supplied, which must be sent carriage paid to reach W. Smith, clerk to the Council, 13, North Street, Romford, on or before May 14.

May 14. Worton.—*Re-making the path from the district road to the parish church at Worton, for the Devizes R.D.C.* Specifications may be obtained of the Council's Surveyor. Sealed tenders, endorsed "Tender for Worton Path," to be sent to John Mitchell, surveyor, Chittoe, Chippenham, not later than May 14.

May 14. Billericay.—*Carting material, and also for horse, harness and man for occasional work, and for water carts, up to 31st March, 1907; also for steam rolling, for the R.D.C.* Forms of tender can be obtained of F. E. Ennals, Ongar Road, Brentwood; or R. J. W. Layland, Billericay. Tenders to be sent to the Clerk, and marked "Tender for Team Labour," by May 14.

May 14. Billericay.—*Stone, for the R.D.C., as follows:—Guernsey granite, Queenast granite, Kentish rag, flints, according to forms of tender, to be obtained of F. E. Ennals, Ongar Road, Brentwood; or R. J. W. Layland, Billericay.* Tenders to be sent to the Clerk, and marked "Tender for Stone," by May 14.

May 16. East Stow.—*Carting road materials in the several parishes of the East Stow R.D. during the ensuing year.* Forms of tender, giving all necessary particulars, can be obtained of Gordon Harrison, surveyor, Stowmarket. Tenders to be sent in envelopes, which will be provided for the purpose, to R. E. Wilkes, clerk to the Council, Stowmarket, by 4 p.m. on May 16.

May 16. Leeds.—*Making of tar macadam roadways and asphalt footpaths in the following streets: Gledhow Wood Grove, Gledhow Wood Avenue, Lidgett Grove and Lidgett Avenue.* Plans and specifications may be seen at the City Engineer's Office, Municipal Buildings. Tenders, on forms supplied, must be sent to the Town Clerk's Office on or before May 16, addressed to the Highways Committee, and endorsed "Tenders for Private Street Works."

May 19. Leith.—*Paving, with cement concrete, lane at Park Road.* Plans and specifications of works may be seen, and information obtained, at the Burgh Surveyor's Office, Charlotte Street. Tenders, marked "Paving," to be lodged with T. B. Laing, town clerk, Town Clerk's Office, Leith, on or before May 16.

May 21. Stevenage.—*Granite.* Supply of 1,000 tons (more or less, as may be required) of 1½in. to 2in., 1½in. to 1½in. and 1in. to 1½in. broken Guernsey, Leicester or other granite, for the repair of the roads in the district, to be delivered at Stevenage Railway Station and sidings (G.E.R.) as and when required up to Mar. 31 next. Sealed tenders, endorsed "Tender for Granite," accompanied by samples, to be delivered to W. Onslow Times, clerk to the Council, U.D.C. Offices, Stevenage, not later than 4 p.m. on May 21. The Council have no special form of tender.

May 21. Petworth.—*Carting materials to the various lengths of road in the several parishes of Petworth, Wisborough Green, Kirdford, Northchapel, Sutton, Bury, Coates, Fittleworth, Edgeland and Stopham; and for supplying and carting materials to the various lengths of road in the several parishes of Bury, Bignor, Sutton, Barlavington, Duncton and Burton, for the R.D.C.* Forms of tender with the number of cub. yds. required to be provided and carted on each particular length of road, will be sent by the Clerk or by the Surveyor of the Council, Fox Hill, Petworth, on receipt of a stamped addressed envelope, to all persons desirous of tendering. The supply and carting required under any accepted tender will have to be done at such time and in such quantities as the Council or their Surveyor may direct. Sealed tenders, endorsed "Tender for Highways," to be sent to Ernest H. Staffurth, clerk, Petworth, on or before 5 p.m. on May 21.

May 23. Ramsgate.—*Supply and delivery of 3,000ft. 6in. by 12in. granite edge kerb.* Specification and form of tender may be obtained on application to the Borough Engineer's Office. Sealed tenders, on forms supplied, must be delivered at the Borough Engineer's Office, Albion House, Ramsgate, not later than May 23.

May 23. Bootle.—*Construction of Wadham Road through the South Recreation Ground and the Bootle Cricket Ground.* Plans and specification may be seen, and bills of quantities obtained at the office of the Borough Engineer. Tenders, sealed, and endorsed "Tender for Construction of Wadham Road," to be delivered to J. Henry Farmer, town clerk, Town Hall, Bootle, not later than 10 a.m. on May 23.

May 24. Aston Manor.—*Paving of the court known as 7 Court, Phillips Street, with granite setts, and other works in connection therewith.* Plans and specification may be seen, and bills of quantities obtained, on application at the Surveyor's office. Sealed tenders, endorsed "Paving," are to be addressed to the Chairman of the Public Works Committee and delivered at the Town Clerk's Office not later than noon on May 24. Fair wages clause.

May 28. Old Hill.—*Forming, metalling, kerbing, channelling, paving, draining and making Meadow Street, Old Hill, for the Rowley Regis U.D.C.* Plan and specifications may be seen at the Council Offices, Lawrence Lane, Old Hill, between 10 and 4 (Saturdays 10 to 1). Tenders, duly endorsed, must be in the hands of Daniel Wright, clerk, Council Offices, Old Hill, Staffordshire, not later than noon on May 28.

SANITARY.

May 11. Edinburgh.—*Construction of a new convenience at Tollcross, conform to plans, specification and schedule of measurement prepared by the Borough Engineer, from whom schedules of quantities and all particulars may be obtained.* Sealed tenders, marked "Tender for Tollcross Convenience," must be lodged with Thomas Hunter, W.S., town clerk, City Chambers, Edinburgh, not later than May 11.

May 11. Fleetwood.—Construction of the pumping station buildings, storage tanks, mains, screens, fences, &c., at Fleetwood. The drawings, prepared by George R. Strachan, M.I.C.E., may be seen, and copies of specification and bills of quantities obtained at the Clerk's office on payment of a deposit of £5. Sealed tenders, endorsed "Tender for Pumping Station, &c." are to be delivered at the Clerk's office at or before 10 a.m. on May 11.

May 14. Yardley.—Construction of the following foul-water sewers:—1,275 yds. or thereabouts of 12in. pipe sewer; 950 yds. or thereabouts of 9in. pipe sewer, together with manholes, and all works appertaining thereto, in accordance with plans, drawings, specification and conditions of contract, which may be seen on application to the Engineer and Surveyor, Arthur W. Smith, at the Council House, Sparkhill, near Birmingham. Specification, bill of quantities and form of tender may be obtained on payment of £3 3s., to F. L. Thompson, clerk. Sealed tenders, endorsed "Reddings Lane Sewerage," to be addressed and delivered to Francis Ladbury Thompson, clerk of the Council, Council House, Sparkhill, near Birmingham, not later than noon on May 14. Fair wages clause.

May 14. Acton.—Construction of 3½ miles of sewers, varying from 6ins. to 6ft. in diameter, 2½ acres of filter beds, and various works connected therewith, for the U.D.C. Instructions for tender and forms of tender, with the form of contract and schedules annexed, can be obtained and the drawings inspected at the offices of Sir Alexander Binnie & Sons, 9, Great George Street, Westminster, on payment of £2. Tenders, enclosed in a sealed cover and addressed in the manner provided in the instructions for tender, must be received at the offices of the clerk to the Acton U.D.C., 242, High Street, Acton, not later than May 14.

May 16. Salford.—3,500 sq. yds. of hard floor tiles, similar to the sample which may be seen at the Salford Sewage Works, Weaste. Forms of tender and particulars may be obtained at the Borough Engineer's office, Town Hall, Salford. Tenders, endorsed "Filter Tiles," addressed to the chairman of the River Committee, must be delivered to L. C. Evans, town clerk, Town Hall, Salford, by noon on May 16.

May 17. Harborton.—Constructing a sewage tank and filter-bed and for providing and laying 560ft. of 9in. and 600ft. of 6in. (or thereabouts) of stoneware pipe drain at the village of Harborton, for the Toines R.D.C. Plan and specification can be seen at the "Globe" Inn, Harborton, or at the office of the surveyor, W. F. Tollit, 10, High Street, Toines. Tenders are to be sent to F. K. Windeatt, clerk, Toines, on or before May 17.

May 18. Kendal.—Constructing 527 lineal yds. of 9in. pipe sewers. Plans and detail drawings can be seen, and bills of quantities obtained at the office of the Borough Engineer. Sealed tenders, endorsed "Contracts Nos. 22, and 23," to be delivered to R. Hampton Clucas, C.E., M.S.E., borough engineer, Town Hall, Kendal, at or before noon on May 18.

May 22. Cavan.—New closets and large cistern, and carrying out the new system of sewerage on the workhouse premises, in accordance with the specification and plans prepared by Thomas O'Brien. The names and addresses of two solvent sureties to be given. Tenders to be sent by post prepaid and registered, and to bear the Cavan postmark, to Joseph D. Grier, clerk of Union, Cavan, not later than May 21. Specification can be seen at the Boardroom.

May 23. Ladybank.—Construction of sewerage and drainage works, comprising the laying of fireclay pipes, the building of manholes, flushers, septic tanks, bacteria filter beds and other relative works. Drawings may be seen and copy of specification, schedule of quantities and form of tender obtained from Bruce, Proudfoot & Macrae, C.E., Cupar, upon payment of £2 2s. Contractors who have obtained a copy of the specification and schedule will have an opportunity of being shown over the proposed line of sewers, &c., on May 14, starting from Ladybank Station at 11 a.m. The tender must be delivered in a sealed cover, marked "Ladybank Sewerage," to J. L. Anderson, town clerk, Cupar, by 10 a.m. on May 23.

May 23. Bootle.—Construction of a sewer along Miranda Road continuation, across the South Recreation Ground. Plans and specification may be seen and bills of quantities obtained at the office of the Borough Engineer. Tenders, sealed and endorsed "Tender for Miranda Road Sewer," to be delivered to J. Henry Farmer, town clerk, Town Hall, Bootle, not later than 10 a.m. on May 23.

May 28. Bootle.—Construction of public conveniences on the east side of Miranda Road continuation, adjoining the Bootle Cricket Ground. Plans and specification may be seen and bills of quantities obtained at the office of the Borough Engineer. Tenders, sealed and endorsed "Public Conveniences, Miranda Road," to be delivered to J. Henry Farmer, town clerk, Town Hall, Bootle, not later than 10 a.m. on May 28.

TIMBER.

May 10. Aberdeen.—Supply of larch posts and rails to be delivered at Torphins, Aboyne and Ballater. Schedules of quantities, &c., may be had on application to John Milne, district surveyor, Aboyne, and sealed offers will be received by John Murray, district clerk, 22, Bridge Street, Aberdeen, up to May 10.

May 14. Kingston.—Supply of 120 fathoms of best Swedish board ends, first quality, square edge, to be delivered at the Workhouse, Kingston-on-Thames, as and when required. Tenders must reach James Edgell, solicitor, clerk, Union Offices, Coombe Road, Kingston-on-Thames, marked "Tender for Wood," by May 14. The Guardians do not issue forms of tender for the supply of wood.

May 14. Dublin.—Supply of 30,000 10in. by 10in. sleeper blocks, for the Great Northern Railway Co. (Ireland). Specification and form of tender can be obtained

from the Secretary on payment of a fee of 1s. each. Tenders, which must be made out on forms supplied by the Company, and endorsed "Tender for Sleeper Blocks," should be delivered to T. Morrison, secretary, Amiens Street Terminus, Dublin, by 10 a.m. on May 14.

May 15. Plymouth.—Supply of a quantity of firewood, not exceeding 150 tons, for the Guardians. Tenders must be on forms provided for that purpose, to be obtained at the office of W. Adams, clerk to the Guardians, 13, Princess Square, Plymouth, and must give full particulars. Tenders by noon on May 15.

No date. Sunderland.—Supply of props, crowns, sleepers, deals, Norway, &c., timber for the year ending June 1, 1907, for the Ryhope Colliery. For forms of tender apply to the offices, Ryhope Colliery, near Sunderland.

MISCELLANEOUS.

May 11. Greenock.—Supply of the following stores, for the Corporation, for one year:—Lime shells; meters; retorts, firebrick, &c.; iron and steel furnishings; cast-iron pipes &c.; brass fittings, &c.; lead, tin and compo pipes; retort mouthpieces; glass; paints, oils, &c.; timber; sand; cements; cartages (Inchgreen); cartages (town); gasfitter; plumber (Town); plumber (Inchgreen); slater; insmith; ironmongery. * Tradesmen willing to offer for these requirements are requested to submit their names. Form of tender and further particulars can be had from William Ewing, engineer and manager, Inchgreen Gasworks. Tenders to be returned, and names of tradesmen submitted, to Colin MacCulloch, town clerk, Greenock, not later than May 11.

May 14. Manchester. Supply of the following stores for the tramways:—Self-acting surfacing and screw-cutting lathe, brassfinishers' lathes, universal milling machine, double car-wheel lathe, car-wheel tyres and axles, iron castings. Specifications and forms of tender may be obtained on application to J. M. McElroy, general manager, Tramways Department, 55, Piccadilly, Manchester. Tenders are to be addressed to the chairman of the Tramways Committee, 55, Piccadilly, Manchester, and must be received not later than 5 p.m. on May 14.

May 15. Bradford.—Supply of the following stores, for the Corporation:—Iron castings, iron, steel, bolts and nuts, oils, street-sweeping machine brushes, brooms, shovels, nails, lime, paints, iron piping. Forms of tender and all necessary information may be obtained on application to Superintendent Call, at the Hammerton Street Depot. Sealed tenders, duly endorsed, to be sent to Frederick Stevens, town clerk, Town Hall, Bradford, on or before May 15. Fair wages clause.

May 15. Dundee.—Supply of the following materials for the Water Commissioners:—Special castings, sluice valves, brass work, blacksmith work. Specifications and forms of tender may be had on application at the office of George Baxter, engineer and manager, Water Engineer's Office, 93, Commercial Street, Dundee and sealed offers, suitably endorsed, must be lodged with William H. Blyth Martin, clerk to the Commissioners, City Chambers' on or before May 15.

May 15. Glasgow.—Supply of the following stores for the sewage department for one year, from 1st June next, according to standard samples, to be seen at the office of the Sewage Department, 30, Cochrane Street:—Iron, ironmongery, bolts and nuts, iron castings, brass furnishings, wood (foreign), brushes, glazier work, oils, grease, paints, lime, cement, fireclay goods and common bricks. Specifications and forms of tender may be had on application to Thomas Melvin, general manager, 30, Cochrane Street. Sealed offers, marked outside "Offers for Sewage Department," must be lodged with A. W. Myles, town clerk, City Chambers, Glasgow, on or before May 15.

May 19. Leeds.—Supply of the following articles:—Wrought-iron tubes, pressed and common red bricks, 2½in., 3in. and 4in. self-faced Bradford or Hatifax flags. Forms of tender may be had on application to the General Manager, Gasworks. Endorsed tenders, addressed to the Town Clerk, Town Hall, Leeds, to be delivered not later than May 19.

May 22. Wallsend.—Supply of the following stores, for the Corporation:—Brooms, broom handles, pick heads, pick shafts, shovels No. 4, No. 6 and Black's No. 4, manhole covers and frames weighing not less than 4½ cwt., gulleys weighing not less than 4 cwt., 2 qrs., 12 lbs., sanitary pipes, bends and junctions, whinstone zin. hand broken, whinstone chips, whinstone sets 4ins. by 5ins. and 3ins. by 4ins., bricks, ballast, sand, lime, cement, limestone and slag (crushed). Tenders must be sent to the Town Clerk, marked "Tender for Goods," on or before noon on May 22. Samples and approximate quantities of each article required may be had on application at the Corporation Offices, Hugh Street, Wallsend, but any such information will be a matter of opinion only, and not binding on the Corporation nor in any way releasing any contractor from his contract.

No date. Bristol.—Supply of plant, &c., for the Electricity Department:—One 3,000 kw. (6,000 volt) three-phase turbo-alternator, together with condensing plant for the same; one 500 kw. motor-generator or rotary converter (6,000 volts A.C. to 500 volts D.C.); two 300 kw. motor-generators or rotary converters (6,000 volts A.C. to 500 volts D.C.); extensions of E.H.T. switchgear (6,000 volts A.C.); extensions of H.T. switchgear (2,000 volts A.C.); extensions of L.T. switchgear (500 volts D.C.); 30-ton electric travelling crane; water-tube boilers, together with economisers, mechanical stokers, superheaters, induced draught plant, &c.; boiler feed pumps; extension of existing coal conveyor; steam and water pipe-work; water tanks; steel troughing and fixings for protection of cables in subway; annual supply of joint and junction boxes. Tenders will be considered from manufacturers only. Parties wishing to tender should communicate with H. Faraday Proctor, city electrical engineer, Temple Back, Bristol, who will furnish them with particulars as to the date on which specifications will be available.

Tenders.

Addressed postcards on which lists of tenders may be stated will be sent post free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Fetter Lane, E.C. Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Birmingham.—For additions to premises, Caroline Street, for Messrs. Goodman, Messrs. Ingall, Son & Mitton, architect, 3, Temple Row West, Birmingham. Quantities by Mr. J. Percival Bridgewater, Queen's Chambers, Colmore Row, Birmingham:—

J. E. Harper	£3,365	15	0
T. Loud & Sons	3,297	0	0
T. Mills & Sons	3,270	0	0
A. J. Teall	3,200	0	0
J. Dallow & Sons	3,184	0	0
W. J. Whittall & Son	3,149	0	0
W. H. Gibbs*	3,015	0	0

* Accepted.

Brighton.—For the erection of new nursing cottages at the Rodean School, near Brighton. Messrs. Thomas Simpson & Son, architects and surveyors, 17, Ship Street, Brighton:—

Field & Co.	£3,378
Cubitt & Co., London	2,815
Patching & Son	2,808
Barnes & Son	2,793
T. A. Hawkins & Co., London	2,760
Rowland Brothers, Horsham	2,739
Cooper & Sons, Maidenhead	2,678
Lynn & Sons	2,614
Sattin & Evershed	2,598
Norman & Burt, Burgess Hill	2,590
Potter Brothers	2,520

[Rest of Brighton.]

Cardiff.—For the erection of warehouse, Tredegar Street, for Mr. Alfred Lewis, Cardiff. Messrs. Habershon, Fawcaker & Co., architects:—

G. Hallett	£2,100	0	0
D. Dances & Sons	2,072	0	0
J. Allan & Sons	2,020	0	0
C. Shopland	1,999	0	0
W. Will	1,999	0	0
W. Symonds & Co.	1,990	0	0
Knox & Wells	1,939	0	0
E. Turner & Sons	1,929	0	0
F. C. Williams	1,923	0	0
Tucker Brothers	1,903	13	10
G. Beams	1,898	10	0
E. T. Bevan	1,858	0	0
W. T. Morgan	1,840	0	0
E. R. Evans & Brothers, Cardiff	1,825	0	0

* Accepted.

King's Lynn.—For rebuilding the "Flower Pot" public-house, Norfolk Street, for Messrs. W. & T. Bagge, King's Lynn. Mr. H. T. Tilson, architect, Railway Road, King's Lynn:—

J. Medwell	£1,662	0	0
Dye & Allen	1,614	0	0
Spaulding & Hampton	1,550	15	0
Tash & Langley	1,549	16	9
Read & Wildbur	1,540	0	0
W. F. Smith	1,519	0	0
F. Anderson	1,512	8	6
J. J. Bone	1,464	0	0
W. White*	1,250	0	0

* Accepted.

[All of King's Lynn.]

Lambeth (North).—For improvements at the Walnut Tree Walk School, Lambeth (north), for the London County Council. The revised accommodation, on the completion of the improvements, will be—boys 340, girls 340, infants 380, being a nett loss of eighty-three places:—

F. & H. F. Higgs, Station Works, Loughborough Junction	£11,667	0	0
J. Marsland & Sons, 1, York Street, Walworth	10,846	0	0
W. Downs, Hampton Street, Walworth Road	10,662	0	0
J. Smith & Sons, Ltd., Junction Works, South Norwood	10,626	0	0
W. King & Son, 3, Vauxhall Bridge Road, Westminster	10,613	0	0
Rice & Son, 15, Stockwell Road	10,543	0	0
Spencer, Santo & Co., Ltd., Earl Street, Westminster	10,431	0	0
Holliday & Greenwood, Ltd., Loughborough Park Works, Brixton	10,424	0	0
J. Garrett & Son, 83, Balham Hill	10,183	0	0
J. Appleby & Sons, Cornwall Works, Aquinas Street, Lambeth	10,150	0	0
E. Triggs, 92, The Chase, Clapham	9,971	0	0
L. Whitehead & Co., Ltd., Portland Place North, Clapham Road	9,908	0	0
J. & C. Bowyer, Westow Street, Upper Norwood	9,777	0	0
Lole & Co., Trafalgar Square, Chelsea	9,371	0	0
W. Smith & Son, Eldon Works, Harleyford Road, Kennington	9,679	0	0
W. Johnson & Co., Ltd., Belle Vue Road, Wandsworth Common	9,679	0	0
J. & M. Patrick, Point Pleasant, Wandsworth	9,516	0	0
C. Wall, Ltd., 4, Lloyd's Avenue, Fenchurch Street	9,399	15	9
Martin, Wells & Co., Ltd., 25, Auckland Street, Vauxhall	9,300	0	0
Galbraith Brothers, 46, Camberwell Green	8,908	5	10

* Recommended for acceptance.

[The architect's (education) estimate, £8,817.]

Lincoln.—Accepted for the erection of typhoid block to the City Hospital:—

Messrs. Close	£2,119
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(Continued on p. xxiii.)

TENDERS—cont. from p. xxiii.

Grimsby.—For the erection of a house in the Park, Grimsby. Messrs. Bentley & Hall, architects and surveyors, Grimsby and Louth:—
 Hewins & Goodhand ... £1,595 0 0
 Wilkinson & Houghton ... 1,572 0 0
 H. Marrows ... 1,559 12 0
 W. Sin ... 1,536 0 0
 Holmes & Richardson ... 1,512 0 0
 J. H. Thompson & Son* ... 1,460 0 0
 * Accepted.

Kingston-on-Thames.—For the erection of the Richmond Road Schools, for the Education Committee:—
 Webb & Grimsdale, Ashford ... £14,999
 J. Long & Son, Bath ... 13,497
 W. H. Hyde, Norwood Junction ... 12,368
 J. W. Brooking, Richmond ... 11,756
 Patman & Fotheringham, Islington ... 11,675
 W. J. Renshaw, Putney ... 11,500
 Mattocks & Parsons, Gray's Inn Road, W.C. ... 11,499
 Rowe & Co., Clapham Road, S.W. ... 11,478
 E. Streather, Croydon ... 11,367
 J. Burgess & Sons, Wimbledon ... 11,350
 A. Faulks, Reading ... 11,269
 Cropley Brothers, Epsom ... 11,197
 W. Smith & Sons, Croydon ... 11,125
 J. & C. Bowyer, Upper Norwood ... 11,088
 J. Shelbourne & Co., Wandsworth, S.W. ... 11,077
 J. Cassé, Hampton Wick ... 11,054
 Myall & Upson, Clacton-on-Sea ... 11,050
 Sabey & Son, Islington ... 10,993
 D. W. Barker, Croydon ... 10,957
 W. J. Dickens, Ealing, W. ... 10,890
 J. Barker & Co., Kensington, W. ... 10,887
 Parsons & Townsend, Wimbledon ... 10,857
 H. Lindfield & Son, Horsham ... 10,773
 Wisdom Brothers, Isleworth ... 10,770
 W. Johnson & Co., Wandsworth Common ... 10,734
 F. & C. Foster, Norwood Junction ... 10,695
 J. Appleby & Sons, Lambeth, S.E. ... 10,666
 J. M. Patrick, Wandsworth ... 10,654
 Martin, Wells & Co., Vauxhall, S.E. ... 10,635
 Higgs & Outwaite, Cobham ... 10,627
 F. Hawkey, Surbiton ... 10,570
 J. Garrett & Son, Balham Hill ... 10,500
 S. Page & Son, Croydon ... 10,449
 T. J. Hawkins & Co., Westminster, S.W. ... 10,375
 C. E. Wallis & Sons, Maidstone ... 10,260
 F. G. Lawrence, * Kingston-on-Thames ... 10,237
 * Accepted.

London.—For the erection of the Plumstead sub-station, for the Fire Brigade Committee of the London County Council:—

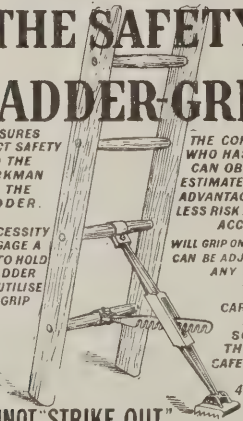
C. Wall, Ltd., London, E.C. ... £8,990
 E. Lawrence & Sons, London, N. ... 8,676
 F. G. Minter, Putney, S.W. ... 8,564
 Kirk & Randall, Woolwich, S.E. ... 8,338
 Spencer, Santo & Co., London, S.W. ... 8,328
 H. Lovatt, Ltd., London and Wolverhampton ... 8,237
 H. L. Holloway, Deptford, S.E. ... 8,200
 Kerridge & Shaw, Cambridge ... 8,189
 Leslie & Co., London, S.W. ... 8,150
 Holloway Brothers, London, S.E. ... 7,930
 F. & H. F. Higgs, * Station Works, Loughborough Junction, S.E. ... 7,894
 * Recommended for acceptance.

ROOFING SLATES:
 Velineli, Penrhyn, and Westmoreland
SLATE SLAB GOODS:
 Both Plain and Enamelled.
ALFRED CARTER & CO., LIVERPOOL.

THE SAFETY LADDER-GRIP.

ENSURES PERFECT SAFETY TO THE WORKMAN ON THE LADDER.

NO NECESSITY TO ENGAGE A MAN TO HOLD THE LADDER IF YOU UTILISE THIS GRIP



THE CONTRACTOR WHO HAS THIS GRIP CAN OBVIOUSLY ESTIMATE TO BETTER ADVANTAGE & RUN LESS RISK AS REGARDS ACCIDENTS.

WILL GRIP ON ANY SURFACE CAN BE ADJUSTED TO ANY ANGLE

10/6 CARRIAGE PAID, FROM THE SOLE MFRS. THE PATENT SAFETY-LADDER GRIP CO. 45, KING ST. BRISTOL

CANNOT "STRIKE OUT"

Melton Mowbray.—For the erection of a new infants' school:—

Haskard, Rudkin & Beck, Leicester £2,115 0 0
 Nichols Brothers, Oakham ... 2,046 18 0
 C. Y. Barnes ... 1,997 0 0
 Wartnaby & Son ... 1,975 10 9
 T. & H. Denman ... 1,975 0 0
 E. Clarke* ... 1,864 0 0
 * Accepted. [Rest of Melton.]

Old Trafford.—For the erection of Seymour Park School, Old Trafford, for the Stretford Education Committee. Mr. Ernest Woodhouse, architect, 88, Mosley Street, Manchester:—

S. Warburton, Miles Platting ... £14,100
 R. Holland, Higher Broughton ... 13,561
 C. H. Normanton & Son, Ardwick ... 13,000
 Young, Tinker & Young, Manchester ... 12,899
 J. Gerrard & Son, Swinton ... 12,970
 J. Ramsbottom, Pendleton ... 12,795
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 A. Hodgkinson, Moss Side ... 12,429
 Burgess & Galt, Ardwick ... 13,144
 R. Carlyle, * Old Trafford ... 11,915
 * Accepted.

Tonbridge.—Accepted for the erection of the boys' Council school, for the Kent Education Committee:—
 Gann & Co. ... £4,264
 (Accepted in lieu of tender from I. Waters & Co., of Forest Row, accepted at £4,189, and since withdrawn on account of error.)

Tonbridge.—Accepted for the erection of a mixed school, for the Kent Education Committee:—
 Wallis & Sons, Maidstone ... £4,460

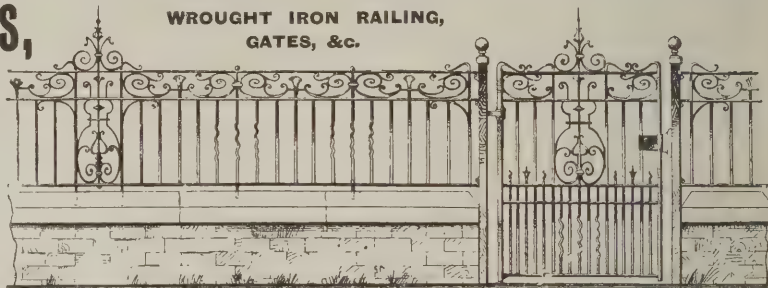
Treorchy.—For the extension of Horeb English Baptist Chapel, for the Church Trustees. Mr. W. D. Morgan, architect, Victoria Chambers, Pentre:—
 J. Evans ... £1,401
 G. Edwards, * 1, Station Road, Treorchy ... 1,300
 * Accepted.

Welling.—Accepted for a new school at Welling, for the Kent Education Committee:—
 Gann & Co., Whitstable ... £3,047

Woolwich.—For the extension and alterations at the London City and Midland Bank, Woolwich. Mr. T. B. Whinney, F.R.I.B.A., architect:—
 J. E. Johnson ... £3,845
 A. J. Staines ... 3,745
 T. L. Greene ... 3,678
 Howell J. Williams, Ltd. ... 3,297
 Thomas & Edge* ... 3,096
 * Accepted.

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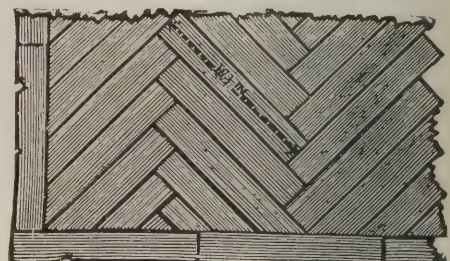
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THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD.

May 9th, 1906.

FIRE SUPPLEMENT (MONTHLY).

THE SAN FRANCISCO CATASTROPHE.

ALTHOUGH the great calamity that has befallen San Francisco is—in the first instance—due to a most lamentable earthquake, yet this disaster at San Francisco must necessarily rank among the great conflagrations of the world rather than among the great earthquakes; for although it is true the earthquake did quite considerable damage and caused much unfortunate loss of life, it is equally true that if the structural condition of San Francisco had even been of a moderately adequate kind, the fearful devastation of property that has taken place could not have occurred.

Whatever the great insurance companies may officially or unofficially intimate as to the great surprise of the losses incurred at San Francisco, there can be no doubt that their accredited representatives in the United States were fully aware of the conflagration hazard of that city, and can thus only have taken the large responsibilities that are now common knowledge either on account of competition or because of that strenuousness which so often induces the home management to look to large turnovers in premiums rather than to the risks at stake in certain American cities.

Any of the Older Schools

of insurance officials will tell the enquirer that "fire-prevention" is of no interest to their offices; that modern methods of construction or planning do not affect them; that they take "risks as they find them," and make rates accordingly to cover all eventualities. The risks which our insurance companies found at San Francisco, and which we assume they should have quoted for in a suitable manner, are perhaps best described in the summary of the National Board of Fire Underwriters' Report on San Francisco, published October, 1905, as one of the series of reports on the fire risks of the great cities of America. The summary of that report as to the conflagration hazard plainly states that "whilst two of five sections of the city into which the congested values district of San Francisco is divided involve only mild conflagration hazards within their own limits, they are badly exposed by the others in which all the elements of the conflagration hazard are present to a marked degree; not only is the hazard extreme within the congested value district, but it is augmented by the presence of a compact surrounding great-height, large-area frame residence district, itself unmanageable from the fire-fighting standpoint by reason of adverse conditions of topography. In fact (and here the italics are our own), *San Francisco has violated all underwriting traditions and precedent by not burning up. That it has not done so is largely due to the vigilance of the fire department, which cannot be relied upon indefinitely to stave off the inevitable.*"

The Board of Underwriters.

The National Board of Fire Underwriters who issued this report is representative, we believe, of all the best companies of Great

Britain, as well as the United States companies. The conflagration hazard described of course assumed the normal conditions of an important fire spreading, whereupon the conflagration hazard would be extreme. Such untoward circumstances as an earthquake causing the additional terrible risk of several fires starting simultaneously was of course not considered. The ordinary possibilities of a conflagration were only thought of, and yet this condemnatory report was issued and was public property. But nevertheless, regardless of the known risk, San Francisco was considered a popular insurance field, insurance business was keenly competed for, and the fact that the destruction of the city by fire was inevitable and quite clear to even the most unintelligent fire insurance man on the spot simply put aside. At home—i.e., at the head offices—the lack of interest in fire-prevention and the scientific aspects of fire-insurance prevented a brake being put on the scramble for business. Probably the results of the investigations conducted at San Francisco by the Board of Fire Underwriters was not even known at the head offices, or, if known, looked upon as exaggerated and being of a fire-preventive character not worthy of attention. Thus, there is really

No Reason to Condole

with our fire-insurance men on the subject of this loss, which must have been entered into with eyes open or without sufficient forethought.

The primary individual losers in this case, we believe, are the actual managers, who in their ambition for large turnovers have incurred such heavy loss for their companies. For them it means that the bonus with which their salaries are frequently supplemented will be materially reduced, if not wiped out, for the current year. That in itself, however, should be a salutary lesson for those who have been all too conservative in matters of fire-prevention and the scientific handling of fire questions; and it only remains to be thankful that our companies have substantial reserves, so that if the catastrophe does not find repetition elsewhere and the policy of fire-prevention is soon adopted by the offices no serious damage will have been done to British insurance prestige or to the shareholder who considers his holding an investment.

It is well known that the minority of insurance managers who take broader views is quite a small minority, and that their views are

Ridiculed by their Colleagues,

and, as we have stated on a previous occasion, it will probably still require some ten to twenty years and a few more conflagrations before a more enlightened policy of scientific fire-insurance takes the place of the present policy of rule-of-thumb and precedents. The increase of fire risk, not only in badly built American cities but in better-built cities at home, owing to the increased hazards of modern industries, has been quite underrated, and insufficient encouragement has been given for good building, careful equipment and painstaking management. Given that

encouragement, the property-owner would have been at greater pains to reduce the individual fire hazard, and thus the general fire hazard of localities would be gradually reduced likewise.

The architect and the builder will primarily realize the almost impossible position they have to take up when recommending clients to induce better forms of construction or equipment in their buildings, having regard to the lack of encouragement from the fire-insurance side. But as one of the leading fire-insurance managers (who has always had a sympathy for scientific fire insurance and fire research) indicated just eight years ago, after the Cripplegate fire, "the present generation of managers will probably have to die out before the offices officially realize that there is something in a fire-preventive policy from the insurance business point of view." As far as our opinion goes, we think that unless the majority realize this before 1910 the series of serious fire losses that must result during the first half of the current century will undermine the splendid insurance businesses that were created during the century just past. It is the old story so ably expressed by the Prince of Wales whilst at the Guildhall, on his return from his visit to Australia, of

"Wake up, England."

In many industries we have woke up, but only in quite individual and isolated instances is this the case in our fire-insurance businesses.

"It is an ill wind that blows nobody any good."

In the same way as the San Francisco catastrophe will, we believe, have done good to our insurance companies in encouraging them to more modern views, so, curiously enough, this catastrophe is good for the building specialist trade and our builders' merchants, who have had some very moderate years of business. There can be no doubt about it that San Francisco will be rebuilt, and, knowing the energy of its citizens, it will be rebuilt most rapidly. For this they will require more steel and more Portland cement than can be economically and rapidly brought to the spot overland from the American East. Thus British steel and British Portland cement will be required. In fact, we believe there will be such a demand that we shall feel the hardening of prices very soon in this country. Orders have already been also placed for specialties, such as slates, and British firms who have articles that can be easily shipped ought to make hay while the sun shines, not only in taking specific orders but in getting rid of surplus stocks.

Nature of the Fire Hazard at San Francisco.

As to the nature of the fire hazard at San Francisco we cannot do better than present plans and an official fire-insurance description of what the town was like prior to the catastrophe. This summarized description should be of interest to architects generally, but particularly to the architect and surveyor in municipal employment for the supervision of building construction. When the detailed reports from San Francisco reach

us we shall supplement this article by a second one, describing the actual effect of the fire on the various districts and upon individual buildings; but in order to realize the conflagration it is well to first of all know what the city was like.

San Francisco in Short.

Summarized, San Francisco is a city of 48 square miles within city limits, in which about 21 square miles are occupied by buildings. The population is about 4,000. The principal industries are foundries and machine shops, fruit-packing and preserving, breweries, slaughtering and packing, shipbuilding and sugar-refining.

The topography of the city is hilly, with excessively steep grades; streets only moderately wide, with few avenues. The winds are generally of high velocity, the prevailing direction being west. The fire-fighting facilities, both in the way of water-supply, fire alarms and fire-brigade management, were very fair. The building laws had no limits for cubic contents of individual hazard, and were unsatisfactory as to the materials for construction and the separation by party-walls. The regulations for the keeping of explosives and inflammables were moderately good.

Regarding the actual districts the following may be taken as a description:—

CONGESTED VALUE DISTRICT.

Limits.

East Street North, Washington, Davis, Jackson, Kearney, Pine, Dupont, Grant, Sutter, Powell, Post, Mason, Ellis, Taylor, Golden Gate, Jones, McAllister, Market, Seventh, Stevenson, Fifth, Jessie, Fourth, Mission, Third, Minna, New Montgomery, Natoma, Second, Minna, First, Natoma, Fremont, Mission and East Street South.

General Characteristics.

The area is about 314 acres, or about 0.49 square mile, containing 101 city blocks or parts of blocks. Values are fairly well distributed, being heaviest in the wholesale district, which lines Market Street on both sides from Steuart and Drumm to Second and Sansome Street and extends back to Mission on the south and as far as Commercial Street on the north, and

in the principal retail mercantile section, which is roughly bounded by Montgomery, Bush, Grant, Post, Stockton, Geary and Powell, and including both sides of Market Street west of Montgomery Street. The values in the foregoing districts are fairly heavy,

thinning out markedly towards the north above Commercial Street in the produce and commission house section, being practically insignificant in the few blocks fronting on East Street and fairly important and evenly distributed elsewhere.

South from the congested value district, and separated from it by a broad belt of low value but compactly built risks, is a very important warehouse, lumber and manufacturing district. It covers a large area and extends along the Southern Pacific Railway from the Bay of San Francisco to Eleventh Street, occupying both sides of the right of way for a distance of one to two blocks and, east of Eighth Street, extending as far south as Irwin Street.

An important wharf and warehouse district extends along the water front of the bay of San Francisco between King and Lombard Streets, containing at times very high values of merchandise and shipping, and adjoining the congested value district on the east but separated by East Street, which averages in width 175 ft.

Chinatown, bounded by Kearney, Pacific, Stockton, California, Dupont and Sacramento Streets, consists of nine rather compact blocks of one to four-storey small retail mercantiles, and adjoins the congested value district on the north-west for a short distance. The values contained are comparatively insignificant.

Stretching along the water front of the Bay from Greenwich to Taylor Streets, and extending back from one to several blocks, is an important manufacturing and lumber district which is well removed from the business district.

Other groups of considerable importance and representing noteworthy values are the group comprising the Union Iron Works, San Francisco Gas and Electric Co., Risdon



A SAN FRANCISCO SKYSCRAPER: THE HOTEL ST. FRANCIS.



PLAN OF THE GENERAL LOCATION OF SAN FRANCISCO.

Iron Works and the Western Sugar Refinery, bounded by Twenty-fourth, Illinois Street and the Bay, and the group of slaughter and meat packing-houses at the junction of Kentucky Street and Railroad Avenue. Both of these groups are well isolated.

CONFLAGRATION HAZARD.

Congested Value District. — General. — Bounded on the north by a mixed mercantile warehouse and dwelling section known as "Barbary Coast," and comprising the old part of the town; on the north-west by Chinatown; on the west by a fashionable boarding-house, apartment and residence section, mainly of frame construction; on the south by a compactly built mixed mercantile, dwelling and manufacturing district; on the east the Bay of San Francisco. For convenience the congested value district has been divided into five sub-districts, numbered consecutively, and described by their principal characteristic occupancy. They are described thus:—

First Section.—The principal retail mercantile section, bounded by Montgomery Bush, Grant, Post, Stockton, Geary and Powell, and including both sides of Market Street west of Montgomery.

Second Section.—The principal wholesale mercantile and light manufacturing district bounded by Steuart, Mission, Second, Sansome, Commercial and Drumm Streets.

Third Section.—The mixed banking, office and light mercantile section bounded by Market, Montgomery, Washington and Sansome Streets.

Fourth Section.—The produce and commission house district bounded by Battery, Washington, Drumm and Commercial Streets.

Fifth Section.—The hotel, rooming house, theatre and concert-hall section, consisting of the blocks north of Market Street and between Powell and Taylor Streets.

First Section.

The generally highly combustible nature of buildings and stocks, lack of improved risks and of protective devices on exposed openings, large number of exceptionally great areas and heights, frequent occurrence of large open light wells, absence of protection for floor-openings augmented by an unusually large amount of frame, often of considerable area and height, causes the probability feature of this section to be classed as very serious.

Second Section.

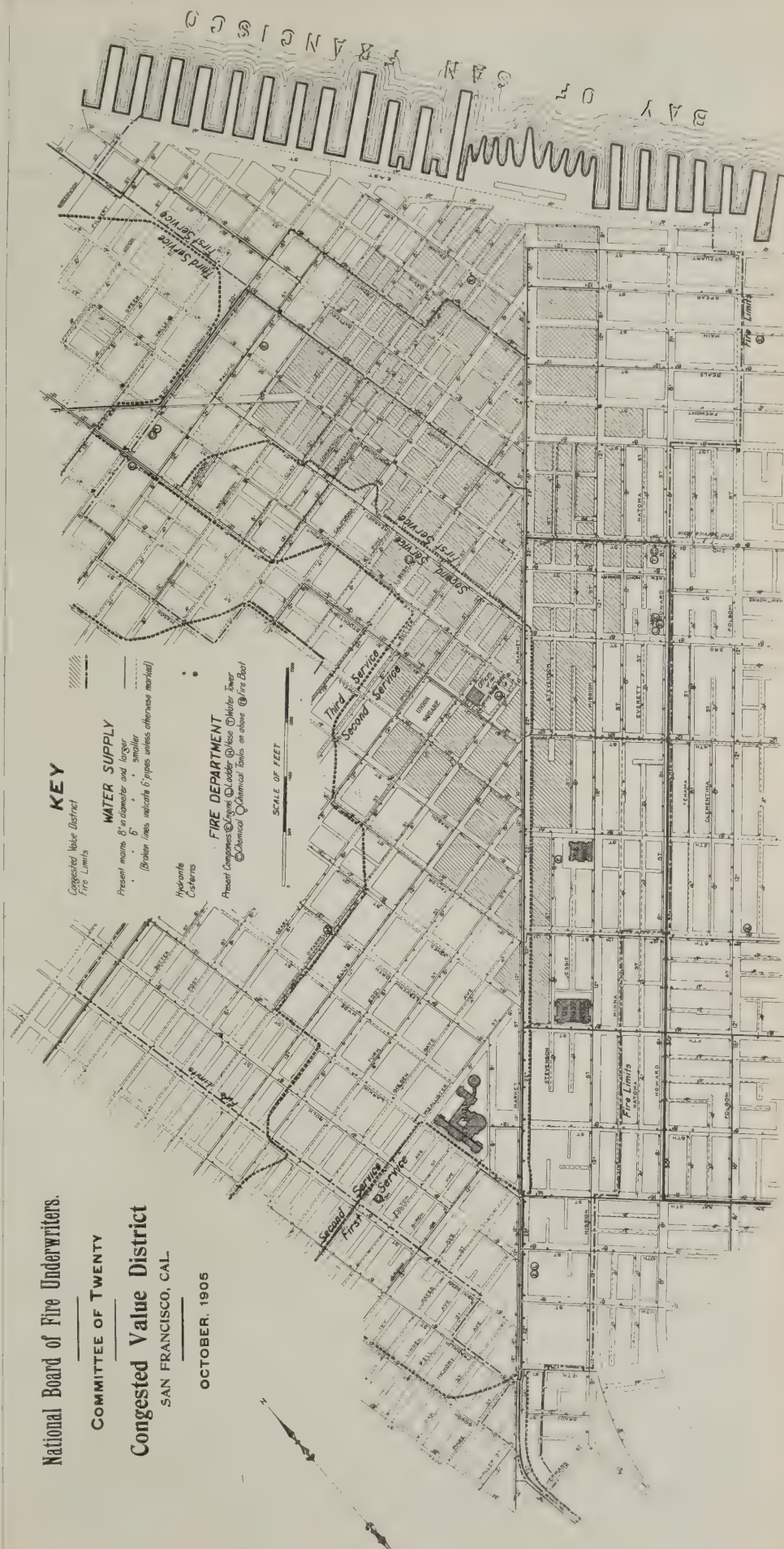
The prevailing type of construction in this section is ordinary joisted brick, wood-furred walls and sheathed ceilings being characteristic throughout. Considerable shutter protection exists, but is largely of an inferior type, inside shutters being common and generally hung on wooden frames. Some effort is made to enclose elevator and stair openings, but in most cases the enclosures are unsatisfactory. Interior open light wells are numerous, greatly increasing the individual hazard and making rapid fires possible. Slow-burning construction and protective devices universally lacking. The probability hazard is therefore very great.

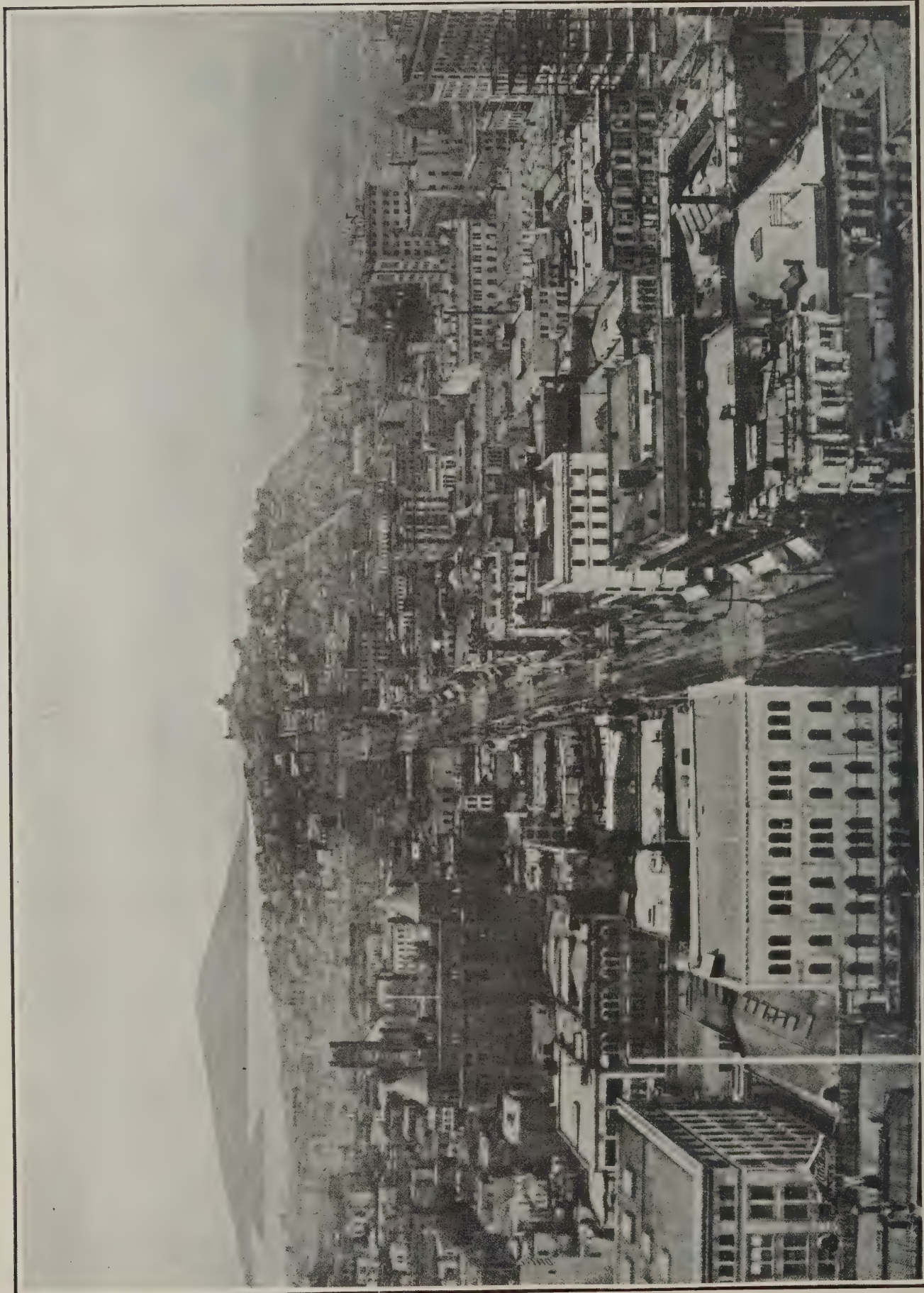
Third Section.

This section is occupied principally as offices, with light retail mercantiles on the ground floor. A good many wholesale houses are located on Sansome Street, and the contents have considerable weight in considering the probability feature. The fireproofs are large and high, and although quite seriously exposed their modifying influence on local conditions is quite effective. The probability feature of the conflagration hazard in this area, while not excessive, is still considerable.

Fourth Section.

No serious conflagration breeders in this section. Heights generally low and areas





[From the San Francisco "News Letter."]

SAN FRANCISCO BEFORE THE FIRE: TELEGRAPH HILL SEEN FROM THE SPRECKEL BUILDING.

small. Buildings all of joisted construction and considerable frame construction obtains. Shutter protection more prevalent than in any other part of the city, and perceptibly modifies the general hazard. What exposures exist are not of a very serious nature. Streets mainly about 50ft. and 70ft. wide, and several blocks have internal narrow streets and alleys. In spite of the general absence of protective devices the probability hazard of this section is very mild.

Fifth Section.

This section contains more serious exposures, involving very large and highly combustible buildings and conflagration breeders than any other equal area in the city. The grouping of conflagration breeders in several blocks, in some cases adjoining, lack of shutter protection, presence of an exceptionally large amount of frame, frequent occurrence of bay windows on inside walls, roof elevations, and other undesirable conditions, make the probability hazard extreme.

Outside of Congested Value District.

First.—Mixed lumber, warehouse and manufacturing district extending from the Bay of San Francisco along the Southern Pacific Railway, and roughly bounded by Brannan Potrero, Sixteenth, San Bruno, Alameda, Eighth, Sixteenth, Hubbell, Seventh, Irwin Street (produced) and the Bay. Buildings are of brick and frame construction, but mainly the latter; party-walls are often blank and invariably parapetted to fair height; shutters quite extensively employed and several frame woodworkers and a few brick warehouses are equipped with sprinklers. Frame planing mills, box factories and other woodworkers are numerous, and commingled as they are with the lumber yards cause very grave conditions. Several blocks contain rows of these risks, closely grouped; and there are several areas, often involving a number of blocks, in which the potential feature is excessively high. Potential hazard very serious throughout. District is somewhat disconnected north of the railroad by blocks, or parts of blocks, of small dwellings and retail mercantiles. Streets of fair width and water-supply mostly fair, but decidedly weak in the lumber district south of the railroad.

While a conflagration involving the entire district is not probable the possibility of large fires occurring is very severe, and local conflagrations of serious proportions are imminent. The group, however, is well removed from the congested value district.

Second.—The lumber, yard, warehouse and manufacturing district extending along the water front from Greenwich to Taylor Streets is also well removed from the congested value district. Lumber yards are small and risks are strung out over a large area, and nowhere seriously grouped. Construction is all brick and frame, mainly the latter. One frame woodworker is sprinklered and one brick (a flour mill) is of fireproof construction. Streets of only fair width, and water-supply is very limited, at best only fair in some blocks. The probability of a serious conflagration occurring in this group is small owing to space isolation and the low height of the lumber piles.

Third.—The isolated group comprising the Western Sugar Refining Co., Risdon Iron Works, San Francisco Gas and Electric Co., and the Union Iron Works, bounded by Illinois Street, Twenty-fourth Street and the Bay. In this group are some immense values and the most important special hazards in the city. It covers a large area, and the two ironworks are fairly well separated from the other two plants by a very high hill. Several of the buildings in the ironworks section are constructed of non-combustible materials

throughout, many of the combustible buildings in the group are equipped with automatic sprinklers, and the whole area is well protected by a private distribution system supplied from three sources; and a high-pressure can be obtained by a large battery of fire pumps. Buildings mainly of brick joisted construction, and in places the space isolation is insufficient. In view of the good protection, practically fireproof nature of some of the buildings, and fairly good space isolation, on the whole, however, there is small probability of a large conflagration originating in this group.

Fourth.—The slaughtering house and stock-yards district consists of two groups well separated by an expanse of water several hundred feet wide located at the juncture of Kentucky Street and Railroad Avenue. Both groups are built on piles out over the water of the bay, and are entirely of light-joisted frame construction. Owing to the nature of the construction, poor water-supply and isolation, the conflagration hazard of this district is abnormally high, and the probability of a sweeping fire destroying the whole group is extreme.

Fifth.—The wharf and warehouse group extending along the water front from King Street to Lombard Street. These warehouses and docks are built over the water on piles, and, with the exception of the brick ferry depot, are all of frame construction and highly combustible. They contain at times very high values of merchandise and shipping. Obviously the potential hazard of the district is very great. Buildings, however, are mainly but one storey high, and although of great area are fairly well separated by open spaces forming the slips; and in view of the close proximity to the centre of the city and availability of a large amount of fire-fighting apparatus, fire tugs and individual protection resulting from an independent distribution system with a good supply of hose, a serious conflagration involving this district is not likely.

CONCLUSIONS.

The principal features affecting the conflagration hazard in the business section are bad exposures, poor construction, lack of proper protective devices, excessive height in non-fireproof buildings, large floor areas, and the large percentage of frame construction present.

Exposures both front and rear should be

eliminated by the adoption of proper protection on all unprotected openings which are exposed. The poorer and more hazardous class of buildings should gradually be replaced by a class of buildings designed with more attention paid to the fire-resisting qualities, and the present ones should be protected in the most effective manner. Measures should be taken to enforce or encourage the installation of sprinkler equipments and other protective devices in all buildings occupied for hazardous purposes and likely to become conflagration breeders from their size or nature of their construction and occupancy.

The adoption of these and other recommendations outlined in this report will greatly reduce the conflagration hazard of this city.

Frame Construction.

The construction outside the fire limits is almost wholly frame. Streets are mainly of good width, but only a few exceed 82½ft. The water-supply on the average is fairly good, but is decidedly weak in several highly-hazardous localities. The mixed dwelling and minor mercantile section which immediately surrounds the congested value district, and extends from it in all directions, with more or less uniformity, is alarmingly compact. These solid blocks of frames often contain four- and five-storey buildings, and the potential hazard is very serious throughout. The exposure to the congested value district is very serious and decidedly marked on the north and west, where the grouping of high-frame apartment buildings is common in the blocks adjacent to the limits of the mercantile district. The use of redwood in building construction and the dampness of the air are thought by some to reduce the conflagration hazard, but redwood is being used to a less extent for finish, and has not been used structurally at all, owing to its lack of strength. In any event, the security resulting from a combination of redwood and such dampness as exists in San Francisco is regarded by the National Board engineers as fancied merely.

An interesting Summary of the Model Theatre Fire Tests at Vienna was presented by Chief Officer Westphalen, of Hamburg, to the Hamburg Architectural Society, and this summary has been published in German with some exceedingly useful illustrations.



THE HILTON ANDERSON BROOKS AND COMPANY'S PORTLAND CEMENT WHARF FIRE.

A CEMENT WAREHOUSE FIRE.

THE fire of last month at Messrs. Hilton, Anderson, Brooks & Company's cement wharf, Upper Thames Street, London, E.C., which was notable for the excellent stop made by the fire brigade, had some interesting features. The warehouse in which it took place was an old-fashioned one, with all its metalwork unprotected and the flooring supported by wood joists. Upon this floor there was a very heavy load of Portland cement, stacked for the most part in bulk. The fire started somewhere near a lift-shaft and immediately spread to the rafters of one of the floors, as shown in the illustration. Fortunately there was no unprotected metalwork in the floor just above the lift-shaft, and the joists alone were affected by the flames. These, of course, rapidly charred, but fortunately not so rapidly but that the fire brigade were able to get to work to extinguish the flames.

Having regard to the fact that the putting of water on to this fire meant absorption of water by the cement and an increase of the load on the floor, it was a matter of the utmost interest how the water was got on to this fire in time to put it out and yet not in sufficient quantities to so load the floor below as to break it down.

Owing to the promptitude of the brigade, the damage was mainly water damage, the fire damage being quite small. Ten minutes' delay would probably have meant a collapse of the building.

The photograph shows the cement in bulk which, as a matter of fact, became an

enormous mass of neat cement-concrete for a layer of considerable thickness and set hard so that it had to be broken up by sledge hammers before it and the powdered cement under it could be cleared away.

Drenchers.—It may be remembered that we published some illustrations of drenchers provided at Dr. Jaeger's factory in London, with a view of assisting in the protection of the factory from external fire-risks. We are pleased to observe from a letter publicly issued by the manager that on the occasion of the fire at 58, Chiswell Street on April 25th the fire was apparently prevented from spreading into the Jaeger premises, although the distance between the fire and the latter premises was only 18ft.

FIRE TESTS.**LAST WEEK'S TESTS.****Reinforced Concrete Floors.**

ON Wednesday, May 2nd, the British Fire Prevention Committee continued its tests with reinforced concrete floors, the floor under investigation being one constructed on the Coignet system with the object of attaining classification as "fully protective" (Class B.), which requires a four hours test followed by five minutes of water, the load being $2\frac{1}{2}$ cwts. per ft. super. Slag concrete with "Ferrocrete" cement were used. There was a considerable attendance of Government officials, architects and surveyors. Without going into detail, pending the

issue of the report, it is generally known that the floor attained the full classification (B.). This was the second test by Messrs. Coignet a previous test having been for the period of three hours, in which classification as fully protective (Class A.) was attained, i.e., the $2\frac{1}{2}$ hours test was passed.

Protection of Window-openings.

Another test conducted on the same day was a rather interesting test as to the protection of window-openings, namely, a comparative test between wire-glazing in hardwood frames versus ordinary 32oz. glazing in ordinary deal frames protected by the roller shutters of the "Kinnear" type. This test will be dealt with later when the report is issued.

KINNEAR ROLLER SHUTTERS.

We publish two photographs of the interesting tests that were carried out with the Kinnear roller shutter doors. These tests, as Mr. J. Herbert Dyer, vice-president of the National Fire Brigades Union, writes in a preliminary note, "were intended to further illustrate the use of suitably constructed light steel revolving shutter doors in large vertical openings in checking the spread of fire where iron doors would be heavy and cumbersome. There were two tests:—

"(a) With a set of two steel rolling shutter doors fitted on either side of a 14in. wall, as for party-wall door purposes.

"(b) With a single steel rolling shutter door fitted on the inside of a 14in. wall.

"The double shutter doors withstood the four hours test, remaining intact and workable at the conclusion of the test, no flame having passed through or around them.

"The single shutter door withstood the $2\frac{1}{2}$ hours test, no flame having passed through or around it.

"Owing to the Committee's testing plant sustaining damage during the conduct of the tests, they had to be interrupted, whereupon water was applied on both sides of the shutters.

"The tests were subsequently continued, and the shutters which had already undergone an exceptional strain by fire and water were again subjected to fire, and at the conclusion to water under pressure with satisfactory results."

As to the object of test, the intended classification was respectively for full protection (Class B.), which means a four hours test, and for full protection (Class A.), which means a $2\frac{1}{2}$ hours test. The object was obtained.

The following is an approximate summary:—

The Set of Two Steel Rolling Shutter Doors.

After two hours the heat radiated through the shutters began to scorch a newspaper on a wooden post placed 12ins. (0'304 m.) away from the outer face of the outer shutter. After 2h. 45m. the newspaper and wood caught fire. No flames passed through or around the outer shutter or over the hood during the four hours of the test. Both the inner and outer shutters, frames and gear remained intact. The maximum bulge on the inner shutter at the conclusion of the test did not exceed 1 $\frac{1}{2}$ ins. (0'038 m.). The maximum warping to the hood protecting gear of the inner shutter did not exceed 3ins. (0'076 m.). The outer shutter retained its alignment. Both shutters could be easily worked and raised at the conclusion of the test.

Note.—The test was interrupted after 3h. 10m., owing to damage to gas producer. Water was applied after the interruption to the fire side of the inner shutter for $2\frac{1}{2}$ minutes (at about 65 lbs. pressure), and to the outer face of the outer shutter for $2\frac{1}{2}$ minutes (at about 45 lbs. pressure). This interruption with the additional application of water before the conclusion of the test were tests of an exceptional character beyond the require-



THE INNER SHUTTER OF THE SET OF TWO ROLLING SHUTTER DOORS AFTER TEST.

ments of the "objects of test." Owing to the interruption the temperature specified was not fully attained, but the additional test by water was considered to be more than equivalent to the non-application of the full temperature.

The Single Steel Rolling Shutter Door.

After the heat radiated through the shutter for some considerable time a newspaper on a wooden post placed 12 ins. (0'304 m.) away from the outer face of the shutter got alight. No flames passed through or around the shutter or over the hood during the 2½ hours of the test. The shutter and frame remained intact. The maximum bulge of the shutter at the conclusion of the test was 1½ ins. (0'038 m.) towards the fire side. The maximum warping to the hood protecting the gearing was 2½ ins. (0'063 m.). The shutter was worked and raised with difficulty to 4 ft. 6 ins. at the conclusion of the test.

Note.—The test was interrupted after 1 h. 40 m., as before stated, and the same additional application of water was made to either side of the shutter beyond the requirements of the "object of test" directly after the interruption. Owing to the interruption the full temperature specified was not attained, but the additional test by water was considered more than equivalent to the non-attainment of the full temperature.

CONCRETE FLOORS.

The object of the two experimental tests conducted by the British Fire Prevention

Committee was to obtain data in respect to the fire-resistance of concrete floors supported by broad flange beams, the light reinforcing joists not being secured to the beams by cleats, bolts or other mechanical means, *i.e.*, being held in position by the concrete between the wide flanges of the beams.

The idea was to see if such floors could obtain classification as being "fully protective" under the Universal Standards of 1903, *i.e.*, whether they would withstand fire (from below) for four hours at temperatures ranging to about and over 1,800 degs. Fahr., followed by water from a steam fire-engine for five minutes, the floors being loaded 2½ cwt. per ft. super.

The sections of floors under test were the largest tested anywhere in the world on the fire issue under the standard requirements, measuring 334 ft. super., the main beams being 15 ft. span.

The conditions, except for some minor points, were identical except for the concrete aggregate, and the tests were classed as experimental tests in respect to joist and concrete floors, as they are not subject to patents, the materials being generally available.

The principles adopted in the design and construction of the floor are explained below.

As to the results, they bear out in every way the conclusions already arrived at by the Committee that Thames ballast concrete is entirely unreliable as a fire-resistant. The failures have been successive and without

exception. The clinker-concrete stood remarkably well, and again bore out its excellent reputation. The tests on this large scale, following those on a smaller scale, will certainly naturally affect the building and fire regulations of the future as to the nature of concrete to be used in floors and for girder protection.

As to the floors under test, they measured 15 ft. by 22 ft. 3 ins., divided into three bays of 7 ft. span centre to centre, the main girders being the "broad flange" type provided by Messrs. H. J. Skelton & Co.

The Thames ballast aggregate was 2 parts of washed sand, 4 parts of unscreened washed gravel and 1½ parts Portland cement. The clinker-concrete was of 3 parts furnace clinker (¾ in. ring), 2 parts sand and 1 part Portland cement.

Comparison of the Results.

The following results are in tabular form from the Committee's official summary, and show the failure of the Thames ballast concrete and the success of the clinker-concrete floors. We have added extracts from Mr. Marsland's preliminary notes to the two reports:—

THE THAMES BALLAST CONCRETE FLOOR.

In 22 minutes after the commencement of the test the soffit of the concrete floor began to split off in patches, and continued to do so at intervals during the test.

In 75 minutes the whole of the concrete casing to lower flange of beam between south and centre bays fell.

In 100 minutes that to the beam between the north and centre bays fell.

The beams of the floor began to deflect in 20 minutes, and continued to do so more rapidly after the concrete to the lower flanges fell, till a maximum deflection of 7 ¾ ins. (1'8 m.) was recorded. Towards the end of the test the concrete to the north bay between the cross joists began to fall and the wooden floor on top became ignited. At the conclusion of the test the lower flanges of the beams were seen to be red-hot.

On the application of water more of the soffit fell, and eventually nearly the whole of the concrete between the cross joists in the north bay fell, the wooden floor on top igniting.

The maximum permanent deflection of the floor as recorded four days after the test was 4½ ins. (1'2 m.).

The concrete at the junction of the broad flange beams and the cross-joists did not crack or break. None of the joists were dislodged, twisted or bent.

Both fire and water passed through the floor, which was badly damaged.

THE CLINKER-CONCRETE FLOOR.

In 25 minutes after the commencement of the test small pieces of concrete began to split off soffit.

In 31 minutes two patches of concrete about 1 in. (0'025 m.) thick became detached from soffit of south bay and fell.

The maximum deflection recorded was 35 in. (0'88 m.) after 240 minutes.

On the application of water the surface of the beams was eroded where struck by the jet. (See illustrations.)

The soffits of the bays were also slightly eroded where struck by the jet.

On the load being removed the top surface of the wood floor was intact.

On removing the floorboards some of them were discoloured by the heat on the underside, and a wood strip at the south-west corner was charred.

Fine diagonal cracks on the top of the floor extending about 3 ft. were found at the south-west, south-east and north-west corners, also cracks on each side of the concrete over the tops of beams.

After the removal of the load it was found the floor was practically level and intact, and there was no permanent deflection.

Neither fire nor water had passed through the floor. Classification was obtained.

MR. MARSLAND'S NOTE.

This test demonstrates the unreliability of ordinary gravel or Thames ballast-concrete as a fire-resisting material at high temperatures.

It also demonstrates that with broad-flanged beams the connecting of the cross-joists to the main beams by cleats, bolts or rivets may be dispensed with when the concrete is carefully placed, but such construction exposes a wider flange to the action of the fire, which requires careful protection.

MR. MARSLAND'S NOTE.

It is interesting and instructive to compare this test with the former.

The floors were practically identical so far as their construction was concerned, the only difference being the aggregate of which the concrete to the bays and supporting beams was composed.

The test clearly demonstrates the superiority of clinker and coke-breeze over Thames ballast.

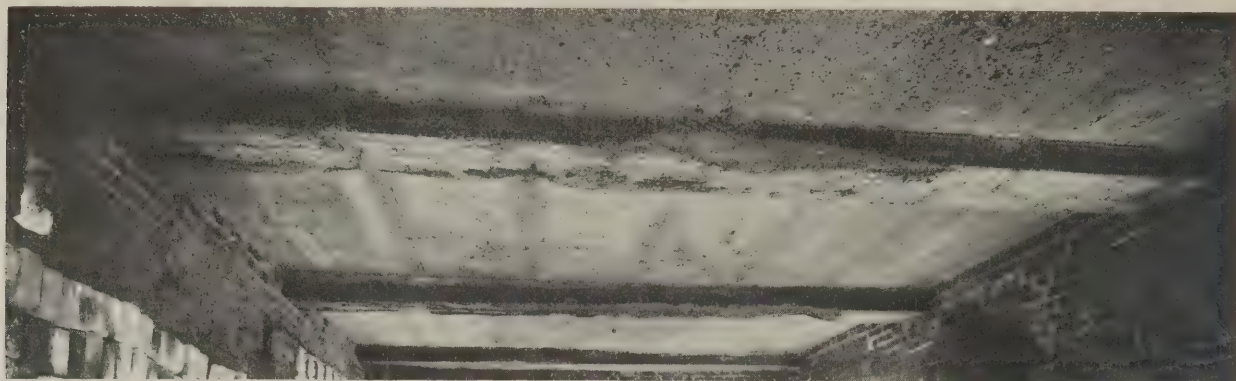
This test also again demonstrated with that broad flange beams the connecting of cross-joists to main beams by cleats, bolts or rivets may be dispensed with.

Design of the Floor.

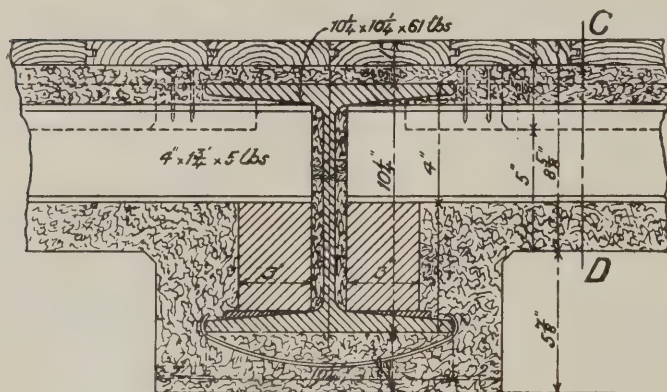
The floor, which is not subject to patent or special rights, was constructed of materials generally available. The following particulars of the floor, and details explaining the:



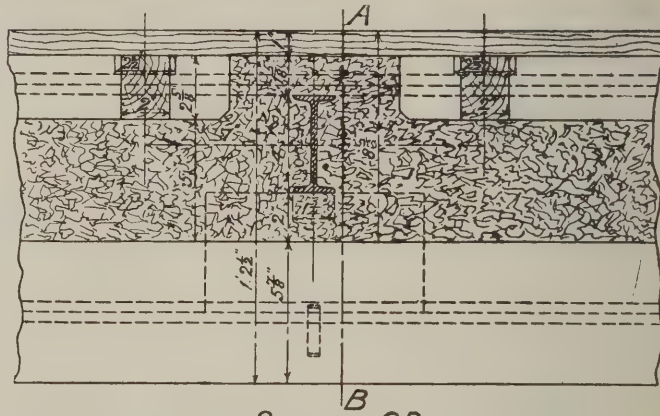
THE SINGLE ROLLING SHUTTER DOOR AFTER TEST (KINNEAR TYPE), WHICH OBTAINED CLASSIFICATION AS FULLY-PROTECTIVE (CLASS A.).



THE CLINKER-CONCRETE FLOOR THAT OBTAINED "FULL" CLASSIFICATION.



SECTION AB



SECTION CD

DETAILS OF CONSTRUCTION OF THE THAMES BALLAST AND CLINKER-CONCRETE FLOORS.

principles adopted in its design, have been prepared by Messrs. H. J. Skelton & Co. —

1. The steelwork consisted of rolled steel "broad flange beams" and light reinforcing joists. The joists were not secured to the beams by cleats, bolts or other mechanical means, but were secured by the concrete held between the wide flanges of the main beams, this being the characteristic feature of the floor under test.

2. The floor was designed to carry a load, including the weight of the floor, of 392 lbs. per sq. ft.; this would give an average of about 20 tons on each of the broad flange beams. This load, according to the published properties of the section employed (viz., 10 1/4 ins. by 10 1/4 ins., of which the published Section

Modulus about $x \times x$ is 67 ins.³), is equivalent to an extreme fibre stress of approximately 7 1/2 tons per sq. in. for a beam supported at both ends and uniformly loaded.

The thickness of the concrete was fixed at a minimum of 5 ins., in accordance with building regulations. For the purpose of eliciting the required number and size of the reinforcing joists, the weight of the superimposed load alone was taken into account, the floor being assumed to carry its own weight. The joists were so spaced as to make the average load on each such as would impose an extreme fibre stress of 7 1/2 tons per sq. in. on the assumption of fixed ends. (Section Modulus about $x \times x$ 1835.)

In making this calculation the span was

measured in the clear, *i.e.*, between the edges of the flanges of the main beams, on account of the assumption of fixed ends, whereas the span of the broad flange beams was measured from centre to centre of the wall bearing at either end.

The weight of the steelwork in this floor, per bay, was 1,160 lbs., which works out at 11 lbs. per sq. ft. super. The extreme depth of floor was 14 1/2 ins.

3. As mentioned in the report, the ends of each steel beam were connected longitudinally to the adjoining beam by tie rods. It should be here pointed out, however, that the designers regard the provision of tie rods in this type of floor as unnecessary and of no advantage as regards strength.



THE THAMES BALLAST CONCRETE FLOOR THAT FAILED.

THE BUILDERS' JOURNAL

AND ARCHITECTURAL RECORD.

May 16, 1906. Vol. 23, No. 588.

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Rusting of Iron. SOME weeks ago we published several letters from Mr. Alan E. Munby in which he sought, by referring to the theory of Professor Dunstan and others that the rusting of iron was due to the presence of hydrogen peroxide, to refute our contention firstly that the ordinary rusting of iron was due primarily to the action of carbonic acid present in the atmosphere or in water, and secondly that the protection of iron by Portland cement and lime was probably due to the presence of alkalies which neutralize carbonic acid. We referred in our replies to the criticisms of Dr. Gerald Tattersall Moody, and expressed the opinion that these had fundamentally undermined Professor Dunstan's contention. Dr. Moody has now again returned to the charge, and the results of his investigations on the rusting of iron are communicated in a paper to the Chemical Society, and published in the journal of that body for April. Dr. Moody's evidence and arguments should allow no more room for doubt that the theory of rusting being due to the presence of carbonic acid is the right one, and that Professor Dunstan, his colleagues, and Mr. Munby are wrong. We cannot do better than use Dr. Moody's own words summarizing the result of his investigations: "The experiments recorded in this paper conclusively show

that oxygen is unable to oxidize iron directly in presence of water, but that when a minute quantity of carbonic acid, such as is contained in air, is present, absorption of oxygen takes place. The explanation of rusting as a process involving the production of hydrogen peroxide, as advanced by Dunstan, is refuted, not only by the complete indifference of iron towards oxygen in presence of water, but also by the composition of rust in actual formation and by the fact that hydrogen peroxide when free from acid does not oxidize iron. On the other hand, the ready interaction of iron and carbonic acid—which exists in all natural waters—resulting in the formation of hydrogen and ferrous salt, affords a satisfactory explanation of the first stages of rusting, which is followed by a more or less complete oxidation of ferrous salt by atmospheric oxygen, leading to the production of rust, the composition of which is variable and dependent on the extent to which oxidation of ferrous salt has taken place." Dr. Moody thinks that Professor Dunstan's work was nullified by the presence of carbonic acid in their apparatus, of the extreme difficulty of excluding which they do not appear to have been aware. Dr. Moody had difficulty in constructing and working an apparatus that would entirely exclude carbonic acid. When he succeeded he found that there was no rusting and no absorption of oxygen after a week's exposure to air and water almost entirely freed from carbonic acid, whereas when ordinary air and distilled water was used 94 per cent. oxygen was absorbed and the iron was badly rusted. Analyses were then made of iron rust from the unpainted interiors of iron flushing tanks in constant use, where of course the iron is under conditions specially favourable to rusting, the metal being alternately and in rapid succession exposed to air and water. Samples of this rust showed between 51 and 60 per cent. of iron present as ferric oxide, between 23 and 36 per cent. of iron present as ferrous oxide, and 8 to 12 per cent. present as ferrous carbonate. When powdered and exposed to air samples of the rust were found quickly to undergo further oxidation into the condition of ferric oxide. "The readiness with which ferrous oxide and ferrous carbonate on exposure to air undergo oxidation forming ferric oxide accounts for the low percentages of ferrous iron found in most samples of rust by previous observers." Dr. Moody calls attention to the assumption by Professor Dunstan that "by the interaction of iron, oxygen and water, twice as much hydrogen peroxide is liberated as is necessary to oxidize the ferrous oxide simultaneously formed. If hydrogen peroxide were actually formed in the ratio stated, ferrous oxide and ferrous carbonate would not be found in rust, since both these substances undergo immediate oxidation in presence of hydrogen peroxide." Dr. Moody draws the conclusion from

experiments that the iron dissolved by carbonic acid first exists as ferrous bicarbonate, which would remain in solution, but would precipitate in presence of air to ferrous carbonate, which again would regenerate carbonic acid by decomposing firstly into ferrous and ferric hydroxides and eventually into ferric hydroxide of iron alone.

Never too Late to Learn. It is very common to hear about the necessity of business and professional men keeping abreast of the times, making themselves conversant with all new developments, and discarding any of the older ideas or methods which may be going out of vogue. The professional man, however, seems inclined to leave the matter as an excellent maxim, no doubt, but one which somehow or other he hardly feels called upon to follow. Architects are apt to get into this mode of thinking. They begin well in the years of their early professional life, searching in all directions for fresh and further knowledge, and it is to be regretted that they do not more often preserve the flexibility of mind which enables them to assimilate new methods and fresh discoveries, rather than sitting down to the steady-going employment of the time-honoured methods recorded in standard textbooks which they had perforce to consult in their student days. A professional man especially should keep himself from becoming stagnant. It is not the boasted English conservatism to dismiss everything new without investigation, but rather to enquire into things carefully and hold back from adopting new methods only if there is a question of their efficiency or safety. Sooner or later, progress in construction is bound to result in changes in architectural form, as it has ever done in all ages and all countries during the past.

A Little Squabble. LAST week we pointed out how biased and unreal the majority of art criticism is, and we made a plea for something genuine. To that little homily we may now add a note on the way critics treat one another when they happen to disagree. The example is afforded by the "Saturday Review," wherein Mr. Pennell has a wrangle with Mr. MacColl about Whistler. He says: "And if membership in national societies and academies makes a man belong to national schools, Whistler was a Frenchman, a German, and an Italian, as well as what he described himself to be, a member of the American school." To this there is an editorial footnote (doubtless inspired, if not written, by Mr. MacColl) that "Mr. Pennell appears to forget that the fuss Whistler made about trifles was only rendered tolerable by his wit, and that when rudeness is employed as a weapon the weapon should at least have some point." Thus do the critics beguile the idle hours with sweet thoughts and honeyed words!

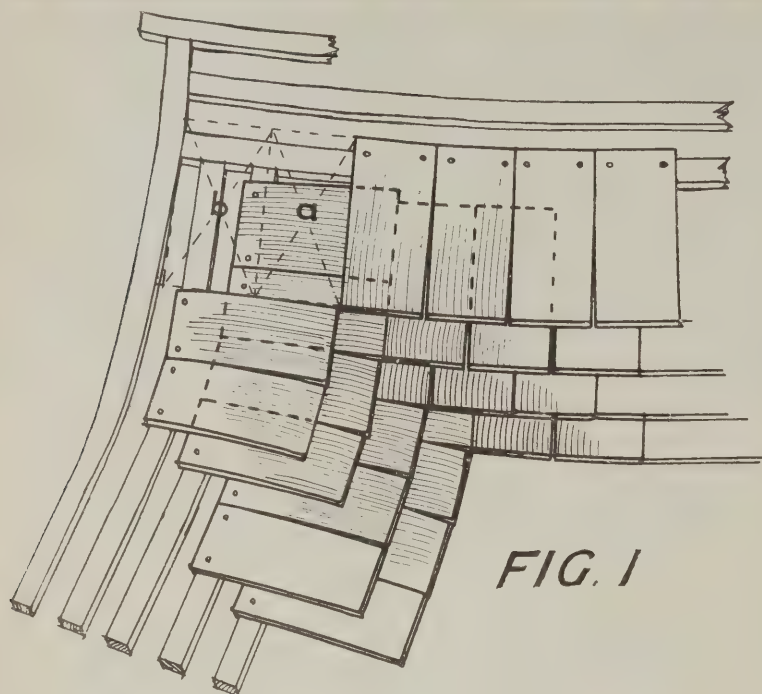


FIG. 1

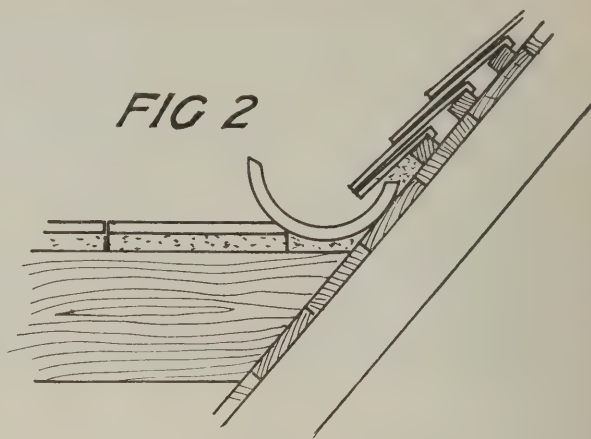


FIG. 2

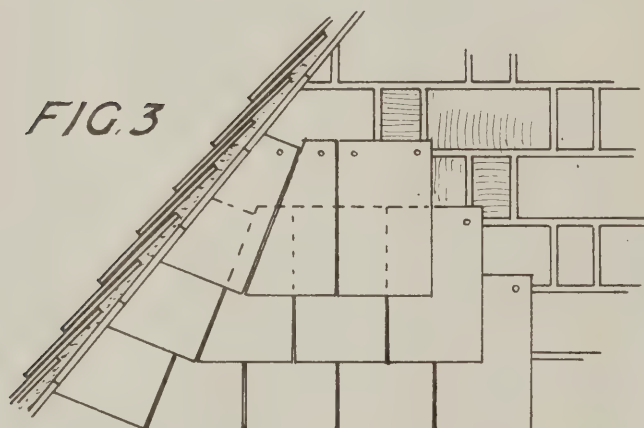


FIG. 3

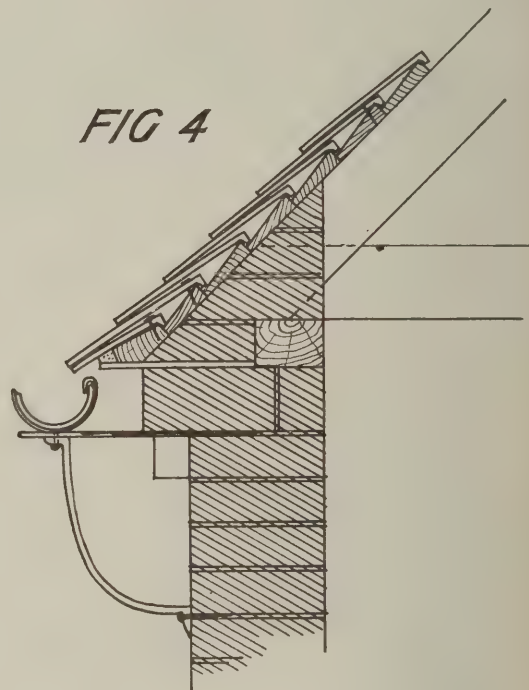
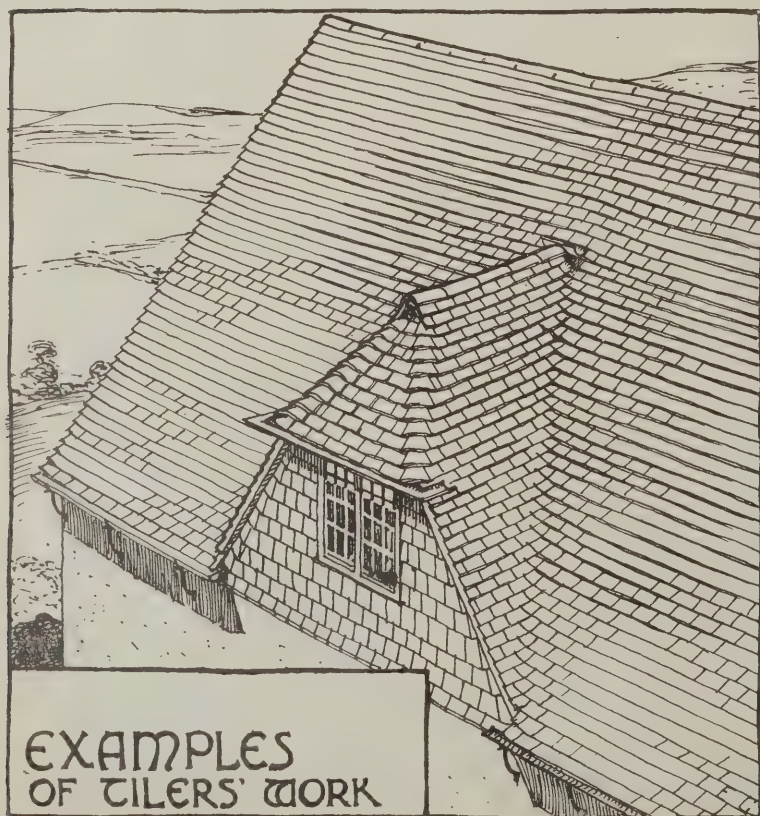


FIG. 4

EXAMPLES
OF TILERS' WORK

TILE-LAYING.

IN these days of easy transit, when material is as much a matter of choice in a building undertaking as the style and extent of the work, there is an ever-increasing danger of losing touch with the traditional methods practised by the old men, who formerly worked lifelong in perfecting methods of application for the materials ready to their hands.

Tiling has in this respect suffered grievously at the hands of the modern builder. It is now quite difficult to discover a man who can undertake the laying of tiles in other than a mechanical way; or, as the Building-Construction-Science-and-Art-Department-examination text-books usually put it, "the manner of laying is similar to slates."

The aim of the tiler in districts to which tiling is indigenous was to produce a water-tight roof without falling back upon the use of lead, any introduction of which was evidently felt to be an admission of incompetence. Incidentally, the result produced always showed a sense of breadth and suavity, with complete freedom from the hard angles formed by the mechanical intersections of hips and valleys on the modern principle. What the tiler would have thought of finishing his valleys, as is sometimes now done, with an open lead gutter to which the tiles are cut on either side to a neat line, it is difficult to imagine. His method of working round a valley is shown by Fig. 1. The valley is first fired up to an easy curve, sufficient to allow the battens,

when laid with a natural sweep, to meet with a right angle in the plane of their upper faces. This sweep causes each course of tiles when laid to curve upwards as shown. The system works best when the margin is about $3\frac{1}{2}$ ins. The dotted tiles "a" and "b" when laid would complete the topmost course shown of the roof-slope on the right of Fig. 1, and the next course to be laid on the left-hand slope would cover these, except for the corner immediately over the valley. These series of corners show alternately as indicated by the direction of the shading lines. It will be seen that this valley is completed without the use of any special tiles, without cutting, and without lead. Staple Inn, Holborn, is a prominent London example with valleys treated in this way, which, however, is exceedingly common all over the country, though seldom practised in modern work. The weather-proofing of hips and ridges is a matter of less importance than with valleys, since water does not run over them; only the rain actually falling on them being likely to percolate. The plain half-round ridge and round-ended hip tiles were practically universal before the last century, and it is at least gratifying to find most makers again manufacturing these patterns.

The intersection of dormers and other lower ridges with higher slopes affords another interesting example of the effort to exclude the plumber. The method is shown in Fig. 2. One length of common ridge-tile is inverted and bedded at the apex of the dormer ridge against the slope behind, forming a short cross-gutter to receive the water from above and direct it well out into the valleys on either side. At Dorchester, Oxon., many examples of this treatment may be seen, but it is not a usual method in most parts of the country.

Tile-hanging to walls and gables gave the workman another chance of exhibiting his resourcefulness. Fig. 3 shows the finish of tile-hanging under a verge. Two tiles at the end of each course are cut wedge-shaped (but retaining sufficient of their heads for nailing) in place of the one unmanageable triangular piece which usually occurs in this position (until it drops out) in modern work. The tiles are nailed into the joints of a gin brick-on-edge semi-hollow wall. This example was sketched at Winchester, where the method is common. Fig. 4 shows a simple treatment of the eaves by which all woodwork is entirely covered, a course of tiles laid flat forming a soffit. The roof tiles in this example are shown hung to feather-edged boarding, which is a method of hanging nibbed tiles cheaper than battens on boarding, and better than battens alone.

Verges are simply formed by laying a course of tile flat on the brickwork, projecting about 2 ins., and running the battens (or boarding) over same to within about an inch of the edge. After the tiling is laid, the wide open joint showing the ends of the battens is pointed up flush, forming the fine thick verge seen in old work. Great care is needed, however, to prevent the modern workman from colouring the pointing "to match the tiles"!

The perspective sketch shows most of the points explained in the diagrams, and also a characteristic treatment of the apex of a hip. In this the hip-rafters and longest pair of jack-rafters are taken, not up to the ridge, but into the last span just below that level. The tiny gablet so formed is often seen filled in with a black bottle-end.

Architecture over the Counter.—The following advertisement appeared in the "Daily Telegraph" last week: "Liberal commission paid to persons in a position to introduce clients to an enterprising firm of architects and furniture and decorative interior designers."

S.K. EXAMINATIONS IN BUILDING CONSTRUCTION.

IN an early issue we propose to publish the answers to the questions set at this month's examinations in building construction held by the Board of Education, South Kensington. Before doing so, however, we would venture a word or two of criticism on the questions set in Stage I.

Question 2.—This question might fairly be asked in almost any of the higher stages: only few persons have the opportunity of practical experience of *lias lime* to be able to answer at first hand "the precautions to be taken in its use." Thirty or forty years ago *lias lime* was much used for dock and other heavy walls, but nowadays Portland cement very generally takes its place.

Question 3.—"What are the essential properties of a good brick?" This might also be a higher stage question: the rest of the question, excepting perhaps "Blue Staffordshire," tests the memory of what one has read, and is not of much value.

Question 4.—A fair question to test powers of observation, not likely to have been very extensively answered, because such matters as common hitches are generally assumed to be altogether for the use of sailors.

Question 5 is the ordinary stock slating question, and it should have been almost universally answered: it is, however, questionable whether the maintenance of fancy names for slate sizes should be any longer encouraged.

Question 6 is a small concession to the elaborate bond drawings in the text-books.

Question 7 might be asked in any higher stage, if first-hand knowledge is expected.

Question 8 is a fair Stage I. question if the examiners will give credit for the ordinary joints one commonly sees, which are usually without any jointing material.

Question 9 may be fair if due consideration is given by the examiner to various interpretations of a $\frac{7}{16}$ in. by $4\frac{1}{2}$ in. sill. It may be taken to be either a window sill or a recess sill. "Weathering and throating" remove it from ordinary door sills.

Question 10 is a fair application of common-sense arithmetic in its first part; the balance of the question is fair.

Question 11.—It is not easy to see what it is intended to test with this question. No wood lintel as a rule should show on the outer face of a wall. The relieving arch should spring from beyond the ends of the lintel, and this is a reason for giving lintels short bearings: the permanent use of the lintel should be for the easy securing of the window or door frame; the sustaining of the small core underneath the arch is a slight duty. A wood lintel with long bearings is not a good form of tie.

Question 12 is a very easy one.

In the old papers of some years ago there would have been two or three questions in antiquated carpentry, framed floors and timber-roof trusses; but it is not well to ignore carpentry and joinery altogether as this paper does. In a paper which is supposed to be taken by many young people who are employed during the day in one or other branch of building, and in which power of selection is given, a fair balance should be attempted; in the present paper the carpenter and joiner has had no consideration. The architect's pupil has in his favour questions 1, 6, 8, 10 and 12; the slater has a question, and so has the mason and bricklayer; but the carpenter and joiner, the plasterer, the painter and glazier, and plumber (question 10 is quite a slater's question) have no special opportunity. Examiners would probably find that if they put practical questions they would get real information from their examinees, and in this way possibly it might result that the small text-books one sees on building construction might in time really give valuable information.

MANCHESTER NOTES.

The New Infirmary.

AT their meeting last week the Board of Management of the Manchester Royal Infirmary accepted the tender (£239,546) of Messrs. Arnold & Son, of Doncaster—who have done the foundations and built the basement floor of the new infirmary in Stanley Grove—for the building of the general superstructure, with the exception of some outer offices and details estimated at £63,000. The other tenders were as follows:—

Holliday & Greenwood, London	-	£258,277
Thomas Rowbotham, Birmingham	-	256,752
Foster & Dicksee, Rugby	-	253,520
Morrison & Son, Liverpool	-	251,300
R. Neill & Son, Manchester	-	245,000
Brown & Sons, Salford	-	244,480

Messrs. Arnold's tender is £4,934 lower than the next lowest of Messrs. Brown & Sons, and the contractors agree to complete the work by July 30th, 1908, or two months earlier than the stipulated time, by which £2,000 will be saved in interest.

Mr. Charles Hopkinson, as chairman of the Building Committee, said the figures included the work for Section A. This comprised the three large four-storey blocks and all the medical and general surgical departments. It did not include the lodges on the outside, the casualty and special block, nor the out-patients' block, the superstructure of the laundry, nor the superstructure of the septic and pathological block, nor the corridors. These were included in Section B. The estimate of the architects, Messrs. Edwin T. Hall, F.R.I.B.A., and Mr. John Brooke, A.R.I.B.A., for Section A was £240,000, and for Section B £63,000. The committee had not regarded price alone nor time alone. The tenders were asked for on the basis of finishing the work by September 29th, 1908, and by finishing the work he did not mean simply Section A but Section B as well; that was the complete hospital.

The Question of Local Labour.

As to local labour, a deputation had waited on them from the Carpenters' and Joiners' Society, who urged that it would be right and proper to spend two or three thousand pounds more in employing a local contractor, and thus ensure the employment of local labour. The committee, however, considered that Messrs. Arnold were giving them an advantage of £2,000 in the date of finishing as well as the advantage in cost. The architects had communicated with Messrs. Arnold as to the number of local men they could employ, and they had replied that if the work were placed in their hands they would employ all local labour with the exception of the foremen and the leading men in each trade, who would come from their permanent staff. It was their intention to work the whole of the large quantity of stone required in Manchester as far as practicable, and from 150 to 200 masons would be employed. In carrying out the foundations contract they had imported very few men, not exceeding 6 per cent, the remaining 94 per cent. being all local men. Messrs. Arnold added that as Manchester firms competed outside there was no reason why they should not compete here.

The total cost of the new infirmary is put at £436,000, including furnishing £22,000 (486 beds at £45 per bed), and commission of architects and quantities surveyor £22,600.

Refuge Assurance Co.'s Premises.

It is now eleven years since the late Mr. Alfred Waterhouse, R.A., brought to completion the building at the angle of Whitworth Street and Oxford Street, Manchester, which he designed as the chief office of the Refuge Assurance Co. The expansion of business during these years has rendered imperative an increase of accommodation, and the company has entrusted to Mr. Paul

Waterhouse, the son (and for many years partner) of their former architect, the task of continuing the building up to the arch of the Manchester, South Junction, and Altrincham Railway and the bank of the River Medlock. Such an extension, involving as it does an additional frontage in Oxford Street of more than 57 yds. and the occupation of an additional area of 2,208 sq. yds., is naturally something more than a mere annexe to the original building. In fact, the architect has realized that in the future the present block must serve as one wing of a composition on a larger scale, and with a view to preventing the monotony of an unduly prolonged frontage of uniform height he has emphasized the centre of the façade by a tower 217ft. high pierced at the base by a carriageway flanked right and left by minor archways for foot passengers. A perspective of the front is exhibited in this year's Academy.

WREXHAM SCHOOL COMPETITION.

MORE than 200 architects applied for the conditions of this competition, and about ninety sets of drawings were ultimately submitted. The assessor (Mr. W. E. Willink, F.R.I.B.A.) finally selected eight, and these were the only designs on view during the latter part of last week. This does not permit of a general commentary on the competition as a whole, owing to the eight designs exhibited being of one type of plan. Evidently the assessor discarded every scheme which did not follow on these lines. The conditions and replies to queries ought to have clearly stated that the playground in particular was preferred on the front of the site, as many excellent plans for this school must have been passed over owing to their disposition on the land. The com-

petition appears to have limited itself to the designs that placed the schools as a whole at the back of the site, with playgrounds and playsheds in front only.

Design placed First.

The assessor has awarded the first premium, £50, to Mr. Frederick Willey, of Durham. The accompanying block plan illustrates the arrangement of this scheme. An alternative tracing for the boys' and girls' departments on the corridor type was submitted, but it is understood that the central hall type is to be adopted. The plan is a good one as a whole, but is open to improvement when examined in detail. The teachers' rooms in some instances are not well shaped, and the cloak-room accommodation seems lavish. If sunlight rules the assessing, this scheme would not compare favourably with the second, having eight classrooms with a north-west aspect. It is, however, undoubtedly the best working plan for supervision. The elevations are plainly treated, though too much effort has been made to break up the front with gables to add interest to the composition. Had the author shown all his chimneys he would have discarded a great many of his gables, which have made the roofing very complicated, and would prove expensive if carried out as shown. The clock-tower is not in the centre, and does not appear to be in harmony with the grouping of the school buildings. The points of the compass are not very accurately drawn on the plans. If the school is to be erected at the cost of £12 10s. 10d. per head, according to the instructions, the elevations will have to be more economically treated and the heights reduced where possible. The building is to be erected on a hillside, and, judging from the levels, much excavating and filling-in will be necessary to level up the playgrounds and playfields.

Design placed Second.

The design awarded the second premium, £30, is by Messrs. Lumsden & Hardie, of Oxtou. This is an ideal plan for securing sunlight into all the classrooms, though the length of the corridors and splay-wings take away from the appearance of the scheme. The grouping of the buildings on the site has been well considered for architectural effect. The position of the cookery and manual instruction rooms is to be recommended for ventilation, but not for means of access from other departments. The elevations are well drawn and coloured. The position and levels of the playground and their means of access are the chief drawbacks to this otherwise clever plan.

Design placed Third.

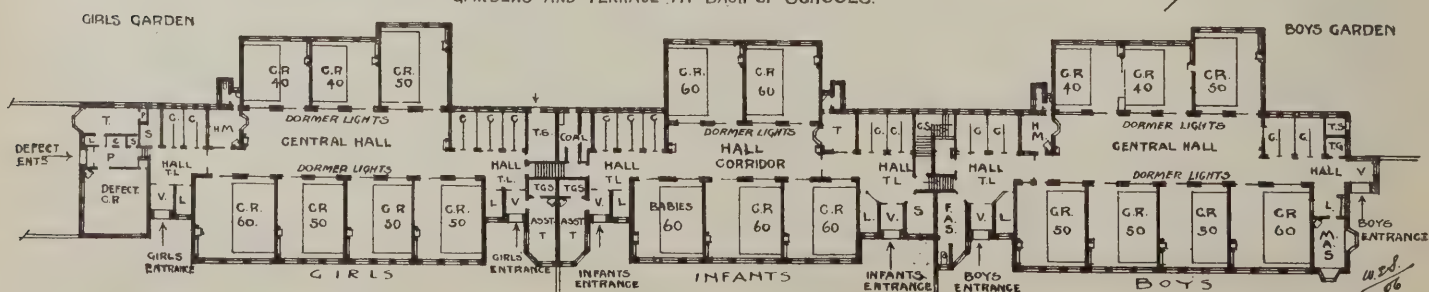
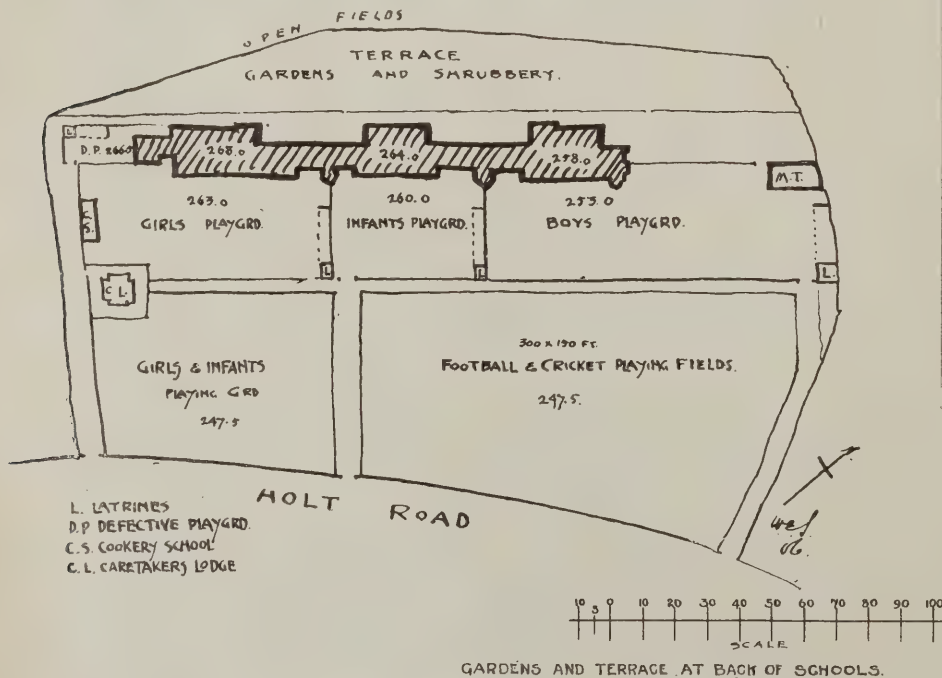
The design placed third, by Messrs. C. E. Deacon & Horsburgh and E. P. Hind, of Liverpool, has few points in its favour, either in plan or in elevation. In the infants' department it is almost impossible for the babies' and infants' classrooms to have sunlight, surrounded as they are by buildings on three sides. One central hall does duty for the boys' and girls' departments, and for this economical feature the infants' rooms have had to suffer both in light and ventilation. The playgrounds have received very little consideration. It is noticeable that a playshed and latrines will interfere with the direct sunshine for the infants' playground, especially when the latter is a few feet below that of the girls'. The elevations are drawn in brown ink in a sketchy manner and are very commonplace. The sections are also very hurriedly drawn. In no way is this design comparable with the first and second.

Other Designs.

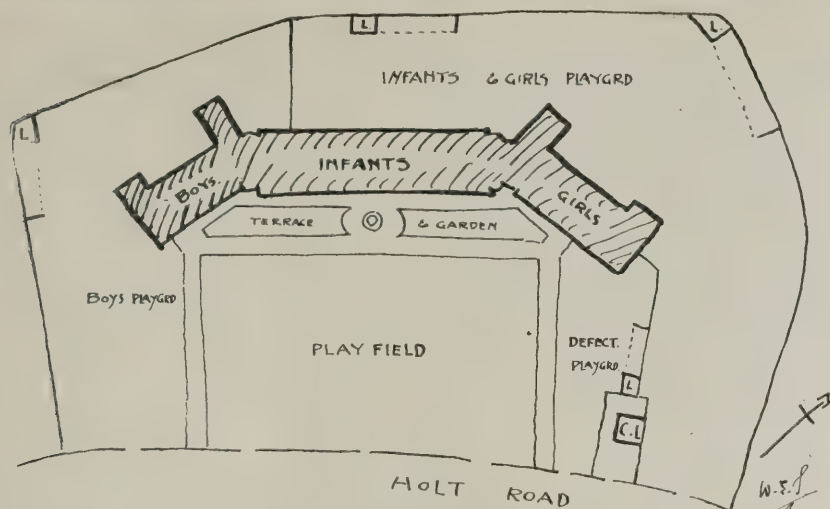
One of the best schemes is that of Messrs. Marshall & Tweedie, of Newcastle. The buildings are set centrally on the site in a similar manner to the design placed third. This plan is much better; only the length of corridor is wasteful and the internal areas are a considerable drawback. The main front showed one of the best elevations exhibited.

Mr. C. T. Taylor, of Oldham, submitted a similar type of plan. Much thought was given to ensure sunlight for the classrooms.

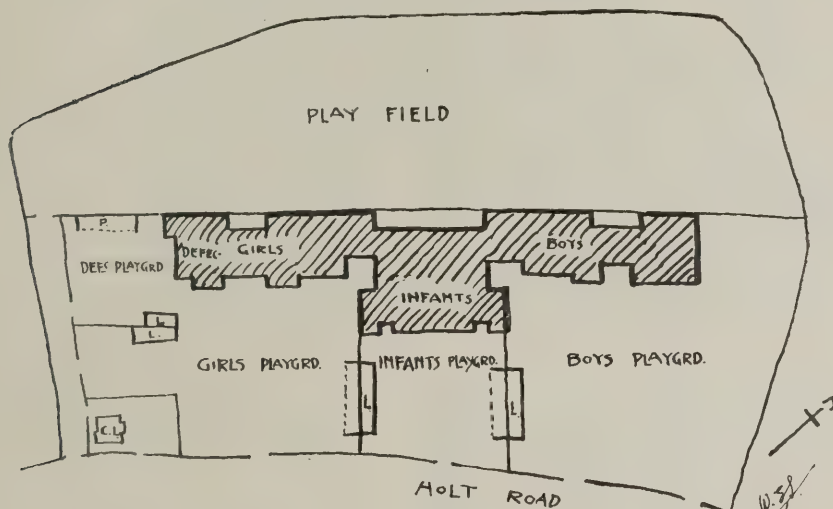
Two of the remaining designs are the work of a local architect, Mr. Walter Slater, of Wrexham, who evidently spent much time in turning out the laboured drawings, neatly drawn and highly coloured. The plans were not so well thought out. The school buildings in one scheme cut up the playground and intercept any communication with the conveniences at the back of the site and with the playsheds at the front; so that the only means of access is by re-entering the school.



WREXHAM COUNCIL SCHOOL: FIRST-PREMIATED DESIGN. FREDERICK WILLEY, ARCHITECT.



WREXHAM COUNCIL SCHOOL: BLOCK PLAN OF SECOND-PREMIATED DESIGN.
LUMSDEN AND HARDIE, ARCHITECTS.



WREXHAM COUNCIL SCHOOL: BLOCK PLAN OF THIRD-PREMIATED DESIGN.
DEACON AND HORSBURGH AND E. P. HIND, ARCHITECTS.

NOTES ON COMPETITIONS.

New Secondary School, Liverpool.

The Education Committee of Liverpool has issued an invitation to architects practising as principals in Lancashire and Cheshire to compete for a new secondary school for girls, to be erected in Aigburth Vale. Applications for conditions of competition are to be accompanied by a remittance of one guinea, which will be returned upon the receipt of *bona-fide* plans. Should this meet the eye of any intending competitors who have not yet applied for conditions, and who do not care to expend their energies in competitions which offer little beyond a sporting chance, the following quotation of the clause as to the adjudication of the designs may serve towards the saving of guineas which would otherwise be irreclaimable: "The Committee will themselves adjudicate upon the designs submitted, but they reserve the right to obtain professional and expert assistance in so doing, with a view to arriving at a decision." There have been sufficient instances of unhappy awards of late to warrant a cautious view being taken of clauses of this nature. It is worth while recalling that at Colchester and Bolton the services of an assessor were dispensed with; and the results were protests from competitors and dissension amongst the promoters. At Wallsend an assessor was engaged to

assist in the adjudication; the respective order of the three designs selected by him was ignored and the author of the third design was appointed to carry out the work. A similar result to either of these is possible in the present instance; it is therefore desirable that all who are interested will communicate with the town clerk and urge the immediate appointment of an expert assessor whose decision shall be acted upon. This has been done by some who have already obtained the conditions, as well as by the Competition Reform Society in the interests of its members within the prescribed counties. The effect may be as happy as was the case with the Southwark Library Competition, where the promoters yielded to a considerable amount of individual appeal and appointed an assessor, although they had originally intended entrusting the adjudication of the designs to a lay committee.

London's New County Hall.

In the annual report of the Council of the Royal Institute of British Architects there was a reference to the advice given by the Institute to the London County Council, recommending the institution of a combined open and invited competition for the new County Hall, to be judged by a jury of assessors. The discussion upon the report did not throw much light upon the method to be adopted, but one thing appears clear, viz., that the open and invited competition would be run upon

lines similar to those of the Hague Peace Palace. To ensure the very desirable inclusion of all eminent architects in the competition, an invitation would be issued to them, and it is reasonable to suppose that the invitation would include the promise of an honorarium. No objection could be taken to this course, for when a man has reached the top rungs of the ladder of fame he can hardly be expected to descend into the arena to cross swords with a few hundred aspirants after glory, unless a possible defeat is to be, by some means and in some measure, compensated for. There is good reason for believing that the Architects' Department at Spring Gardens intends, if possible, to carry out this important work itself. Without reflecting in any way upon the abilities of the members of the architectural staff, it is to be hoped it will not have the opportunity of executing a professional commission which belongs by right to the architect ratepayers of London, at least to be competed for by them. The point of economy is also an important one in so far as it concerns the cost of professional services, for it is undeniable—to anybody who knows anything of the cumbersome system which prevails in all branches of the L.C.C.'s service under present conditions—that the working expenses there are in excess of those in a private office.

Palace of Peace: Awards.

The following are the awards in the competition for designs for the proposed Palace of Peace at the Hague:—1st, £1,000, L. M. Cordonnier, Lille; 2nd, £750, A. Marcel, Paris; 3rd, £583, Franz Wendt, Charlottenburg; 4th, £416, Otto Wagner, Vienna; a prize of £250 to Howard Greenley and H. S. Olin, of New York, and another of £250 to Franz Schwechten, of Berlin. The winning design is in the style of the chateaux of Northern France, the main building being flanked by high towers. M. Cordonnier, the successful architect, is about forty-eight years of age, and has already carried out several important works. In 1885 he won the first prize in the competition for the Amsterdam Bourse.

Bangor University.

A limited competition is to be held for the design of new buildings for the University College of North Wales at Bangor, and the following five architects have been invited to compete:—Mr. W. D. Caröe, Mr. Henry T. Hare, Mr. Arnold Mitchell and Mr. A. Marshall Mackenzie—of London—and Mr. J. Francis Doyle, of Liverpool.

Coventry Municipal Offices.

The first premium, £50, in this competition has been awarded to Mr. T. F. Tickner, architect, of Coventry.

Competitions Open.

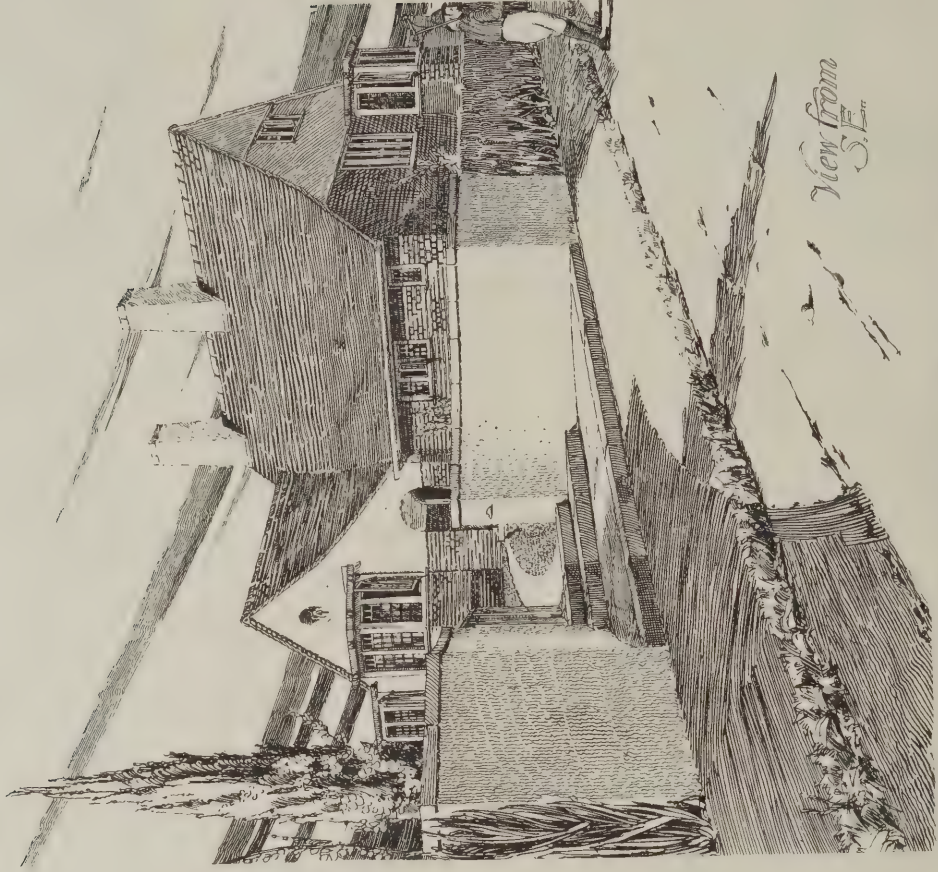
May	31	CHAPEL AND SCHOOLROOM AT MANSELTON, SWANSEA. Particulars from Mr. T. Roberts, 71, Brynhyfryd, Swansea.
June	26	NURSING AND CONVALESCENT HOME AT GLOSSOP, to cost £6,000. Premiums of £20 and £10. Particulars from Mr. T. W. Ellison, town clerk, Norfolk Chambers, Glossop.
"	30	ELEMENTARY SCHOOL AT EAST WEMYSS. Particulars from Mr. A. Watson Taylor, clerk to the School Board, East Wemyss, R.S.O., Fifeshire.
July	2	SECONDARY SCHOOL FOR GIRLS AT AIGBURTH VALE, for the City of Liverpool Education Committee. Limited to architects in Lancashire and Cheshire. Particulars from the Town Clerk, Municipal Offices, Liverpool.
"	4	SCHEME OF SEWERAGE AND SEWAGE DISPOSAL WORKS AT WARBINGTON. Premiums of £100 and £50. Particulars from Mr. J. W. Loader Cooper, clerk to the U.D.C., Queen Street, Emsworth.
No date		DETACHED AND SEMI-DETACHED HOUSES AT CLIFTONVILLE, BELFAST.—Premiums £700. Particulars from R. J. McConnell & Co., 51, Royal Avenue, Belfast.



Ground Plan.



A WEEK-END COTTAGE AT TRIMMINGHAM
FOR GEORGE JEWSON ESQ. RE
H.C. IBBERTSON F.R.I.B.A. ARCHITECT.
28 MARTINS LANE E.C. CAMBRIDGE & HUNSTANTON.



The leading idea of this cottage, which was planned to meet the requirements of a simple holiday life, is a single large room supplemented by a sheltered loggia. The loggia is approached directly both from the common room and the kitchen, and is used for meals in suitable weather. There are two rooms in the roof, and the bathroom is large enough to be used as an emergency bedroom. The walls are of red brick, partly rough-cast, and the roof is covered with Bedford hand-made tiles. The cost of the cottage was £578.

THE LONDON COLISEUM.

Mr. Matcham's Defence.

AT the adjourned meeting of shareholders in the London Coliseum held at Cardiff last Thursday some statements were made by and on behalf of the architect of the building, Mr. Frank Matcham, which deserve to be recorded in answer to Mr. Stoll's (see p. 252 of our issue for last week). Mr. Edward Nicholl, in his report on behalf of the committee of inspection, said Mr. Matcham had informed them that the statement that he had exceeded his estimate by about £50,000 was very misleading and likely to give him very considerable trouble and injure his business, "and in justice to Mr. Matcham we must say we have received a letter of explanation which is being considered by us."

Mr. Matcham himself stated at the meeting that the amount given in the report, £167,000, was somewhat misleading. He was not responsible for that outlay. He could assure the shareholders that his firm had certified to the extent of £120,682 as the cost of building, including decorating, upholstering and furnishing, and from that amount must be deducted £5,675 for extra work in connection with machinery. This left the sum of £115,000 for which he was responsible. The difference between this amount and the sum stated he had no control over, and he was in no way responsible for it.

A shareholder complained that the explanation was not explicit.

Mr. Matcham: The work was taken out of my hands for a time.

Asked who were the responsible men, Mr. Matcham replied: The electrician and engineer appointed by the directors, and the directors themselves. The work connected with the stage machinery and the electric lighting was taken out of my hands, and I had no control over it. The engineer who carried out the work was appointed by Mr. Stoll.

A Shareholder: At your suggestion?

Mr. Matcham: Decidedly not. We wanted to do the work. Our firm wanted the work to pass through our hands.

Is that usual?

Mr. Matcham: Ordinarily the machinery of the stage would hardly come in our province, but we wanted the work. The only commission I have received is the amount of £2,500.

A Shareholder: Are you claiming any extra commission?

Mr. Matcham: I claim 5 per cent. on the value of the work which passed through our hands, £12,200.

A Shareholder: We have been given to understand that you have claimed on a larger amount, and that on your claim counsel's opinion has been taken.

Mr. Matcham: I do not think we have heard the result of counsel's opinion.

Mr. Carey: I feel I must rise on this question. Mr. Stoll, the managing director, wrote to Mr. Matcham, and our solicitors wrote to Mr. Matcham, calling his attention to the facts, and urging him to keep within the bounds. We consulted our solicitors in regard to the claim of Mr. Matcham, and took counsel's opinion. It was of such nature that we felt we could not proceed with the claim at all. I am sorry to in any way dispute Mr. Matcham's word, but his explanation is entirely wrong. Mr. Stoll, the managing director, told you at the last meeting that Mr. Matcham unfortunately had a serious illness, and in every possible way we, as directors, tried to keep within bounds. In regard to the mechanical stage, of course that is another matter concerning Mr. Stoll himself. It was a pet idea, directly the work of an electrician. In every possible way the directors tried to shield the company and keep down cost.

Mr. Matcham: All I can say is that the directors had the contracts laid before them for acceptance before the work was carried out.

Mr. Stoll said he had no reason to deviate from his previous statement, except in one respect. The architect's commission was included in the amount of £67,000 mentioned. He did not think Mr. Matcham's statement at all satisfactory.

A Shareholder (to Mr. Matcham): In regard to the estimate of £100,000 in the prospectus, have you made any claim for work which exceeded your estimate?

Mr. Matcham: No.

Mr. Stoll: Mr. Matcham has made a claim for the amount of work which passed through his hands and which, according to his own words, is shown at £121,000, against £85,000.

A Shareholder: There is a great discrepancy between your answers and Mr. Matcham's.

Mr. Stoll: If Mr. Matcham does not claim the amount, we will take the disputed point as settled.

Mr. Matcham: Really, we have not sent in our account yet.

Mr. Stoll: But there have been a good many letters asking for payment.

It was decided that the company should be wound up voluntarily.

Enquiries Answered.

The querist's name and address must always be given, not necessarily for publication.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Stencil Patterns.

GILLINGHAM.—ALPHA writes: "Where can I obtain a booklet of stencil patterns or of designs suitable for decorating the walls and ceilings of a large chapel?"

We do not know of any book giving just what you require. You would do best to consult the various books on design and decoration given in our "Book List No. 2."

Building Work in Egypt.

LONDON.—WORKS writes: "There is a possibility of my obtaining an appointment in Egypt as foreman or clerk of works, and I should like to ascertain the conditions under which a man works there. Am I right in supposing that the labour is mostly black, and is the method of building anything akin to the English mode? Is the climate a comfortable one? I should also like some idea of the clothes necessary, the sort of food general to the country, and also as to approximate cost of living in, say, Khartoum or Fort Sudan, and whether it is usual to provide dwellings for the staff."

Building work in Egypt is carried out in the same way as in this country. Appointments for positions under Government are made from the Government offices in Queen Anne's Chambers, Westminster. Whether or no houses are provided for the staff depends upon the importance of the appointment, junior appointments generally being accommodated in this way, and the higher appointments left unprovided. There are English contractors in Cairo and Alexandria, but we do not think there are any in the Sudan; the contractors there are Germans, Italians and other Europeans, who employ native labour, and carry out work according to their own methods. The climate varies in different parts of the country, but is generally equable, being, of course, very hot in summer. It is impossible to give any general figures as to cost of living, as everything depends on particular circumstances.

The Metre Scale.

LEITH.—METRE writes:—"I send drawing of a metre scale (not reproduced). (1) Do all the figures 1, 2, 3, &c., on one edge represent centimetres? (2) Is this scale the natural scale, i.e., full size? (3) What is the scale on the other edge marked $\frac{1}{50}$ at one end and $\frac{1}{200}$ at the other? (4) In drawing a plan to $\frac{1}{8}$ in., $\frac{1}{4}$ in., $\frac{1}{2}$ in., 1 in., $1\frac{1}{2}$ ins., or 3 ins. to the foot, what would be the corresponding metre scales?"

(1) Yes. (2) Yes. (3) $\frac{1}{50}$ and $\frac{1}{200}$ of a metre. A centimetre is $\frac{1}{100}$ of a metre. The $\frac{1}{50}$ is 2 centimetres to the metre; the $\frac{1}{200}$ is 5 millimetres to the metre. (4) The answer depends on the exact meaning of this question. The English scales do not correspond with the metre scale, and a house drawn out to an English scale cannot be transposed into the metre scale. It must be redrawn. If, however, it is desired to know the scales usually employed by French architects, the scale corresponding to our $\frac{1}{8}$ th scale would be 1 centimetre to the metre, and so on: details full size and 10 centimetres to the metre.

Building Line.

Referring to the enquiry under this head on p. 249 of our issue for last week, "Surveyor" writes: "Before your correspondent finally refuses to keep to the line suggested or ordered by the local authority he should first ascertain if there is a Private Act which they are working under. Such an Act may give them power to define a line where the building line is very irregular, with the result that they are keeping new buildings in the rear of what would be permissible if the Act of 1883 is all that is relied on. Any Private Act should be read to see what compensation is due to owners, and how such compensation is to be obtained."

Obituary.

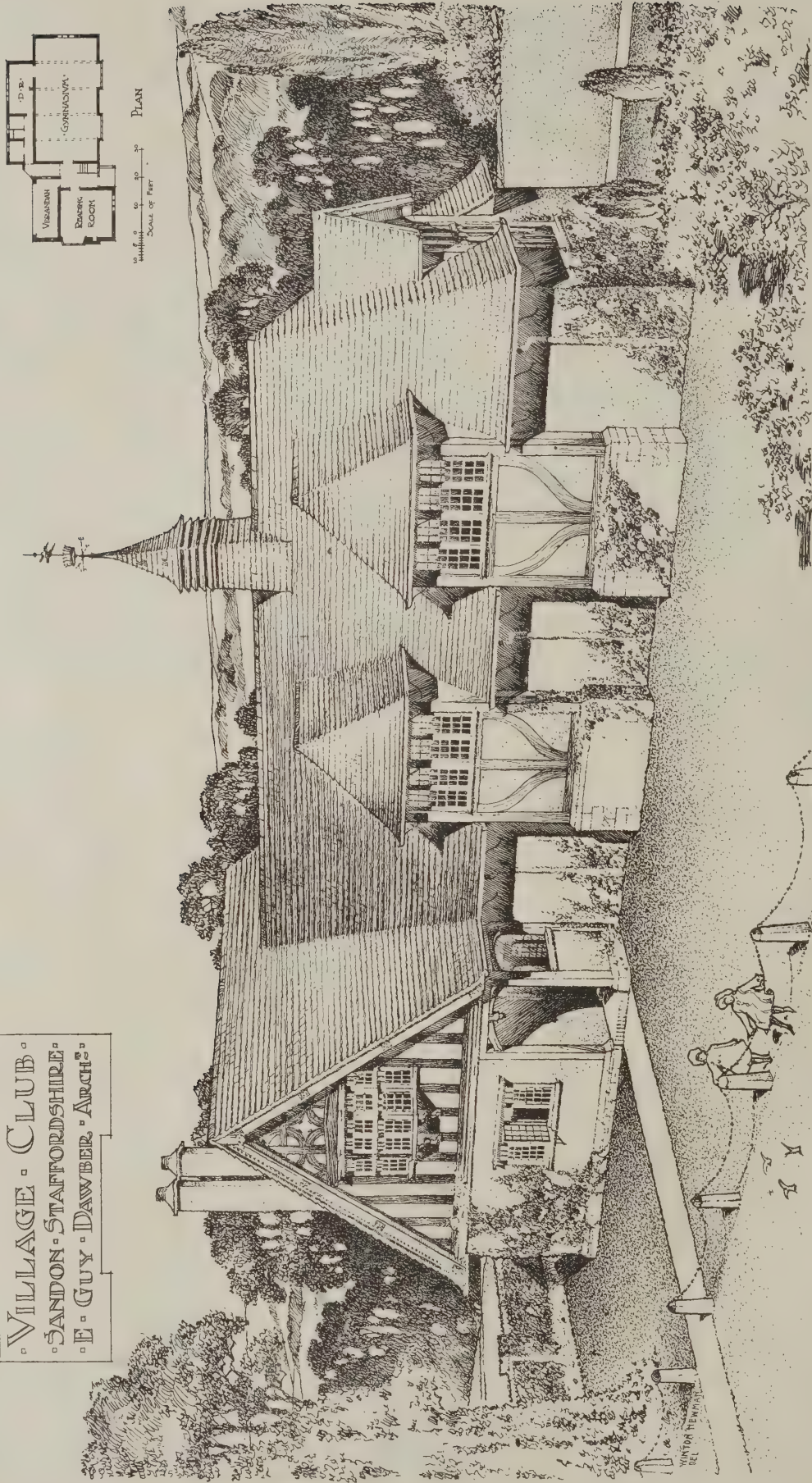
Mr. George Low, F.R.I.B.A., of London, died on May 2nd, aged 82.

Mr. Edmund Woodthorpe, F.R.I.B.A., F.S.I., surveyor for the northern district of the City of London, died on May 3rd at Hampstead, aged 47. Mr. Woodthorpe was an M.A. of Oxford.

R.I.B.A. Fellowship.—A special general meeting of the Institute is to be held on Monday next, May 21st, to receive the report and recommendations of the Fellowship Procedure Committee. The chairman will move that the regulation under by-law 9 be amended so as to read as follows: "The voting papers, which shall be in the form of the voting papers issued for the election of the Council, shall state the name and address of every candidate, with the names of his respective proposers, the year in which he was articulated, and, in the case of a candidate for Fellowship, the year in which he became engaged as a principal in the practice of architecture."

R.I.B.A. Examinations.—The Royal Institute of British Architects have decided to grant exemption from their intermediate examination to students who have satisfactorily passed through the four years' course of the Architectural Association schools; also to accept the school or leaving certificate of the Oxford and Cambridge Schools Examination Board in lieu of the preliminary examination, provided that the certificate includes all the subjects of the latter examination; also to empower representative South African societies to grant exemption from the preliminary examination on presenting certain certificates, to be approved; and also to hold the intermediate examination in South Africa.

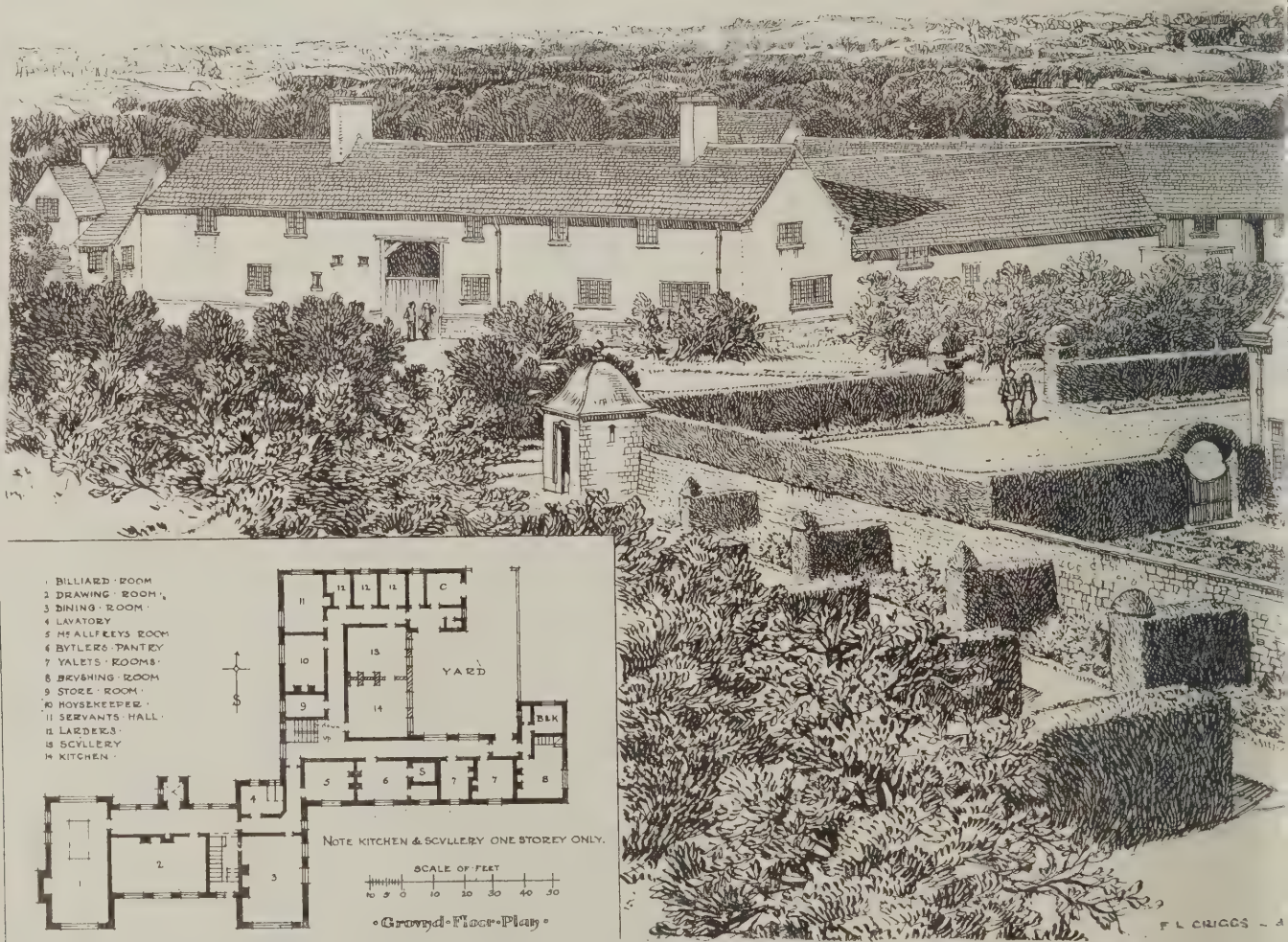
VILLAGE CLUB
SANDON STAFFORDSHIRE
E. GUY DAWBER ARCHT.



(Royal Academy Exhibition, 1903.
(For particulars see page 266.)

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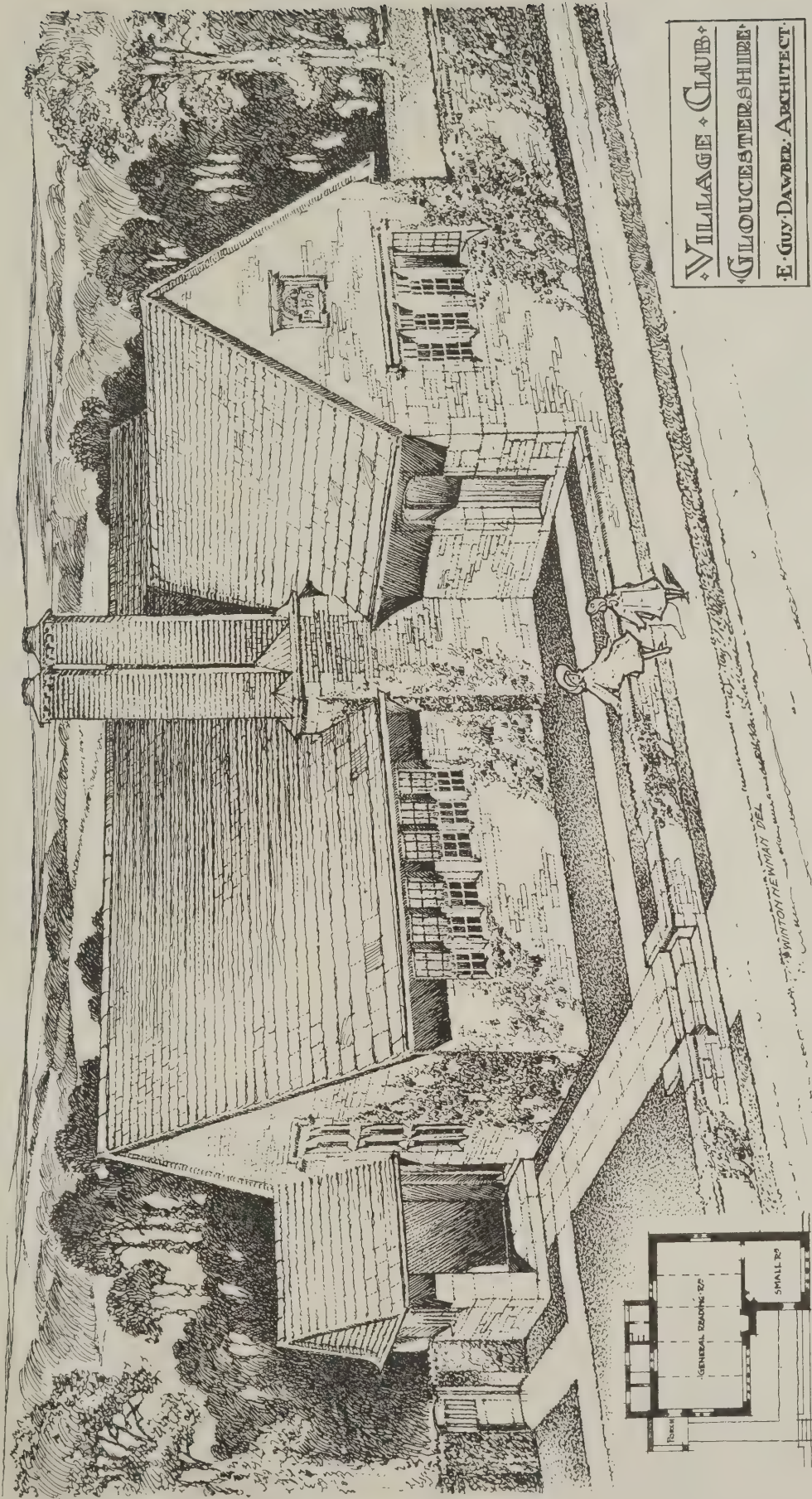
Supplement to
THE BUILDERS' JOURNAL AND ARCHITECTURAL RECORD.
Wednesday, May 16th, 1906.





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(For particulars see next page.)

VILLAGE CLUBS.

THE village club at Aston-sub-Edge, Gloucestershire, illustrated on the preceding page, is built of local stone, with brick chimneys, and covered with a stone slate roof. It contains a general reading-room and a small room. The building was erected for the estate under the superintendence of Mr. T. W. Knowles.

The club at Sandon, Staffs, is rough-cast, with a tiled roof. The whole of the wood used in its construction is of oak from the estate. The building contains a large gymnasium with dressing-rooms, and a reading-room, and on the first floor a billiard-room. It was carried out under the superintendence of the estate clerk of works, Mr. East. The architect of both clubs is Mr. E. Guy Dawber, F.R.I.B.A., of London.

Notes and News.

Newcastle Clerks of Works and Builders' Foremen's Association.—At the recent annual meeting Mr. T. Pigg was elected president and Mr. Bennison vice-president.

A New County Court for Westminster is to be built by the Treasury on the site of the old premises in St. Martin's Lane. Work will be commenced next August.

Mr. P. H. Thoms, president of the Dundee Institute of Architects, has been specially elected a Fellow of the R.I.B.A., under the proviso to by-law 9.

A new Building Estate is being developed at Beech Hill Park, near Barnet, and a number of eligible plots are to be offered for sale on June 12th by Messrs. Debenham, Tewson & Co. (See p. xix of this issue.)

Contract for Liverpool Cathedral.—The contract for the erection of the superstructure of Liverpool Cathedral has been let to Messrs. Morrison & Sons, builders, of Wavertree, Liverpool, who have carried out the foundation work. Only the chapter house, the Lady chapel and the choir and transept will be proceeded with at present. It is anticipated that the Lady chapel and chapter-house will be ready in about five years, but the choir will take a much longer time.

International Congress of Architects.—It would greatly facilitate the arrangements now being made by the Executive Committee if members of the Institute who intend to take part in this Congress, which is to be held in London during July, would signify their intention of doing so as early as possible. Subscriptions, £1 (subscribing member), £4 (donor) and 10s. (lady), should be made payable to "The Secretary, Seventh International Congress of Architects," 9, Conduit Street, W.

Swedish Timber: Government Bill to Limit Purchases of Forest Land.—A Bill has just been passed by the Swedish Government limiting the rights of large timber companies to purchase extensive tracts of land in the forest districts of Northern Sweden. Under the old conditions the timber was felled on a very large scale more with a view to immediate profits than to the proper working of the forest lands, and the extension of agriculture in those districts was thus materially hampered.

Messrs. Mellowes & Co., Ltd., of Corporation Street, Sheffield, have secured the order for glazing on their patent "Eclipse" imperishable system the roofs of Messrs. Vickers, Sons & Maxim's works at Sheffield; Messrs. Cammell, Laird & Co.'s at Sheffield; Messrs. Ransomes & Rapier's at Ipswich; the Sherwood Colliery Co.'s premises at Mansfield; the Birmingham Railway Carriage and Wagon Co.'s works at Smethwick; and the Buchanan Street Station of the Caledonian Railway at Glasgow: also warehouses in Brazil.

Mr. H. P. Monckton, F.R.I.B.A., has been elected a member of the City Corporation.

Surveyors' Institution, Junior Meetings.—At the junior meeting held at the Surveyors' Institution on May 7th a paper on "The Fiscal Burdens on the Land and Taxation of Site Values" was read by Mr. Cyril H. Donne. The members of the Law Students' Debating Society were invited to attend. The paper was followed by a keen discussion. At the conclusion of the meeting a special vote of thanks and of appreciation of his services was accorded to Mr. Sydney A. Smith, the retiring hon. secretary. At the annual general meeting, held prior to the ordinary meeting, Mr. C. H. Dinwiddy was appointed to succeed Mr. Smith as hon. secretary. The dinner will be held on May 16th.

Birmingham City Surveyorship: Selection.—Out of fifty-three applicants for the post of city surveyor at Birmingham Mr. Henry E. Stilgoe, borough engineer and surveyor to the Dover Town Council, has been selected by the Public Works Committee, who recommend the City Council to appoint him to the position at a salary of £1,250 per annum. Mr. Stilgoe is thirty-nine years of age, and he has held his present appointment at Dover for upwards of eleven years. He is a member of the Institution of Civil Engineers, a vice-president of the British Association of Waterworks Engineers, a member of the Incorporated Association of Municipal and County Engineers, and a member of the Royal Sanitary Institute.

Views and Reviews.

The Weathering of Stones.

The title of this book may seem somewhat unpromising to the student of building construction, but it contains a vast quantity of most valuable information. It is, of course, an American book, but the information which is given respecting the formation and effect of weather upon stones both here and in other countries is most useful. The advice has often been given that before deciding upon the use of any particular bed or quarry the effect of the weather upon its exposed surface should be noted. This book shows how we may elicit information from such natural weather surfaces. Of course it does not follow that the stone which weathers well in the open country will weather well in towns, but there is no doubt much to be gained from an examination of the weathered surfaces of rocks. The geology, too, which architects ought to study both in its relation to the formation of stones and the nature of soils, is so largely dependent upon the disintegrating action of natural forces that this book deals with a branch of study which is of the utmost importance to an adequate grasp of the subject. Crystallography and chemistry are the other branches which are embodied in the study of geology, but this book, although it refers extensively to these branches, is only concerned with them as they affect the decay and weathering of the rocks, and not so much with their formation.

"Rocks, Rock-Weathering and Soils," by George P. Merrill. London: Macmillan & Co., Ltd., price 17s. nett.

Painting.

This little volume is one of the useful series of technical-instruction manuals which Messrs. Cassell publish. The bulk of the matter contained in it was contributed by Mr. William Fourniss, late examiner of painters' and decorators' work to the City and Guilds of London Institute. The book is quite simple in character, and deals with the subject in an easy way, understandable by the veriest tyro. The tools are dealt with and the materials, followed by painting by machinery and useful chapters on preparing surfaces for painting, painting woodwork, ironwork, stucco or plaster, dis-

tempering and whitewashing, colour combination, house-painting, varnish and varnishing, stains and staining, and the estimating and measuring of painters' work. We wonder why all books on painting are so inaccurate in their treatment of colour combination. The question is a scientific one, which must be somewhat difficult for the ordinary person to understand, but it cannot be accurately explained without scientific treatment, and this book is only another addition to the many which inadequately deal with this branch of the subject. Apart from this, however, the book is an excellent one.

"Practical Painters' Work," edited by Paul N. Hasluck. London: Cassell & Co., Ltd., price 2s.

NEW LONDON BUILDINGS.

AT yesterday's meeting of the London County Council the Building Act Committee reported the following applications under the London Building Act, 1894, their recommendations as to consent or refusal being appended in *italics*:—

Five gate piers at the entrances to the South Eastern Hospital, on the western side of Avenley Road, New Cross Road, Deptford, on the application of T. W. Aldwinckle & Son, on behalf of the Metropolitan Asylums Board. (*Consent*.)

Bay windows in front of Nos. 13, 15, 17 and 19, Glen-shiel Road, Eltham, on the application of J. J. Bassett, on behalf of A. Cameron Corbett. (*Consent*.)

Retention of porches in front of Nos. 13, 14, 15, 16, 17 and 18, Kuskin Walk, Herne Hill, on the application of R. E. Mayo. (*Consent*.)

Retention of an iron and glass porch in front of No. 40, York Road, Lambeth, on the application of Ohlson & Sons, on behalf of Mr. Hitchcock. (*Consent*.)

Re-erection of Lansdowne Hall, Canterbury Grove, West Norwood, on the application of W. G. Scott, on behalf of Rev. Fuller Gooch. (*Consent*.)

Re-erection of buildings on the south-western side of Garratt Lane, Wandsworth, with flank walls abutting on the north-western and south-eastern sides of Kostella Road, on the application of W. Bartholomew, on behalf of P. C. Newman and C. Newman, junr. (*Consent*.)

Buildings on the northern side of Pentonville Road, to abut also upon Winchester Street, on the application of C. E. Pettit, on behalf of T. Lilley and Lilley & Skinner, Ltd. (*Refusal*.)

Projecting one-storey shops in front of Nos. 5 and 7, Flaxman Road, Loughborough Junction, on the application of Binns Brothers. (*Refusal*.)

Adaptation for carriage traffic of Jerome Place, Hillingdon Street, Walworth, and the erection of buildings at less than the prescribed distance from the centre of the roadway of Jerome Place, on the application of Gledhill Brothers. (*Consent*.)

Modification of the provisions of that section with regard to open spaces about buildings, so far as relates to the proposed erection of a block of dwellings on the western side of Rupert Street, Whitechapel, with an irregular open space at the rear, on the application of R. W. Hobden, on behalf of Hickman, Ltd. (*Consent*.)

Projecting one-storey shop in front of No. 210, South Lambeth Road, Kennington, on the application of F. E. Williams, on behalf of J. Hill. (*Refusal*.)

Extension of the period within which the erection of warehouse buildings on the north side of Great Arthur Street and south side of Bayer Street, Golden Lane, was required to be completed, on the application of Joseph & Smithem. (*Consent*.)

Deviation from the plans approved on March 20th 1906, for the construction of an iron gangway to connect Hay's Wharf and Wilson's Wharf over the public right-of-way leading from Battle Bridge Lane to Battle Bridge Stairs, Rotherhithe, so far as relates to an alteration in the position of the gangway, on the application of the proprietors of Hay's Wharf. (*Consent*.)

Extension of the time within which the roadway of a proposed street for carriage traffic to lead from Francis Street to Coburg Row, Westminster, was to have been clearly defined throughout by posts and rails, or so otherwise as the Council should permit, and thrown open to the public as a highway, on the application of R. B. Grantham & Son. (*Consent*.)

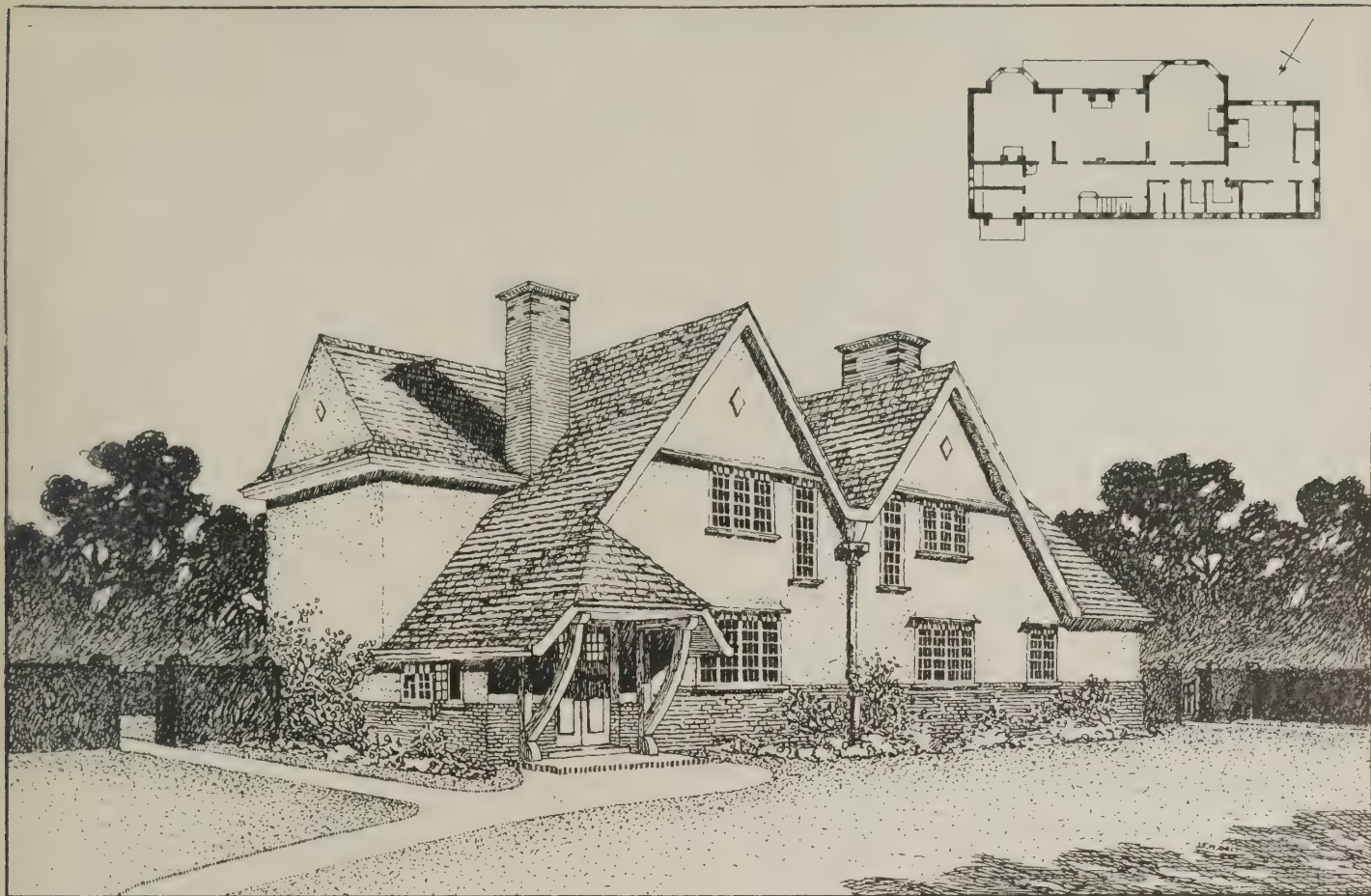
Extension of time within which the roadway of a proposed street for carriage traffic to lead from Wimbledon Park Road to Granville Road, on the Wimbledon Park Estate, Wandsworth, was to have been clearly defined throughout by posts and rails, or so otherwise as the Council should permit, and thrown open to the public as a highway, on the application of Glasier & Sons. (*Consent*.)

Bay window on the space at the rear of block "P" of the Peabody dwellings, Peabody Square, Blackfriars Road and Webber Street, Southwark, on the application of R. Robertson, on behalf of the Housing of the Working Classes Committee of the Council. (*Consent*.)

The Theatres and Music Halls Committee also reported the following:—

Drawing submitted by F. Matcham & Co., showing a new engine-room proposed to be erected at the Holborn Empire, Holborn. (*Consent*.)

Drawings submitted by F. H. Payne showing the proposed arrangements at Olympia, Addison Road, Kensington, during the exhibition of the Society of Motor Manufacturers and Traders, Ltd., to be held in November, 1906. (*Consent*.)



HOUSE AT CHRISTCHURCH PARK, SUTTON, SURREY. H. D. SEARLES WOOD, F.R.I.B.A., ARCHITECT.

This house was designed to give as many of the rooms as possible the benefit of a south aspect. The materials are red bricks, rough-cast, and Reading tiles.

THE LATE MR. GARNER.

An Appreciation.

THE sad and unexpected death of Mr. Thomas Garner, which took place on the last day of April at his beautiful old house—Fritwell Manor—in Oxfordshire, has brought to a close the career of a distinguished architect whose unfailing industry, conspicuous talent and single-minded devotion to his art merit something more than a passing notice.

Born in 1839 at Wasperton Hill, in Warwickshire, and reared amidst the old-fashioned and simple surroundings of a remote rural district, Thomas Garner imbibed the natural hearty country instincts which became a part of his nature, and were never blunted or diminished during many years of residence in London, and before the long-hoped-for return to the country was realized by his establishment in the fine Jacobean Manor House at Fritwell. To his country education he owed the love of riding and the excellent horsemanship which he retained to the last.

Mr. Garner was articled to Sir Gilbert Scott at the early age of seventeen, and served, with the energy and enthusiasm that never left him, as one of the many pupils of that architect. Amongst his contemporaries in Sir Gilbert's office, many have risen to distinction; we may instance Mr. T. G. Jackson, R.A., Mr. Micklethwaite (architect in charge of Westminster Abbey), and Mr. Somers Clarke, who has the care of St. Paul's Cathedral. Mr. G. F. Bodley, R.A., whose partner he was destined to become, just preceded him at Scott's office, but a warm friendship was soon established between the senior and junior. On the

completion of his articles Mr. Garner returned to Warwickshire, and was responsible in his first few years of practice for various works on his own account, or as representative of Sir Gilbert Scott. Mr. Garner returned to London about the year 1868 to assist his friend Mr. Bodley, who was rapidly coming into note, and who found himself somewhat over-burdened with work. The assistance soon grew into the partnership, which was to last for more than twenty-five years, and which ceased by the friendly dissolution of a friendly bond about the year 1897. For a time the collaboration of the partners was actual and close, but as work increased upon their hands it became their habit to individualize, each partner assuming the entire and separate responsibilities for definite work. The earlier period of close collaboration produced some remarkably successful results, none perhaps more notable than the fine churches of the Holy Angels at Hoar Cross, Staffordshire, and of St. Augustine at Pendlebury, near Manchester. The succeeding period of dual practice under partnership allotted most of the civil or domestic work entrusted to the firm to the almost undivided initiation and control of the junior partner, while his senior devoted himself more especially to ecclesiastical work, and to decoration. Mr. Garner was almost entirely responsible for the design and supervision of much of the firm's work at Oxford, such as St. Swithin's quadrangle at Magdalen, and the tower at Christ Church; and entirely so for the president's lodgings at Magdalen. He designed, while his partner was busy with other work, Hewell Grange, Lord Windsor's Worcestershire mansion, with all its elaborate and costly details; the well-known reredos in St. Paul's Cathedral; and several sepulchral monuments, such as those of the Bishops of

Ely, Lincoln and Chichester, and that of Canon Liddon.

Of his work subsequent to the dissolution of partnership it is sufficient to mention his rehabilitation of Yarnton Manor, Oxon., and of the Slipper Chapel at Houghton-le-Dale; Moreton House, Hampstead; the Empire Hotel at Buxton; and the crowning work of his arduous life, the beautiful chancel of Downside Abbey, near Bath, beneath whose roof his body now reposes.

Mr. Garner was of a shy and modest disposition, and less known to his contemporaries than his most unusual abilities, scholarship and attainments would have allowed a less retiring character to remain.

As an instance, however, of contemporary estimation we may state, upon the best possible authority, that when Mr. Bentley, stricken by the fatal paralytic stroke, was asked by Cardinal Vaughan what architect he would choose to carry on his work in Westminster Cathedral, he answered: "Garner, for he is a man of genius."

Mr. Garner was an admirable and rapid draughtsman, and an untiring student; he will long be remembered by his friends for his warm heart, his ardent enthusiasm, his minute and scholarly knowledge, and his unceasing energy. His long-projected book on old English manor-houses was completed for publication at the time of his death, and the first part will, we believe, be issued by Mr. B. T. Batsford in a few months.

Cement for San Francisco.—Bookings for Essex-made cement for San Francisco are so heavy that manufacturers cannot guarantee delivery of fresh orders until the end of July. The difficulty is accentuated by the fact that cement for shipment must be in casks, which the coopers cannot produce fast enough to meet the demand.

Complete List of Contracts Open.

With a few exceptions, news of Contracts Open are not repeated after they have been published once in these columns, so that readers will find particulars in our previous issues of other contracts that still remain open.

Unless expressly stated to the contrary all deposits required for bills of quantities, &c., are returned on receipt of bona-fide tenders.

The words "Fair Wages Clause" inserted in certain paragraphs signify that persons tendering must conform to a fair-wages clause in the contract, which requires them to pay the rates of wages current in the district.

BUILDING.

May 17. Caerleon.—*Extensions and alterations* to Williams' Endowed Schools, Caerleon. Tenders to be endorsed "Alterations of Schools," and delivered to L. L. Morris, Arlington Chambers, Newport, Mon., not later than 2 p.m. on May 17. Drawings and specifications may be inspected at the offices of the architects, Lansdowne & Griggs, Metropolitan Bank Chambers, Newport, Mon., and bills of quantities may be obtained there upon deposit of £1 rs.

May 18. Gwaelodygarth.—*Building a villa* at Gwaelodygarth. Plans and specification can be seen at the office of Arthur Marks, architect, Merthyr, and bills of quantities obtained on deposit of £1 rs. Sealed and endorsed tenders to be delivered not later than noon on May 18.

May 18. Runhall.—*Erection of the Primitive Methodist Chapel, Runhall.* Plan and specification can be seen at the office of A. F. Scott, 24, Castle Meadow, Norwich. Tenders to be addressed to Rev. J. H. Rose, 3, Park Road, East Dereham, endorsed "Tender for Runhall Chapel," and sent in not later than 4 p.m. on May 18.

May 18. Forres.—*Alterations and additions.* For the mason, carpenter, plumber, plasterer, slater and painter and glazier works of additions to and alterations on farm buildings at Newton of Dalvey, Forres. Plans and specifications may be seen with P. Fulton, architect, Forres. Tenders are to be lodged with John Leask, solicitor, Forres, on or before May 18.

May 18. North Tillymauld.—*Mason, carpenter and slater works* to be executed in making alterations on the farm offices at North Tillymauld. Also estimates for the mason and carpenter works to be executed in making alterations on the offices at Tillymauld Croft. Plans, specifications and general conditions for both works can be seen with the tenants or with Davidson & Garden, 12, Dee Street, Aberdeen, with whom offers are to be lodged on or before May 18.

May 18. Skene.—*Mason, carpenter and slater works* to be executed in making repairs on the stable and barn on Peter Mackie's Croft, Westhill, Skene. Plans, specifications and general conditions can be seen with the tenant or with Davidson & Garden, 12, Dee Street, Aberdeen, with whom offers are to be lodged on or before May 18.

May 19. Leicester.—*Builders' work* in the construction of engine-beds, cooling-room, insulation, &c., connected with the proposed duplicate refrigerating plant at the Wholesale Market. Specification, quantities and all particulars may be obtained at the office of the Borough Engineer on payment to the Borough Treasurer of the sum of £1. Sealed tenders, on the forms supplied, addressed to the Chairman of the Markets Committee, Town Hall, Leicester, are to be delivered not later than May 19, endorsed "Tender for Engine-beds, Wholesale Market."

May 19. Elgin.—*Works* for the Town Council as follows:—For distemping, &c., at Town Hall; for repairing and pointing dyke at Ladyhill; for laying concrete pavements; for erecting bowl-house in Cooper Park; for taking down and re-erecting walls in Greyfriars Street; for painting Bishopmill Bridge. Specifications and schedules may be seen at the office of the Borough Surveyor. All tenders must be lodged with the Town Clerk on or before May 19.

May 19. Thornley.—*Erection of forty workmen's dwelling-houses* at Wheatley Hill Colliery, for the Wear-dale Street Coal and Coke Co., Ltd. Plans and specifications can be seen at Thornley Colliery Office up to May 17. Tenders to be delivered and addressed to the Company, Thornley Colliery Office, Thornley, R.S.O., by May 19.

May 19. Glyn-Neath.—*Erection of thirty-two cottages* at Glyn-Neath, for the Abernath-Glyn-Neath Building Co., Ltd. Plans and specification may be seen at the offices of J. Cook Rees, architect, Neath. Sealed tenders to be sent to Thomas Williams, secy., 30, High Street, Glyn Neath, endorsed "Tender for Cottages," on or before May 19.

May 20. Crewe.—*Erection of schools* off Earle Street, providing accommodation for 1,525 children. Persons desirous of tendering for the whole of the different trades are requested to send in their application, together with a deposit of £2 2s., to H. D. Struthers, director of Education, Municipal Buildings, Crewe, on or before May 20. Quantities, together with other necessary information, will be supplied in due course by the Architect to those tendering.

May 20. Killinchy.—*Erection of a manse* for the R.P. church, Ballymccashon, Killinchy. Plans and specifications may be had at the office of J. Scott, B.E., engineer and architect, Ocean Buildings, Belfast, to whom sealed tenders are to be delivered not later than May 20.

May 21. Dourton.—*New school* for 100 scholars for the managers of Dourton School, Shrivernham, near Swindon. Applications for bills of quantities to be made to Hicks & Lynam, surveyors, 12, John Street, Adelphi, London, W.C., who will supply copies on payment of £2 2s., before May 21.

May 21. Weymouth.—*Erecting a pair of houses* at Charlestown, near Weymouth, for Messrs. Courage. Plans and specifications may be seen at the office of S. Jackson, M.S.A., architect and surveyor, Bridge Cham-

bers, Weymouth, to whom tenders must be sent not later than 4 p.m. on May 21.

May 21. Nottingham.—*Alterations* in the rock cellars under the Castle Rock, for the Corporation. Plans may be seen and copies of the specification, bills of quantities, and forms of tender obtained from F. B. Lewis, city architect, Guildhall, on payment of £1 rs. Sealed tenders, properly endorsed, to be addressed to and delivered at the office of S. G. Johnson, town clerk, Guildhall, Nottingham, not later than 10 a.m. on May 21. Fair wages clause.

May 21. Hinckley.—*Erection of science buildings* at the Grammar School, Hinckley, for the governors of the school. Conditions of contract, quantities and form of tender may be obtained, and plans inspected upon application to the architects, Barrowcliff & Alcock, Town Hall Chambers, Loughborough, on payment of a sum of £1 rs. Sealed tenders upon the forms supplied, to be endorsed "Grammar School Extension," and delivered at the office of S. & H. Pilgrim, solicitors to the Governors, Hinckley, not later than 11 a.m. on May 21.

May 21. Byfleet.—*Erection of a house and premises* in Church Road, Byfleet, Surrey, for Arthur Sharp. The plans, elevations, sections, details and specifications can be seen at the office of D. G. Andrew, architect, Bridge Road, East Molesey. Tenders to be sent by post or delivered by 8 p.m. on May 21, marked "Tender for House." The tenders will then be opened in the presence of those tendering.

May 22. Newbigging.—*Mason, carpenter and slater works* of (1) steading, Heatherbraes, Auchterless; (2) alterations on house and offices, Newbigging, Gordons-town. Plans and specifications may be seen with the respective tenants and with James Duncan & Son, architects, Turriff, and the sites and alterations will be shown to intending contractors on May 17, at Newbigging, at 10 a.m. and at Heatherbraes at 11 a.m. Sealed tenders to be lodged with C. & P. H. Chalmers, advocates, Aberdeen, or the architects, on or before May 22.

May 22. Launcells.—*New chapel and vestry and other offices.* Persons desirous of tendering may see the plans and specifications at Mr. Lisle's, Grimscoot, near Launcells. Sealed and endorsed tenders to be sent to the Rev. F. Baines, The Manse, Holsworthy, on or before May 22.

May 22. Aintree.—*Erection of buildings* for electric sub-station and battery station at Aintree, for the Lancashire and Yorkshire Railway. Plans can be seen and form of tender, quantities and specification obtained on application at the Engineer's Office, Hunt's Bank, Manchester. Tenders, endorsed "Tender for Electric Sub-station, &c., at Aintree," to be in the hands of R. C. Irwin, secretary, Hunt's Bank, Manchester, not later than 10 a.m. on May 22.

May 22. Maldon.—*Underpinning and various other works* to Mundon School. Plan and specification can be seen at the office of the Clerk between 10 and 4 any working day except Saturday. Sealed tenders, endorsed "Repairs, Mundon School," to be delivered to F. H. Bright, clerk to the Maldon Advisory Sub-Committee, Maldon, Essex, not later than May 22.

May 22. Hull.—*Rebuilding* of horse stables, Waverley Street, for the North-Eastern Railway. Plans and specification may be seen and quantities and further information obtained upon application to William Bell, the Company's architect at York. Duplicate plans may also be seen upon application to the Clerk of Works' Office, Paragon Station, Hull. Quantities supplied on personal application to parties tendering for the whole of the works. Sealed tenders, marked "Stables, Waverley Street, Hull," to be sent to the Secretary at York not later than noon on May 22.

May 22. Newcastle.—*Converting old premises* at New Bridge Street into offices and stores for the North Eastern Railway. Plans and specification may be seen and further information obtained upon application to William Bell, the Company's architect, Central Station, Newcastle-on-Tyne. Contractors will be required to take their own quantities. Sealed tenders, marked "Offices, New Bridge Street, Newcastle," to be sent to the Secretary at York not later than noon on May 22.

May 22. Glasgow.—*Erection of a sub-station* at Springburn, for the Electricity Department. Tenders for brick and mason work, painter-work, wright-work, slater-work, plumber-work, plasterwork and iron and steel work. The plans may be seen and copies of the specifications and forms of tender obtained on application to W. W. Lackie, electrical engineer, 75, Waterloo Street, Glasgow, on making a deposit of £2 for each schedule. Sealed tenders, marked "Electricity Department, Springburn Sub-Station, Tender for — Work," must be lodged with "The Town Clerk, City Chambers, Glasgow," on or before 10 a.m. on May 22.

May 23. Aberaman.—*Building twenty-one houses* at Aberaman, for the Treaman Building Club. Plans and specification can be seen at the office of T. Roderick, architect, 23, Clifton Street, Aberdare. Endorsed tenders to be sent to F. Preece, secy., Aberaman Gardens Aberaman, not later than May 23.

May 23. Greenock.—*Supply and erection* at Inchgreen gasworks of a washer-scrubber and tar extractor, having a capacity of 3,000,000 cub. ft. for twenty-four hours; exhaustor, brickwork for bench of sixty-four retorts, with ironwork for same, and causewaying of coke yard. Specifications and plans can be seen and tender

forms had by applying to William Ewing, engineer and manager, Inchgreen Gasworks. Sealed tenders, endorsed "Tender for Washer Scrubber and Tar Extractor," &c., to be returned not later than May 23.

May 23. Carlisle.—*New Wesleyan Church* in Lowther Street. Firms desirous of tendering for the various trades required in the erection of the above, are requested to send in their names to the offices of Johnstone Brothers, architects and surveyors, 39, Lowther Street, Carlisle, before May 23, together with a deposit of 10s. 6d.

May 23. Dorchester.—*Repairs and alterations* at the Dorchester County Hospital. Specifications, prepared by Walter J. Fletcher, A.M.I.C.E., may be seen at the boardroom of the hospital. Tenders must be sent, marked outside "Tender for Repairs," to Walter E. Groves, clerk, not later than May 24.

May 24. Monquhitter.—*Mason, carpenter and slater works* of Steading, Maryland, Tillymauld, Monquhitter. Plans and specifications may be seen with the tenant and with James Duncan & Son, architects, Turriff, and attendance will be given at Maryland on May 22 at 3 p.m., to show the site to intending contractors. Sealed tenders to be lodged with the Architects on or before 10 a.m. on May 24.

May 24. Maldon.—*Erection of a new secondary school and pupil teachers' centre* for the Education Committee. Builders desirous of submitting tenders are requested to forward their names to the architect, P. M. Beaumont, High Street, Maldon, on or before May 24.

May 25. London, S.E.—*Erection of additional class-rooms and science rooms, cloak-rooms lavatories, gymnasium, and alterations and additions* at the Roan Girls' School, Devonshire Road, Greenwich, S.E., for the Governors. Drawings and specifications may be seen at the offices of the architect, Alfred Roberts, F.R.I.B.A., 92, London Street, Greenwich, S.E., from whom bills of quantities may be obtained on payment of a deposit of £5. Sealed tenders, on the form and in the envelope supplied, must be delivered at or before 9 a.m. on May 25 at the architect's office.

May 25. London, N.—*Erection of a new sorting office* at Palmer's Green, N. Drawings, specification and a copy of the conditions and form of contract may be seen on application to J. Wager, H.M. Office of Works, Westminster, S.W. Bills of quantities and forms of tender may be obtained at the Office of Works on payment of £1 rs. Tenders must be delivered before noon on May 25, addressed to the Secretary, H.M. Office of Works, &c., Storey's Gate, London, S.W., and endorsed "Tender for Palmer's Green Sorting Office."

May 25. West Hartlepool.—*Infirmiry extension, and new laundry* to be erected within the union grounds, for the Guardians. Quantities can be obtained on deposit of £1 rs. for each set, and plans and specifications seen at the office of J. J. Wilson, architect, Tower Street, West Hartlepool. Tenders, properly endorsed and sealed, to be sent to G. Kilvington, clerk, Guardians' Offices, Hart Street, West Hartlepool, not later than noon on May 25.

May 25. Barrow-in-Furness.—*Erection of fourteen houses* in Thwaite Street and Brewery Street, for the Barrow Co-operative Society, Ltd. Bills of quantities may be obtained at the office of the architect, Henry T. Fowler, A.R.I.B.A., 6, Cornwallis Street, Barrow. Tenders to be forwarded to James Clarkson, Barrow Co-operative Society, Ltd., Abbey Road, not later than noon on May 25. Fair wages clause.

May 26. Greete.—*Erection of a combined parish room and cottage* at Greete, near Tenbury, for Col. Hope Edwards. For particulars apply in writing to W. W. Robinson, architect, Hereford. Sealed tenders, marked "Tender for Greete Parish Room," to be sent to W. S. Davies, solicitor, Tenbury, not later than May 26.

May 23. Rhydney.—*Works* for the U.D.C.:—Retaining wall, about 100 cub. yds.; barbed wire fencing, about 2,200 yds.; post and tube fencing, 1½ in. and rin., about 320 yds. Plans and specifications may be seen at the office of the Council, No. 61, High Street, Rhydney, between 9 and 10 and 4 and 5 any days except Thursday and Saturday, 9 and 10 only. Tenders to be sent to L. Reynolds, solicitor, Milbourne Chambers, Merthyr Tydfil, sealed and endorsed, "Fencing, &c.," not later than noon on May 28.

May 23. Bolsover.—*Proposed Council school, Bolsover*, to accommodate about 640 children. Persons desirous of tendering for the work may see the drawings, specification, agreement, &c., at the office of the Architect to the Committee, St. Mary's Gate, Derby, between 10 and 4, except on Saturday, when they will be on view from 10 to 12. A copy of the bill of quantities, specification, conditions of contract and form of tender can be obtained at the Architect's Office upon payment of £1 rs. Sealed tenders in envelopes provided for the purpose, and endorsed "Tender for New Council School, Old Bolsover," must be delivered to George H. Widdows, A.R.I.B.A., architect to the Committee, County Education Offices, St. Mary's Gate, Derby, not later than 5 p.m. on May 28.

May 23. Pemberton.—*Erection of the Carnegie library*, Pemberton, for the borough of Wigan. Quantities may be obtained, and plans, &c., inspected on application to J. B. & W. Thornley, architects, College Chambers, Wigan. Tenders, endorsed "Carnegie Library," to be delivered to Harold Jevons, town clerk, not later than May 28.

May 29. London, E.—*Erecting a school on the Janet Street site, Westferry Road, Poplar, E., for sixty mentally defective children, for the London County Council.* Persons desiring to submit tenders may inspect the drawings and specification and obtain the bills of quantities, form of tender and other particulars at the Education Offices (Architect's Department), Victoria Embankment, W.C., upon payment to the cashier of a sum of £3. Tenders must be upon the official forms, and the printed instructions contained therein must be strictly complied with. Fair wages clause. Tender must be enclosed in an envelope (which will be provided), and delivered at the Education Offices (Room 148), Victoria Embankment, W.C., not later than 11 a.m. on May 29.

May 29. Senghenydd.—*Erection of sixty houses and road-making, &c., at Senghenydd, for the Lewis Merthyr Consolidated Collieries, Ltd.* Drawings and specifications can be seen at the office of John H. Phillips, F.R.I.B.A., Clive Chambers, Windsor Place, Cardiff, to whom sealed tenders, endorsed "Senghenydd," are to be delivered on or before May 29.

May 29. London, S.E.—*Supply of roofing complete for platforms of new station in Madras with sheltering shed and footbridge, for the South Indian Railway Co., Ltd.* Specifications and forms of tender may be obtained at the Company's offices. A charge which will not be returned, will be made of £1 for each copy of the specification. Copies of the drawings may be obtained at the office of Sir George B. Bruce, 3, Victoria Street, Westminster, on payment of 5s. per sheet. Tenders addressed to the Company marked "Tender for Roofing" must be left with Henry W. Notman managing director, 55, Gracechurch Street, E.C., not later than noon on May 29.

May 30. Abram.—*Erection of a new public elementary school at Lilly Lane, Bryn Gates Abram, near Leigh.* The plans may be seen and bills of quantities obtained at the office of the County architect, Henry Littler, 16, Ribblesdale Place, Preston, by payment of a deposit of £2. Tenders must be delivered before noon on May 30, sealed and endorsed, to W. Aspinall, Rockleigh, Ashton-in-Makerfield.

No date. Pentrechwyth.—*Rebuilding of the "Rising Sun," Pentrechwyth near Swansea, for E. Evans Bevan, Neath.* Plans and specifications may be seen and bills of quantities obtained upon application to J. Cook Rees, architect and surveyor, Church Place, Neath.

No date. Cork.—*Erection of shops and offices in King Street, in accordance with plans and specifications, to be had of Hugh W. Flanagan, B.E., B.A., architect, Yorkville, Summer Hill.*

No date. Usworth.—*Building twelve houses at Usworth Colliery.* Plans and specification may be seen by appointment, on application to Mr. Douglas, Usworth Colliery Offices, co. Durham.

No date. West Sleekburn.—*New Primitive Methodist Church at West Sleekburn, near Bedlington.* Builders are requested to send their names to Davidson & Philipson, architects, Pearl Buildings, Newcastle-on-Tyne. Bills of quantities will be supplied to such applicants only.

No date. Kendal.—*Remodelling building additions new bathroom, &c., to house No. 37, Lowther Street, Kendal, for Henry Hoggarth.* Plans can now be inspected and bills of quantities obtained on application at the office of John Hutton, M.R.S.I., architect, Kendal.

No date. Manchester.—*New buildings at the corner of Corporation Street and Ducie Bridge, for the Co-operative Insurance Society.* Builders desirous of tendering for the whole of the work required in the erection and completion of new chief offices are requested to send in their names to the architects, Bradshaw & Gass, F.R.I.B.A., 19, Silverwell Street, Bolton, together with list of three large buildings (one at least in terra-cotta) with first-class internal finishings recently executed by them. Bills of quantities will be supplied.

No date. Sleaford.—*Proposed Primitive Methodist chapel, assembly hall and schools.* Persons desirous of submitting tenders for the above are requested to send their names and addresses to Herbert Walker & Son, architects, Nottingham and Sleaford.

No date. Langley Park. *New Wesleyan school.* Contractors desirous of submitting tenders for the above are requested to forward their names and addresses to James W. Thompson, architect, 63, Grey Street, Newcastle-on-Tyne. Bills of quantities (prepared by G. Bell) will be forwarded, when ready, on receipt of a deposit of £1 is.

ENGINEERING.

May 17. Cork.—*Construction of waterworks at Knockraha, for the R.D.C., according to plan and specification which may be inspected at the Boardroom, Cork Workhouse.* Tenders to be sent to John Cotter, clerk of Council, Boardroom, Workhouse, Cork, by noon on May 17.

May 17. Weymouth.—*Wiring the premises formerly known as the "Steam Packet" Inn, the Quay, Weymouth, for the purpose of lighting these premises electrically, in accordance with specifications and conditions, which may be seen at the Electric Power Station, Sunnysbank, Weymouth.* Sealed tenders endorsed "Tenders for Wiring 'Steam Packet' Inn," to be delivered at the Municipal Offices, Clarence Buildings, by 2.30 p.m. on May 17.

May 17. Weymouth.—*Wiring Nos. 7, 8 and 9, Pulteney Buildings, for the purpose of lighting these premises electrically and also for supplying the necessary fittings in connection therewith, in accordance with specifications and conditions which may be seen at the Electric Power Station, Sunnysbank, Weymouth.* Sealed tenders, endorsed "Tenders for Wiring Nos. 7, 8 and 9, Pulteney Buildings," to be delivered at the Municipal Offices, Clarence Buildings, by 2.30 p.m. on May 17.

May 18. London, S.E.—*Repair and maintenance of artesian well and pump.* Specification and form of tender may be obtained on application to the borough

electrical engineer, W. E. J. Heenan, M.I.E.E., Spa Road, S.E. Tenders, addressed to the Town Clerk and endorsed "Well and Pump," must be delivered to F. Ryall, town clerk, Town Hall, Spa Road, S.E., not later than 4 p.m. on May 18.

May 19. Cardiff.—*Sinking a well (45ft. deep and 4ft. diameter) near the Gaer, in the parish of St. Nicholas, near Cardiff, for J. Cory.* Specification to be obtained on application to the engineer, H. T. Blake, Ross, Hereford. Sealed tenders, endorsed "St. Nicholas Well," to be forwarded to the proprietor's solicitor, F. S. Collins, Ross, Herefordshire, not later than May 19.

May 22. Carlisle.—*Putting in an apparatus for heating the hospital at Fusehill by means of a system of steam pipes and ventilating radiators, for the Guardians.* A plan of the building and copy of instructions can be obtained of George Armstrong, architect, Bank Street, Carlisle. Persons tendering are to show by diagram on the plan their proposed route of pipes and position of radiators, to prepare and submit with their tender a specification of the work proposed, and to give a guarantee for the successful working of the installation for a period of not less than three years. Hospital wards can be inspected from 2 p.m. to 4 p.m. on any weekday. Tenders, which are to be marked "Tender for Heating," to be left at 7, Victoria Place, Carlisle, before noon on May 22.

May 22. Ystradgynlais.—*Laying and jointing about 0 yds. of 6in., 5,304 yds. of 5in., 1,180 yds. of 4in., and 1,400 yds. of 3in. cast-iron pipes, and the construction of storage and collecting tanks, &c.* Plans and specifications may be seen and bills of quantities and all particulars obtained any weekday at the office of J. W. Leyshon, sanitary inspector, Ystradgynlais. Sealed tenders, on forms to be obtained, should be endorsed "Contract No. 2," and delivered at the office of L. J. Kempthorne, clerk, Dyffryn Chambers, Neath, not later than 3 p.m. on May 22.

May 23. Accrington.—*Supply of machinery in connection with Lancashire boiler plant, and high-speed generating plant at the Electricity Works.* Specifications and forms of tender can be obtained on application to the Borough Electrical Engineer, Electrical Engineer's Office, Accrington. Sealed tenders, endorsed "Generating Plant," to be addressed to Harold Gray, borough electrical engineer, Electrical Engineer's Office, Accrington, and delivered not later than noon on May 22.

May 23. Manchester.—*Strengthening of Smedley Lane bridge over the River Irk and Irwell Street bridge over the River Irwell.* Drawings may be seen and specification, bill of quantities, and form of tender obtained on application at the City Surveyor's Office, Town Hall, Manchester, on payment to the City Treasurer of £2 2s. All cheques or postal orders are to be made payable to the order of "The Corporation of Manchester." Tenders, enclosed in the official envelope and addressed to the Chairman of the Improvement, &c., Committee, to be delivered at the City Surveyor's Office not later than 10 a.m. on May 22.

May 23. Cardiff.—*Erection of a pumping station and chimneys at Penarth Road, for Western District Sewer, Contract No. 7.* Plans, specification, and conditions of contract may be seen and bills of quantities obtained at the office of W. Harpur, M.I.C.E., city engineer, Cardiff, upon payment of a deposit of £3, between 10 and 5. Tenders on the prescribed form, and accompanied by the bills of quantities under separate cover, to be sealed and endorsed "Tender for Pumping Station, Penarth Road," to be delivered at the Town Clerk's Office on or before May 23.

May 24. Coventry.—*Supply and erection of Lancashire boilers; economizer; steam and water pipes; mechanical stoker; two 600-kw. and one 300-kw. alternators; two-phase motors.* Copies of specification may be obtained from the City Electrical Engineer on receipt of £5 5s. Tenders will only be considered for a section or sections, and not for part of a section. Tenders to be addressed to the Town Clerk, Hay Lane, Coventry, and must be received by him on or before 10 a.m. on May 24, sealed and endorsed "Tender for Electricity Works."

May 24. Carlisle.—*Supply, delivery and erection of the following plant:—Contract No. 12: Traction battery. Contract No. 13: (a) Reversible Booster; (b) motor-driven balancer.* On payment of a deposit of £2 2s. Plans, specifications and forms of tender for either contract may be obtained from the City Electrical Engineer, Electric Light and Power Station, Carlisle, who will deal with any enquiries concerning same. Sealed endorsed tenders to be delivered at the office of Charles D. Burnett, city electrical engineer, Corporation Electric Light and Power Station, James Street, Carlisle, before noon on May 24.

May 25. Grangemouth.—*Construction of a covered service tank on the summit of the hill north of Millhall Reservoir, east of Polmont, and other relative work for the Town Council.* Drawings may be seen and copies of the specification and schedule obtained in the office of Warren & Stuart, 94, Hope Street, Glasgow, on payment of £1 is. Sealed offers, endorsed "Grangemouth Water Tender for Contract No. 10," to be lodged with James P. Mackenzie, town clerk, Grangemouth, not later than May 25.

May 25. West Hartlepool.—*Laundry machinery, for the Guardians.* Specification can be obtained on deposit of £1 is. from G. Kilvington, clerk, Guardians Offices, Heut Street, West Hartlepool, to whom sealed and endorsed tenders are to be sent by noon on May 25.

May 26. East Grinstead.—*Drainage.* Contract No. 1. Supplying 6in. cast-iron socket pipes (about 1,400 yds.). Contract No. 2: Laying pumping main and sewers. Contract No. 3: Building engine-house, tanks, &c. Contract No. 4: Supplying and erecting duplicate gas-engines and pumps. Plans and specifications may be seen and forms of tender and other particulars obtained from W. E. Woollam, engineer and surveyor, Council Offices, London Road, East Grinstead, during the usual office hours, on depositing a cheque or postal order value £1. Specification and particulars of Contracts Nos. 1 and 4 will be forwarded on application. Tenders, on the prescribed form only, must be sent in sealed envelopes provided for that purpose to E. P. Whitley Hughes, clerk to the Council, East Grinstead, on or before May 26.

May 28. Beckenham.—*Supply and erection of a steel footbridge (6ft. wide and 8ft. span) over the Norwood Spur Railway in Avenue Road, for the U.D.C.* Preliminary plans and sections may be seen and specifications and forms of tender obtained on application to John A. Angell, surveyor, on the production of a receipt from the collector (who attends his office daily from 9 to 10 a.m. only, except on Tuesdays, when his hours are from 9 a.m. to 1 p.m.) for a deposit of £1. Tenders, duly sealed, and endorsed "Tenders for Footbridge," to reach F. Stevens, clerk to the Council, not later than 4 p.m. on May 28.

May 29. Worthing.—*Supply and erection of gas-engine and gas-producer plant at the Electricity Generating Station, High Street.* The drawings may be seen and specification with form of tender obtained at the office of the Resident Electrical Engineer at the Generating Station. Sealed tenders, endorsed "Tender for Gas Plant," addressed to the Town Clerk, Municipal Offices, Worthing, must be delivered before noon on May 28.

May 30. London, W.—*Laying of 2in. and 3in. water mains in Harrow Road, Hammersmith, Fulham and Kensington, in the western district, for the Metropolitan Water Board.* Forms of tender, with schedule and conditions of contract, can be obtained from the Clerk by personal application or on receipt of stamped addressed envelope; and tenders, enclosed in sealed envelopes, addressed to the Clerk of the Board, and endorsed "Tender for Pipe Laying, Western District," must be delivered at the offices of the Board, Savoy Court, Strand, W.C., not later than 10 a.m. on May 30. The plans may be inspected and further particulars obtained at the office of the Engineer, Western District, Commercial Road, Pimlico, S.W., between 10 a.m. and 4 p.m., except on Saturdays.

IRON AND STEEL.

May 21. Rotherham.—*Supply of the following articles, for the Tramways Committee:—(1) Steel balls, probable quantity 105 tons; (2) fish plates, probable quantity 3 tons; (3) tie bars, probable quantity 4½ tons; (4) bolts and nuts, probable quantity 2½ tons; (5) granite setts, 5in. by 4in, probable quantity 1,100 tons; (6) two miles .325 trolley wire; (7) thirty-six bracket arms 12ft. long.* Form of tender to be obtained and specification seen for Nos. 1 to 5, upon application to the Borough Surveyor. Form of tender for Nos. 6 and 7 to be obtained upon application to the Electrical Engineer. Applications to be accompanied with a deposit fee of £1. Fair wages clause. Tenders, endorsed "Tramway Materials," to be sent to W. J. Board, town clerk, Town Hall, Rotherham, on or before May 21.

May 22. Ystradgynlais.—*Cast-iron pipes for the R.D.C. in the following quantities:—6in. diam., about 50 yds.; 5in. diam., about 5,304 yds.; 4in. diam., about 1,180 yds.; 3in. diam., about 1,400 yds.* Delivered at Ystradgynlais or Abercave (Midland Railway), as directed. All particulars may be obtained at the office of J. W. Leyshon, sanitary inspector, Ystradgynlais. Sealed tenders, on the form supplied, should be endorsed "Contract No. 1," and delivered at the office of L. J. Kempthorne, clerk, Dyffryn Chambers, Neath, not later than 3 p.m. on May 22.

May 24. Sunderland.—*Provision and fixing of 193 wrought-iron fireguards in the various schools in the borough.* Copies of drawing, specification and schedule of quantities may be obtained at the Borough Surveyor's Office, Town Hall. Sealed tenders, addressed "To the Chairman of the Education Works Sub-Committee" and endorsed "Tender for Fireguards," must be delivered at the Town Clerk's Office, Town Hall, before noon on May 24.

May 25. Manchester.—*Supply, delivery and erection of thirty-seven steel girders over the River Medlock, at the Gaythorn Station, for the Gas Department.* Specification and drawing can be obtained from C. Nickson, superintendent, Gas Department, Town Hall, on payment of £1 is. Any further particulars required may be had on application to J. G. Newbigging, M.I.C.E., at his office, Rochdale Road Gasworks. Sealed tenders, addressed to the Chairman of the Gas Committee, and endorsed "Steel Girders, Gaythorne," must be delivered at the Gas Offices, Town Hall, not later than 9 a.m. on May 25.

May 26. Bradford.—*Supply and delivery at Bradford of 500 tons of steel girder rails, 22 tons of fishplates and 32 tons of joint pieces, for the Corporation tramways.* Drawings, conditions, specifications and form of tender may be obtained at the office of J. H. Cox, M.I.C.E., city surveyor, Town Hall, Bradford. Sealed tenders, endorsed "Tender—Steel Rails," to be sent to Frederick Stevens, town clerk, Town Hall, Bradford, on or before May 26. Fair wages clause.

May 23. Skipton.—*Supply of valves, fittings, pipes and miscellaneous ironwork, required for the valve shaft, &c., of the Embay Moor Reservoir, for the U.D.C.* Drawings may be seen, and copies of the specification, form of tender and schedule of work may be obtained of the engineers, G. H. Hill & Sons, 3, Victoria Street, Westminster, and Albert Chambers, Albert Square, Manchester, on receipt of the sum of £2 2s. A limited number of sets of the drawings, uncoloured, are available, and can be lent to persons tendering on payment of the sum of £2, which will not be returned. Sealed tenders, endorsed "Tenders for Valves, Ironwork, &c., Embay Moor Reservoir," must be received by Richard Wilson, clerk to the Council, Skipton, by May 28.

May 29. London, S.W.—*Supply of ranges to working-class dwellings, for the London County Council.* Persons desiring to submit tenders may obtain the drawings, specification, form of tender and other particulars at the Architect's Department, Housing Section, 19, Charing Cross Road, W.C., upon payment to the Cashier of the Council the sum of £5. Tenders must be upon the official forms, and printed instructions contained therein must be strictly complied with. Fair wages clause. Each tender is to be delivered at the County Hall, in a sealed cover, addressed to the Clerk of the London County Council, Spring Gardens, S.W., and marked "Tender for the Supply of Ranges." No tender will be received after 10 a.m. on May 29.

(Continued on p. xiv.)

LEEDS NEW WATERWORKS.

Huge Blunders.

SOME interesting statements concerning the new Leeds waterworks appear in the "Leeds and Yorkshire Mercury," which newspaper says: "The position of affairs in the Colsterdale Valley, the site of the new reservoir of the Leeds Corporation, appears to have gone from bad to worse. As far back as last October Mr. J. H. Armitage, chairman of the Waterworks Committee, admitted that what had come to light in connection with the proposed works in that valley was 'one of the most shocking and unfortunate exposures revealed in connection with the work of any city in the country.' Mr. Armitage went on to state that, as a result of 300 mistakes in the contract drawings, a loss of several thousand pounds would be incurred, and an additional 50 acres of land would be required to satisfactorily carry out the work.

Three Alternatives.

"The most important admission, however, made by Mr. Armitage, was that it had also been proved beyond contradiction that the ganister bed upon which the embankment rested would finally outcrop 560ft. beyond the embankment, and if the embankment were made on that particular spot they would have to go down 70ft. more and spend an additional £227,000. The committee were faced with three alternatives—either to remove 1,000,000 cub. yds. of the hillside, to alter the position of the embankment, or to make the embankment twice as thick by weighting it with thousands upon thousands of tons of stones to prevent the possibility of any catastrophe. It was found that one side of the valley was slipping away; and altogether the position was such that no one had any idea what the Colsterdale works were going to cost.

"This was the position last October, when, as a result of the mistakes, it was found necessary to purchase another 50 acres of land to satisfactorily carry out the work. If, therefore, we hear of the Corporation purchasing this 50 acres, and paying as much as £150 per acre, it is natural to assume that one of the three alternatives had been decided upon—that the Corporation had determined to stick to their original site, and deal with the outcrop by going 70ft. farther down, and

Spending an Additional £227,000.

"We understand on excellent authority that the Corporation entered into negotiation for the purchase of an additional 50 acres of land, but within a few days of handing over the purchase money suddenly found that it would be folly to build their dam on the original site, and decided to go to Parliament in November for new powers. . . . Originally, nearly 400 acres of land were purchased in the Colsterdale Valley. After the purchase of other 50 at £150 an acre, 250 acres will be absolutely useless for reservoir purposes . . ."

The Present Position.

Mr. Armitage, when seen by a representative of the "Mercury" said: "Since the serious defects were discovered we have been sinking a series of trial holes in every direction, and at the request of the new waterworks engineer (Mr. Henzell), Mr. Henry Rofe, of Westminster, was called in to consult with him. The trial holes are just nearing completion, and the engineers have practically the whole of the information now in their possession, which will enable them to report to the committee and advise. The Waterworks Committee is expecting their report very shortly."

It will be interesting to see what the engineers recommend. In any case it would seem that the blunders made in the past will incur thousands of pounds extra cost.

THE CRAFTSMAN IN FRANCE.

WRITING in the "Architectural Record" of New York in connection with a portfolio of plates illustrating some modern interiors in France, Mr. Russell Sturgis, the well-known critic, makes some interesting remarks about the French craftsman. It is not to be denied, he says, that the skilled and practised workman is much more in evidence in France than in American cities. "No one who has tried to have decorative work done in Europe, he being on the spot himself to look after it, but will remember his surprise at the facility with which the very first cabinet-maker or stone-cutter that he talks with sees his meaning and is prepared to meet him half way. What does this mean? It means tradition! It means the result on the present generation of the workmanlike habits which existed in many previous generations.

The French carver

can do nothing except in the recognized styles, but he knows those styles in a wonderful way; and when he learns from your remarks or from your preliminary sketches that you mean something in the way of *Louis Treize*, let us say, he is prepared to block out in soft wood friezes and panels quite in harmony with what he takes to be your purpose, and of surprising value to you in your attempts to make up an important piece of decorative joiner-work to refresh your sculpture.

"So in the matter of pure sculpture in material other than wood, it makes little difference to the working sculptor whom you consult whether he is asked to employ one assistant and one set of tools, and with them to work in soft stone of the Paris basin, or whether with other workmen and quite other tools he is to produce something in hard plastering—in stucco or pure gypsum. In either case he will 'meet you half way,' as has been said before. His readiness and his knowledge are of evident assistance to the designer of the whole work, who is not driven to the wretched habit of drawing everything out to scale and also to full size before he even talks to a workman about the putting of the whole in hand.

French Stonework.

"There is done in Paris, and in the other towns which are built up with the soft cream-white material which we call Caen stone, almost the only modern work in great solid blocks set one upon another in Greek simplicity of process. The Paris workman does use mortar—in that respect he has abandoned his Greek exemplar—but he cuts his blocks straight in four ways and builds piers of them, or he cuts them with two faces, two beds and two vertical joints, and lays each block facing out and in. He is not afraid of the dampness of out-of-door weather; he is not wild for furring and hollow walls; he seems to find that the stone block weathers on the outside and preserves its interior mass and its inner face very well, without extra precautions."

OUR PLATE.

Burrough Court, Leicestershire.

THIS house with the stabling and cottages is approaching completion for H. C. Allfrey, Esq., on a fine site about half a mile from John O'Gaunts station. The walls are of brick, covered externally with cement harling. The base is of Ketton stone, which is also sparingly used for footstones, chimney caps, &c. The roofs are covered with Colley-weston stone slating, and the windows have metal casements and leaded glazing. Internally the house is simply treated, it being intended to panel some of the walls when quite dry. The general contractors are Messrs. Herbert & Sons, of Leicester, Mr. W. J. Vinnell being the clerk of works. The architect is Mr. Walter H. Brierley, F.S.A., of York.

Correspondence.

The Architectural Draughtsman.

To the Editor of THE BUILDERS' JOURNAL.

SIR,—Referring to the letter from "Architectural Draughtsman" which appeared in your columns a short time ago in respect to the heartrending actions of pupils in architects' offices on plans on which the draughtsman has spent hours of labour, your readers will doubtless be interested to hear of a pupil who was given a plan of an estate to finish off. He had to put trees in several of the fields, and by mistake he put some in the wrong field; so, quite seriously, he drew an arrow from the middle of them into the right field, and then carefully printed thereon: "These trees should be in the next field."—

Yours faithfully,

CHARD.

A DRAUGHTSMAN.

Current Market Prices

FORAGE.

		£	s.	d.	£	s.	d.
Beans	per qr.	1	13	0	1	15	0
Clover, best	per load	4	0	0	4	7	6
Hay, good	do.	3	12	6	3	17	6
Sainfoin mixture	do.	3	10	0	4	0	0
Straw	do.	1	8	0	1	14	0

MISCELLANEOUS.

Bricks Stocks, d/d to job	per 1,000	1	14	0	—
Do. Flettons on rail	do.	1	4	0	—
Do. Pressed Wire Cuts, d/d to job	do.	1	16	0	—
Do. Blue brindled wire cuts	do.	1	1	0	—
Do. do. wire cuts	do.	1	5	0	—
Do. do. pressed facings	do.	1	17	6	—
Coke Breeze, into carts at gasworks	per load	0	2	0	—
Do. d/d to job	do.	0	4	0	—
Sand	per yard	0	7	6	—
Ballast	do.	0	6	6	—
Granite Chippings	do.	0	11	6	—
Do. do.	do.	0	11	6	—
Cement	per ton	1	11	6	—
Lime	do.	1	4	0	—
Granite Broken, 1½ in.	do.	0	15	6	—
Do. do. 2 in.	do.	0	15	0	—
Do. do. 2½ in.	do.	0	14	6	—
Do. Kerb, Norwegian, 6x12 and 12x6 in river	per foot	0	1	2	—
Do. do. do. circular	do.	0	1	5	—
Do. do. do. 12x8 in river	do.	0	1	5	—
Do. do. do. circular	do.	0	1	8	—
Glass, English Sheet, in crates of stock sizes, Do. do. do. 3rds	do.	0	0	6	—
Do. English patent plain rolled plate in stock crates ½	do.	0	0	2	—
Do. do. do. ¾	do.	0	0	2½	—
Do. do. do. 1	do.	0	0	2½	—
Casual Oil, French	per cwt.	1	10	0	1 2 0
Colza Oil, English	do.	1	5	9	—
Copp'ras	per ton	2	0	0	—
Lard Oil	per cwt.	2	15	0	2 17 0
Lead, white, ground, carbonate	per ton	16	0	0	—
Do. red	do.	15	0	0	0 19 0
Linseed Oil, barrels	per cwt.	1	2	1	—
Petroleum, American	per gal.	0	0	6½	0 0 6½
Do. Russian	do.	0	0	5½	0 0 6
Pitch	per barrel	0	8	0	—
Shellac, orange	per cwt.	9	5	0	—
Soda, crystals	per ton	3	2	6	3 c
Tallow, Town	per cwt.	1	7	3	1 8 3
Tar, Stockholm	per barrel	1	5	0	—
Turpentine	per cwt.	2	9	3	—

METALS.

Standard Copper	per ton	83	15	0	84 0 0
Do. Strong sheets	do.	96	10	0	97 0 0
Lead, Soft Foreign	do.	16	10	0	16 15 0
Do. English	do.	16	15	0	17 0 0
Do. pipes	do.	19	5	0	19 10 0
Do. sheets	do.	18	15	0	19 0 0
Galvanised Corrugated sheets	do.	12	7	6	12 10 0
Spelter G.M.	do.	26	5	0	26 10 0
Angles, Scotland	do.	6	15	0	7 0 0
Bars	do.	7	15	0	8 0 0
Marked bars, Staffs	do.	9	0	0	—
Common bars	do.	6	15	0	7 0 0
Angles, M'boro.	do.	6	10	0	6 12 6
Joists	do.	6	7	6	6 10 0
Angles, Midlands	do.	6	10	0	6 12 6
Joists	do.	7	0	0	7 5 0
Girders plates, Midlands	do.	7	7	6	7 10 0
Angles, Foreign, c.i.f. Thames	do.	6	0	0	6 2 6
Tees	do.	6	2	6	6 5 0
Joists	do.	6	1	6	6 2 6
Channels	do.	6	2	6	6 5 0
Nails, Wire	do.	0	0	0	—
Tin, Foreign	do.	198	10	0	199 0 0
Do. English ingots	do.	197	0	0	198 10 0
Zinc, sheets, Silesian	do.	27	0	0	—
Do. do. Vieille Montaigne	do.	27	5	0	—

TIMBER.
SOFT WOODS.

Deals, Blankaholm, Yellow, 1st, 4x11	per std.	£	s.	d.	£	s.	d.
Do. do. do. 1st, 4x9	do.	10	10	0	—	—	—
Do. do. do. 1st, 3x9	do.	10	15	0	—	—	—
Do. do. do. 2nd, 4x10	do.	9	5	0	—	—	—
Do. do. do. 2nd, 4x8	do.	9	15	0	—	—	—
Do. do. do. 2nd, 4x7	do.	9	0	0	—	—	—
Do. do. do. 2nd, 4x6	do.	8	15	0	—	—	—
Do. Bure, Yellow, 2nd, 4x9	do.	9	15	0	—	—	—
Do. Mariehill, Yellow, 4th, 4x9	do.	10	10	0	—	—	—
Do. Matane, Bright Spruce, Unsorted, 4x9	do.	9	0	0	—	—	—
Do. Asbacka, Yellow, 3rd, 3x9	do.	13	5	0	—	—	—
Do. Norrköping, Yellow, 1st & 2nd, 3x7	do.	8	10	0	—	—	—
Do. Pernoviken, Yellow, 1st & 2nd, 2½x7	do.	10	0	0	—	—	—
Do. Ornskoldsvik, White, Unsorted, 2½x7	do.	8	15	0	—	—	—
Do. Constantza, White, 2nd, 3x11	do.	9	5	0	9	10	0
Do. Archangel, Yellow, 1st, 3x9	do.	19	0	0	—	—	—
Do. do. White, 1st, 3x9	do.	11	5	0	—	—	—
Do. do. do. 2nd, 3x11	do.	10	15	0	—	—	—
Do. do. do. 2nd, 3x11	do.	10	10	0	—	—	—
Do. Quebec, Red Pine, Unsorted, 3x11	do.	9	5	0	—	—	—
Do. do. do. do. 3x11	do.	9	0	0	—	—	—
Do. do. Spruce, 1st, 3x9	do.	12	15	0	—	—	—
Do. do. do. 1st, 3x8	do.	12	5	0	—	—	—
Do. do. do. 1st, 3x8	do.	12	10	0	—	—	—
Do. do. do. 2nd, 3x7	do.	8	15	0	—	—	—
Do. do. do. Unsorted, 3x9	do.	9	5	0	—	—	—
Do. St. John, Spruce, 1st, 2nd & 3rd, 3x8	do.	8	5	0	—	—	—
Do. do. do. do. 1st, 2nd & 3rd, 3x7	do.	8	0	0	—	—	—
Do. Montreal, Dry Pine, 3rd, 3x9	do.	10	15	0	11	5	0
Battens, St. John's Bright Spruce, 1st, 2nd & 3rd, Unsorted, 3x6	do.	7	15	0	—	—	—
Do. Blankaholm Yellow, 1st, 3x4	do.	9	0	0	—	—	—
Do. Quebec, Bright Pine, 3rd, 3x6	do.	9	10	0	—	—	—
Floorings, Sandarne, Yellow, 1st & 2nd, 1x5	per square	0	10	6	—	—	—
Do. do. do. 2nd, 1½x6½	do.	0	13	9	—	—	—
Do. do. do. 2nd, 1x6½	do.	0	11	0	—	—	—
Do. Forsgrund, Yellow, 2nd, 1x7	do.	0	9	6	—	—	—
Do. Christiania, Yellow, 3rd, 1x7	do.	0	9	9	—	—	—
Do. Dram, Yellow, Unsorted, 1x6	do.	0	8	9	—	—	—
Do. do. do. do. 1x5	do.	0	8	3	—	—	—
Do. do. do. do. 1x7	do.	0	9	9	—	—	—
Do. Fredrikstad, Yellow, 3rd, 1x7	do.	0	9	6	—	—	—
Do. do. Yellow Mixed, 1x6	do.	0	9	6	—	—	—
Do. do. do. do. 1x5½	do.	0	8	9	—	—	—
Do. do. do. do. 1x5	do.	0	8	6	—	—	—
Do. do. do. do. 1x4½	do.	8	8	0	—	—	—
Fir, Dantzie and Memel	per load	2	10	0	5	0	0
Pine, Quebec, Yellow	do.	4	0	0	7	5	0
Do. Pitch, American	do.	2	16	0	5	0	0
Laths, log, Dantzie	per cu. fath.	4	0	0	6	0	0

HARD WOODS.

Ash, Quebec	per load	4	2	6	7	10	0
Birch, New Brunswick	do.	2	17	6	4	5	0
Do. Quebec	do.	3	2	6	6	0	0
Box, Turkey	per ton	6	0	0	20	0	0
Cedar, Cuba	per ft. sup.	0	0	3	0	0	4

Tenders.

Addressed postcards on which lists of tenders may be stated will be sent post free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Fetter Lane, E.C.

Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Blackheath.—Accepted for the erection of a dwelling-house in Oakcroft Road, for Mr. A. B. Bacon. Mr. E. W. Leeson, architect, 49, Princes Street, Manchester:—
Kennard Brothers £1,250

Bedford.—For extensions to the shire hall, for the Bedfordshire County Council. Mr. W. H. Leete, county architect:—

W. Wade, Eaton Ford	£3,535
Martin, Wells & Co., Vauxhall, S.E.	3,500
Stephens, Bastow & Co., Bristol	3,488
J. S. Kimberley, Banbury	3,395
C. E. Haynes Offa Road,	3,393
H. Martin, Northampton	3,288
S. Foster, Kempston	3,179
A. J. Bateman, Ramsey, Hunts	3,187
A. P. Hawtin, Northampton	3,169
Warton & Dunstall, 46, Ashburnham Road	3,100
A. J. Dawes, Priory Street	3,076
F. Gough & Co., Hendon, N.W.	3,071
W. Bell & Sons, Cambridge	3,020
Scale & Robin, Cambridge	3,000
Goodman & Murkert, Wellingborough	2,980
W. H. Hyde, Norwood Junction, S.E.	2,973
J. Cooper & Son, Nottingham	2,960
Oakbuilding Co., Cambridge	2,950
Hackley Brothers, Wellingborough	2,949
Co-operative Builders, Kettering	2,915
W. Loughton, Midland Road	2,912
S. Freshwater & Sons	2,877
J. Corby & Son, Tavistock Street	2,839

* Accepted. [Rest of Bedford.]

Bromley.—For the erection of a house in Durham Avenue, for Mr. G. S. Cooper. Messrs. S. & W. Stocker, architects, 90 and 91, Queen Street, Chesham, E.C. Quantities by Mr. W. James Pamphilon, 21, Finsbury Pavement, E.C.:—

Pearce Brothers	£2,140
C. King	2,040
F. G. Minter	2,007
W. G. Lark & Sons	1,980
F. C. Arnaud & Son	1,975
T. Grady	1,932
F. P. Duthoit	1,895
R. A. Lowe	1,885
T. Crossley & Son	1,883
L. Evans	1,795
W. Hookaday	1,790
S. W. Harris & Co.	1,747
J. Watt	1,473

Coventry.—Accepted for the erection of new foundry buildings, Foleshill, for Messrs. Webster & Bennett, machine tool makers. Messrs. Tait & Herbert, architects, Leicester and Coventry:—

Steelwork—Needham & Lowe, Leicester	£2,050
Builders' work—Executors of C. Garlick, Coventry	800

Dovercourt.—For the erection of two blocks of semi-detached residences, Stour View Estate, Mr. H. S. Watling, F.S.A., architect, Dovercourt and Ipswich:—

T. Parkinson & Sons	£1,900
W. H. Blomfield	1,780
H. J. Linzell	1,678
Skerrett, Sons & Co.	1,391
E. Saunders	1,290
Downs & Sage, Harwich and Dovercourt	1,220

* Accepted.

Gorleston.—For the erection of the free library, for the Great Yarmouth Town Council. Mr. J. W. Cockrill, A.R.I.B.A., borough surveyor:—

J. E. Pestell	£2,600
C. C. J. Caffey	2,565
Moore & Son, Southtown	2,540
G. T. Flaxman, Southtown	2,490
Carter & Wright	2,473
J. Eastoe	2,447
L. D. Harman	2,440
J. G. Haddingham	2,436
A. Gunns	2,427

G. W. Beech	£2,345
B. G. Beech*	2,335

* Accepted subject to revision.
[Rest of Yarmouth.]

Hereford.—Accepted for the erection of a pair of semi-detached villas, for Mr. Francis Preece, on the Highfield Building Estate. Messrs. Groome & Bettington, architects and surveyors, Palace Chambers, Hereford:—
C. Cooke, Hereford £789 11 0

Manchester.—For the erection of the superstructure of the Manchester Royal Infirmary. Messrs. Edwin T. Hall, F.R.I.B.A., and John Brooke, A.R.I.B.A., joint architects. (See p. 259):—

Holliday & Greenwood, London	£258,277
Thomas Rowbotham, Birmingham	256,752
Foster & Dicksee, Rugby	253,520
Morrison & Son, Liverpool	251,300
R. Neill & Son, Manchester	245,000
Brown & Sons, Salford	244,480
Arnold & Son, Doncaster	239,546

* Accepted.

Leyton.—Accepted for the erection of car-sheds on the site in Lea Bridge Road, for the Leyton Urban District Council:—

W. Manders, Leyton	£12,178
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Thirteen other tenders.

London, N.—For the erection of a junior school and infirmary at Maitland Park, Haverstock Hill, N., for the Orphan Working School. Messrs. Young & Hall, architects, 17, Southampton Street, Bloomsbury, W.C.:—

A.	B.	C.
Ashby & Horner	£5,454	£4,941
Rider & Sons	775	5,284
Oldray & Sons	595	5,400
Prestige & Co.	860	5,118
Simpson & Sons	786	5,129
Patrick & Sons	737	5,059
Howell J. Williams, Ltd.	724	5,048
Higgs & Hill	734	5,039
Holliday & Greenwood*	550	4,708

* Accepted.

A.—Preliminary and drains. B.—Junior school. C.—Infirmary.

Newark.—For renewals, repairs and alterations to properties belonging to the St. Leonard's property. Messrs. Sheppard & Lockton, architects and surveyors, Bargate, Newark:—

F. W. Crossland	£1,587 14 6
H. Hurst	1,580 0 0
T. H. Harper	1,325 0 0
C. Williamson	1,325 0 0
G. Brown & Son	1,295 0 0
C. Baines	1,220 0 0
W. Smith, Newark	1,130 0 0

* Accepted.

Newhaven.—For the erection of new Council offices and fire station in Fort Road, for the Urban District Council. Mr. F. J. Rayner, architect, 34, Meeching Road, Newhaven:—

Potter Brothers	£2,056 0 0
Rowland Brothers	1,849 0 0
H. Lindfield & Sons	1,848 0 0
R. Cook & Sons	1,800 0 0
T. Rich	1,800 0 0
M. Woolger	1,798 0 0
C. Cook, Brighton Road, Newhaven	1,757 16 0

* Accepted.

Southall.—For the erection of new secondary schools, for the Middlesex County Council. Mr. H. G. Crothall, architect:—

		A.	
J. Stewart	£13,429	£2,378	0 0
F. G. Minter	12,369	2,056	0 0
W. J. Dickens	12,070	1,997	0 0
Ward & Son	12,027	2,155	0 6
W. Lawrence & Son	11,844	1,990	0 6
Mattock & Parsons... ..	11,834	2,000	0 0
Fassnidge & Son	11,823	2,041	0 0
Treasure & Son	11,806	2,041	12 3
W. Brown	11,786	2,026	0 0
Fairhead & Son	11,658	1,984	0 0
Wisdom Brothers	11,625	1,954	0 0
W. J. Renshaw	11,599	1,949	0 0
A. & B. Hanson	11,598	1,994	0 0
H. Knight & Son	11,484	1,990	0 0
D. D. Heath	11,420	1,994	0 0
J. Dorey & Co.*	11,125	1,905	0 0

* Recommended for acceptance.

A.—Manual training and cookery centres and caretakers' apartments.

(Continued on p. xiv.)

Guaranteed
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Gearing and
Fittings.

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FANLIGHT OPENERS & GEARING.

Metal Sashes.

Panic Bolts.

Weather Bars.

Reversible
Window
Fittings, &c.

TENDERS—cont. from p. xiii.

Liverpool.—Accepted for the erection of the super-structure of the new cathedral. Mr. G. Gilbert Scott and Mr. G. F. Bodley, R.A., joint architects:—
Morrison & Sons, Wavertree, Liverpool.

London.—Work at Long Grove Asylum, for the London Council. County

Supply of airing court fencing.		
D. Rowell & Co., London	£1,298	6 8
A. J. Main & Co., London	1,199	5 0
G. Wright, Ltd., London	1,117	3 8
Bayliss, Jones & Bayliss, Wolver-		
hampton	1,095	19 8
Hill & Smith, Brierley Hill	1,071	10 0
Laundry machinery.		
Moorwood Sons & Co., Ltd.,		
Sheffield	£7,381	10 0
The Cherry Tree Machine Co., Ltd.,		
Blackburn	4,969	12 0
T. Bradford & Co.,* London	4,664	11 2
W. Summerscales & Sons, Ltd.,		
Keighley	4,633	0 0
D. & J. Tullis, Ltd., Clyde Bank,		
N.B.	4,244	0 0
Telephones, Fire-alarms and tell-tale clocks.		
Strode & Co.	£2,399	
F. A. Glover & Co., Ltd.	2,067	
Bromley, Batstone & Kirk	1,760	
Cox-Walkers,* Darlington	1,715	
Private Wire and Telephone Installation		
Co.	1,795	

[Rest of London.]

Kitchen plant.		
J. & F. May	£2,716	0 0
Killick & Cochran, Liverpool	2,684	0 0
Benham & Sons, Ltd., London	2,548	0 0
G. N. Haden & Son, Ltd., Trow-		
bridge	2,076	0 0
W. Summerscales & Sons, Ltd.,		
Keighley	1,996	0 0
T. Bradford & Co.,* London	1,938	0 0
Moorwood, Sons & Co., Ltd.,		
Sheffield	1,578	0 0
McDowall, Steven & Co., Ltd.,		
London	1,487	12 0
* Accepted.		

London, E.—For the reconstruction of Victory Bridge, carrying Ben Johnson road over the Regent's Canal, for the London County Council:—

Heenan & Froude, Ltd., Manchester	£6,161	1 3
J. Cockerane & Sons	5,807	19 2
G. Hay & Co.	5,806	11 10
Muirhead & Co.	5,605	6 5
Wilkinson Brothers	5,600	0 0
A. Facey & Son, Leytonstone	5,566	8 3
J. Strachan, Cardiff	5,480	0 0
A. Thorne*	5,442	2 6
[Chief engineer's estimate, £5,591 6s. 9d.]		
* Recommended for acceptance. [Rest of London.]		

London, E.—For reinstating that portion of the Central Street school, Finsbury, E., which will be demolished in connection with scheme of street improvements, for the London County Council:—

W. Gregar & Son, Jupp Road,		
Stratford	£3,112	0 0
W. Shurmur & Sons, Ltd., Upper		
Clapton	2,997	0 0
Perry & Co., Bow	2,953	0 0
G. S. S. Williams & Son, Barnsbury	2,930	0 0
W. H. Lascelles & Co., Ltd., 121,		
Bunhill Row	2,913	8 0
E. Triggs, Clapham	2,854	3 0
J. Grover & Son, New North Road	2,846	0 0
L. H. & R. Roberts, Islington	2,766	0 0
L. Whitehead & Co., Ltd., Clapham		
Road	2,724	0 0
E. Lawrence & Son, City Road	2,703	0 0
W. M. Dabbs & Son, Clapton	2,699	0 0
Patman & Fotheringham, Ltd.,*		
London, N.	2,637	0 0
[Architect's (education) estimate, £2,751.]		
* Recommended for acceptance.		

Lytham.—Accepted for the erection of a new Wesleyan mission hall:—

H. Mogridge	£2,641	
Plymouth. —For the erection of the new church of St. Simon. Mr. Harbottle Reed, architect, Exeter:—		
Cowlin & Son	£7,777	
J. Crockerell	7,520	
Stephens, Bastow & Co.	7,432	
A. R. Lethbridge & Son	7,289	
W. G. Laphorne & Co.	7,122	
Wakeham Brothers	7,085	
J. Trevan	6,969	
J. Long & Son	6,910	
Hayward & Wooster	6,687	
Stephens & Son	6,448	
Ambrose Andrews	6,174	
Dart & Francis, Ltd.	5,881	
Pethick Brothers*	5,840	
* Accepted.		

Tonbridge.—For the erection of a new Council school to accommodate 420 children, for the Kent Education Committee:—

T. L. Fearon, Folkestone	£5,814	
J. Chessum & Sons, London, E.	5,495	
J. E. Johnson & Son, London, S.W.	5,491	
J. Crates & Son, Tunbridge Wells	5,454	
J. Ellingham & Sons, Dartford	5,280	
W. S. Shepherd & Co., London, S.W.	5,252	
E. Punnett & Sons, Tonbridge	5,161	
R. Avar, Maidstone	5,139	
J. McKay, Clacton	5,099	
Davis & Leaney, Goudhurst	5,060	
Strange & Sons, Tunbridge Wells	4,924	
G. H. Denne & Son, Deal	4,862	
Gann & Co., Whitstable	4,797	
R. Cook & Sons, Crawley, Sussex	4,770	
Martin & Co., Tonbridge	4,768	
J. Jarvis & Son, Tunbridge Wells	4,740	
J. Leney & Son, Tunbridge Wells	4,740	

G. E. Wallis & Sons,* Broadmead Works,
Maidstone 4,646

* Accepted.

Teddington.—For the erection of a new elementary school to accommodate 800 children, with cookery and manual training centres, committee-room and caretaker's house, for the Middlesex County Council. Mr. H. G. Crothall, architect to the Education Committee:—

A.		
C. F. Kearley	£12,996	0 0
Mattock & Parsons	12,975	0 0
J. Ward & Son	12,519	5 6
Messum & Sons	12,475	0 0
Patman & Fotheringham	12,423	0 0
W. Blackburn	12,250	0 0
Fassbridge & Son	12,124	0 0
D. D. Heath	12,104	0 0
Treasure & Son	12,086	0 0
A. & B. Hanson	11,993	0 0
F. G. Minter	11,990	0 0
W. J. Renshaw	11,893	0 6
W. Lawrence & Sons	11,874	0 0
A. Fairhead & Son	11,823	0 0
J. Barker & Co.	11,759	0 0
Wisdom Brothers	11,642	9 0
J. Dorey & Co.	11,606	0 0
Gough & Co.	11,539	0 0
H. Knight & Son*	10,987	0 0
* Accepted.		

A.—Cookery and manual training centre.

Tredegar.—For the erection of twenty-two houses in Charles Street, for the Charles Street Building Club. Mr. Thomas Danks, architect and surveyor, Oakfield Road, Tredegar:—

J. D. Vaughan & Co., Tredegar	£6,138	
G. & D. Jones, Bargoed, Glam.	4,808	
W. J. Wadley, Cardiff	4,180	
E. & D. Davies, Dowlais	3,828	
T. W. & J. Jenkins, Penydarren, Merthyr	3,806	
Amended tenders for seventeen houses only.		
E. & D. Davies	3,009	
T. W. & J. Jenkins*	2,975	
* Accepted.		

Walmer.—For the erection of cottages and stabling, for Mr. W. R. Davies. Messrs. Fry & Miller, architects, 22, Cannon Street, Dover. Quantities by architects:—

A. W. Thompson	£1,539	12 0
J. E. Turner	1,537	12 11
J. W. Sandcraft	1,531	0 0
R. & G. Brisley	1,505	0 0
W. Bromley	1,482	0 0
T. T. Denne	1,439	0 0
S. & R. Jefford,* Walmer	1,337	0 0
* Accepted.		

Walthamstow.—For the erection of the Edinburgh Road Council School, for the Education Committee. Mr. H. Prosser, architect, Education Offices, High Street, Walthamstow. Quantities by Mr. G. T. G. Wright, 3, Great Winchester Street, E.C. 1:—

H. Lovatt, Ltd.	£7,384	
Rowe & Co.	7,258	
J. McKay	7,069	
Sands & Burley	6,900	
Patman & Fotheringham	6,793	
F. & A. Willmott	6,776	
Killby & Gayford	6,729	
W. J. Maddison	6,669	
F. J. Coxhead	6,619	
Pollard & Brand	6,600	
R. & E. Evans	6,589	
W. Lawrence & Son	6,583	
J. Chessum & Sons	6,580	
G. E. Wallis & Sons	6,574	
Appleby & Sons	6,570	
A. G. Crisp	6,530	
Hammond & Son	6,487	
J. & J. Dean	6,412	
H. Knight & Son	6,397	
Rowley Brothers*	6,334	
* Accepted.		

CONTRACT LIST (continued from p. 269).

PAINTING AND PLUMBING.

May 17. Edinburgh.—Painter work at new pavilion at Saughton Public Park according to plans and specification, which may be seen at the Public Works Office, where also schedules of quantities may be obtained. The estimates must be sealed, and marked "Tender for Painter Work, Saughton Public Park," and sent to R. Morham, city architect, Public Works Office, City Chambers, Edinburgh, by 10 a.m. on May 17.

May 19. Skipton.—Repairing, painting, &c., of street lanterns during the period from June 1, 1906, to May 31, 1907, for the U.D.C. Specification may be seen and all information obtained on application to John Mallinson, surveyor to the Council, Town Hall, Skipton, and sealed tenders, endorsed "Street Lanterns," are to be sent to him not later than May 19.

May 21. Plymouth.—Painting a ward pavilion at the Borough Hospital. Specifications for the work can be seen at the office of the Medical Officer of Health. Sealed tenders, endorsed "Tender for Painting," to be sent to F. M. Williams, Medical Officer of Health, Health Department, 19, Whimble Street, Plymouth, on or before May 21.

May 22. Belfast.—Supply of plumber's work and materials for the year ending 31st March, 1907, for the Corporation. Forms of tender and particulars may be obtained at the Superintendent of Work's Office, Town Hall Street. Sealed tenders, on official forms only, endorsed "Tenders for Plumber's Work," to be lodged in the Town Clerk's Office before 10 a.m. on May 22.

May 22. Selby and Market Weighton.—Painting the Company's property upon the Selby and Market Weighton Branch, for the North Eastern Railway. Specification may be seen and further information obtained on application to E. Smith, the Company's district engineer, Hull. Sealed tenders, marked "Tender for

Painting Selby and Market Weighton Branch," to be sent to the Secretary, at York, not later than noon on May 22.

May 25. Birmingham.—Cleaning and painting the main corridor of the Workhouse, Western Road. Fair wages clause. Specifications and all information can be obtained on application to the Master, F. C. Mitchell, Workhouse, Western Road, Birmingham. Sealed tenders, endorsed "Tender for Painting Corridor," to be delivered to C. Fletcher, clerk to the Guardians, not later than May 26.

No date. Kendal.—Painting and drescoing the whole of the internal walls, cleaning the roofs, marble tablets on walls and other work, for the Vicar and Churchwardens at Kendal Church. Bills of quantities and other information may be obtained on application to John Hutton, M.R.S.I., architect, Kendal.

ROADS AND CARTAGE.

May 17. Edinburgh.—Work and materials required in constructing new granite tramway at Elm row, continuing present tramway from Montgomery Street to London Road, and in laying compressed asphalt paving on concrete bed at Manor Place and Cowgate. Schedules of quantities may be obtained and specifications seen on application to the City Road Surveyor, City Chambers. Tenders, sealed within the official envelopes supplied, must be lodged with Thomas Hunter, W.S., Town Clerk, City Chambers, by 10 a.m. on May 17.

May 17. London, W.C.—Paving works for the Westminster City Council. Forms of tender, schedule, specification and conditions of contract, can be obtained on application at the Works Department, Westminster City Hall, Charing Cross Road, W.C., between 10 and 4 (Saturdays 10 and 1). Fair wages clause. The contract deeds will be prepared at the expense of the Council, and contractors will be required, together with two sureties, to enter into bonds for the due fulfilment of their contracts, or, in the alternative, to agree to the retention by the Council during the period mentioned in the form of tender of certain moneys. Contractors are prohibited from directly or indirectly canvassing members or officials of the Council in support of their tenders and the tender of any contractor who does so canvass will be rejected. Each tender, on the official form supplied, is to be delivered at the City Hall, in a sealed cover, addressed to the Town Clerk, Westminster City Hall, Charing Cross Road, W.C., and marked "Tender for Paving Works." No tender will be received after 10 a.m. on May 17.

May 18. Manchester.—Execution of the work named in the undermentioned streets and passages:—Sewering, draining, paving, &c., Gill Street, from Wesley Street to Grey Mare Lane, Openshaw; sewerage, draining, paving, &c., Great Southern Street, from the easterly side of Santiago Street to the Withington boundary Moss Side; sewerage, draining, paving, &c., Santiago Street, from the centre of Heald Avenue to Great Southern Street, Moss Side, and Rusholme; draining, paving, &c., Acorn Street, from Moss Lane East to Great Western Street, Moss Side; draining, paving, &c., Peel Avenue, from Santiago Street to a point 454 yards distant in a westerly direction, Moss Side and Rusholme; draining, paving, &c., Cowesby Street, from Alison Street to Claremont Road, Moss Side; draining, paving, &c., Normanby Street, from its northerly end to a point 101 yds. distant in a southerly direction, Moss Side; draining, paving, &c., Salisbury Street, from the easterly side of Fernleaf Street to Normanby Street, Moss Side; sewerage, draining, paving, &c., passage behind Nos. 19 to 33, Kendall Street, 30 to 62, Ryder Street, and adjoining '9, Kendall Street, Bradford, North Manchester; sewerage, draining, paving, &c., passage behind Nos. 49 to 81, Robert Street, 3, Hague Street, 2, Thompson Street, 386 to 412, Oldham Road, and adjoining 398 to 402, Oldham Road, Newton Heath, North Manchester. Forms of tender may be obtained on application to the Paving, &c., Department (Surveyors' Office), and must be returned to the Chief Clerk, Paving, &c., Department, Town Hall, Manchester, before 10 a.m. on May 18.

May 18. Preston.—Levelling, paving, flagging, channelling, &c., Parker Street, from Roebuck Street to No. 41, and Roebuck Street, from Shelley Road to Inkerman Street. Plans, sections and specifications may be seen and schedule of quantities and form of tender obtained at the office of the Borough Surveyor, Town Hall, Preston, to whom sealed tenders, endorsed "Tender for Paving, &c.," must be delivered not later than noon on May 18. Fair wages clause.

May 18. Barnstaple.—Completing the footpaths, roads, &c., at Portland Street, Newport. Plans and specification may be seen at the office of the Borough Surveyor. Tenders, endorsed "Portland Street," will be received at the Town Clerk's Office on or before May 18.

May 19. Hadleigh.—Supply of 170 tons of 2in. broken Guernsey or Alderney granite, to be delivered free at Hadleigh (Suffolk) Railway Station, between June 18 and 30 for the U.D.C. Sealed tenders, endorsed "Tenders for Granite," with sample, to be sent to Charles J. Grimwade, U.D.C. Office, Hadleigh, Suffolk. No form of tender is issued.

May 21. London, N.—Supply and delivery of a 10-ton steam-roller and scarifier for the Islington Borough Council. Form of tender and particulars can be obtained upon application to the borough engineer, J. Patten Barber, at the Town Hall, Upper Street, Islington, N. Sealed tenders, endorsed "Tender for Steam Road-Roller and Scarifier," must be received by W. F. Dewey, town clerk, Town Hall, Upper Street, Islington, N., by May 21.

May 21. Plymouth.—Making-up and completing, under section 150 of the Public Health Act, 1875, the following streets and lanes:—Knighton Road Lane, South, No. 1; Cleveland Road Lane. Tenders are invited for carrying out the works. Plans and specifications, and conditions upon which forms of tender will be granted, may be seen and bills of quantities obtained at the office of James Paton, borough engineer, Municipal Offices, Plymouth, to whom tenders must be delivered not later than 5 p.m. on May 21.

May 21. South Shields.—Lowering of roadway, drainage, re-macadamising, &c., under N.E.R. Bridge, Jarrow Road, in connection with the Jarrow and South Shields Light Railway. General and detail drawings may be seen and a copy of the form of tender, general conditions, specification, quantities, &c., and other information obtained at the office of S. E. Burgess, M.I.C.E., borough engineer and surveyor, Chapter Row. Tenders on forms supplied (to be fully priced out in the schedule and totalled) must be delivered to the Town Clerk, Court Buildings, South Shields, not later than noon on May 21, endorsed "Tender for Road Lowering, Jarrow Road."

May 21. Sheringham.—Making-up of Regis Place, for the U.D.C. The plans and specification may be seen at the office of T. Inglis Goldie, A.R.I.B.A., surveyor to the Council, Railway Road, Sheringham, and bills of quantities obtained on deposit of a cheque of £2 2s. The tenders to be delivered to E. C. Rolfe, clerk to the Council, Church Street Chambers, Sheringham, not later than 3 p.m. on May 21.

May 22. Newport.—Supply of materials or for hauling broken and unbroken stone for the repair of the main roads for the year ending March 31, 1907, for the Monmouthshire County Council. Particulars and schedules may be had on application at the County Council Offices, Newport. Sealed tenders, endorsed "Tenders for Hauling and Supplying Materials for Main Roads," to be sent to William Tanner, county surveyor, County Council Offices, Newport, Mon., on or before May 22.

May 22. London, W.—Supply of machine-broken road stone and stone chippings for the Great Western Railway Co. Conditions of contract and forms of tender (upon which alone tenders will be received) may be obtained on application to G. K. Mills, secy., Paddington Station, London, by whom tenders, marked outside "Tender for Road Stone, &c.," will be received on or before May 22.

May 22. Spennymoor.—Flagging, herbing, channelling, road-making, sewerage, &c., required in the making of Park Avenue, Back Park Avenue and Front Park Crescent, form the U.D.C. Plans, specifications, &c., may be seen and form of tender obtained on application to C. R. Spencer, surveyor to the Council, Silver Street, Spennymoor. Tenders, endorsed "Park Avenue, &c.," to be sent to F. Badcock, clerk to the Council, Council Offices, Spennymoor, not later than 4 p.m. on May 22.

May 23. Barrow-in-Furness.—Flagging or tar paving of the Receiving and Cottage Homes in Rosse Road. Plans and specifications may be inspected at the office of H. T. Fowler, A.R.I.B.A., architect, Cornwalis Street. Tenders to be enclosed in a sealed envelope, marked "Tenders for Paving," and delivered at the Parish Offices, Harrison Street, before 10 a.m. on May 23.

May 24. Cuckfield.—Materials and carting. Supply of about 550 tons of granite broken to 1½ in. gauge, and for 125 yds. of flints, for the U.D.C. To be delivered carriage free at Haywards Heath Station at such times and in such quantities as the Surveyor may direct. Samples of granite and a sample truck of flints containing 4 yds. must be sent to Haywards Heath Station, carriage paid and invoiced to the Surveyor, on or before May 24. Tenders are also invited for carting the above materials from Haywards Heath Station on to the several roads in the district. Tenders, on forms to be obtained from Edward Waugh, clerk, Haywards Heath, must be sent to the latter on or before May 24.

May 28. Guildford.—Construction of a new road, about 100 yds. in length and 40 ft. wide throughout, and inclusive of certain works of sewerage and surface-water drainage. Plans and specification may be seen and forms of tender obtained on application to C. G. Mason, A.M.I.C.E., borough surveyor, Tuns Gate. No tender will be considered upon the prescribed form. Tenders, endorsed "Tender for New Road," are to be sent to F. S. Miller, town clerk, Town Clerk's Office, Bridge Street, Guildford, on or before May 28.

May 23. Witham.—Supply of 500 tons of good granite, uniformly broken to 1½ in. gauge; also for 300 tons of blast furnace slag, uniformly broken to 2 in. gauge, to be delivered in equal quantities weekly, carriage free, at the Witham Station of the Great Eastern Railway during the months of October, November and December. Tenders, endorsed "Tenders for Granite" or "Tenders for Slag," with samples, to be sent to W. Bindon Blood, clerk, District Council Office, Witham, Essex, on or before May 28.

May 23. Burgess Hill.—Supply of 200 yds. of surface dug flints, 650 tons of 1½ in. granite and 40 tons of just granite, for the repair of highways, to be delivered as required by Sept. 29, for the U.D.C. Delivery may be either at Burgess Hill Railway Station or on such of the roads within the district as may be directed by the Surveyor. Persons tendering must state at which place they propose to deliver. Tenders (on forms to be obtained of the Clerk), sealed and endorsed "Tender for Flints" or "Tender for Granite" as the case may be, and accompanied by samples, to be delivered to the Clerk to the Council, Burgess Hill, on or before May 28.

May 23. Mistley.—Paving, metalling, channelling and making-up certain streets at Mistley, for the Tending R.D.C. Specification, bill of quantities and form of tender may be obtained upon application to the surveyor, J. Bell, at Great Bentley. Plan and conditions may be seen at the Surveyor's house any weekday, except Wednesdays, at noon, provided twenty-four hours' notice is given. Sealed tenders, accompanied by priced bills of quantities and endorsed "Tender for Private Street Works," must be sent to A. J. H. Ward, clerk to the Council, 42, Church Street, Harwich, not later than May 28.

May 29. Great Yarmouth.—Supply of the following road materials:—1,400 tons 1½ in. Guernsey granite; 1,400 tons 1½ in. basalt, quartzite, penlee, or other stone of equal value for roadmaking; 1,500 yds. cube broken flint; 500 yds. cube coarse gravel; 1,000 yds. cube fine footpath gravel. Specifications, form of tender, and envelopes in which the tenders must be enclosed, can be obtained at the office of J. W. Cockrill, M.I.C.E., borough surveyor, Town Hall, Great Yarmouth. Tenders are to be delivered

at the office of the Town Clerk, Town Hall, Great Yarmouth, before noon on May 29.

May 29. Aldershot.—Genuine iron slag tar macadam, about 700 tons, more or less, delivered f.o.r. at either of the town stations for the U.D.C. Forms of tender and all particulars may be obtained upon application at the offices of the District Surveyor. Tenders, endorsed "Tar Macadam" to be sent to the clerk, W. E. Foster, on or before May 29.

May 29. London, S.W.—Providing and laying new tar-paving in playgrounds attached to schools, and also for repairing, retopping and running tar-paving at the various schools, &c., under the London County Council. Persons desiring to submit tenders may obtain the specification, form of tender, and other particulars at the Education Offices (Architect's Department), Victoria Embankment, W.C. Tenders must be upon the official forms, and the printed instructions contained therein must be strictly complied with. Fair wages clause. Each tender must be enclosed in the envelope provided, and delivered at the Education Offices (Room 148), Victoria Embankment, W.C., not later than 11 a.m. on May 29.

May 29. Gateshead.—Re-paving Bridge Street and Church Street from the Swing Bridge to High Street, and Chandless Street, from High Street to Elder Street. Plans and specification can be seen and quantities obtained at the office of N. P. Pattinson, borough engineer, Town Hall. Separate tenders are to be sent in sealed and endorsed "Tender for Paving Bridge Street and Church Street" and "Tender for Paving Chandless Street," on or before 2 p.m. on May 29.

May 29. Gateshead.—Paving, &c., the following streets:—(1) Dean Street, (2) Back Beacon Street, (3) Back Derwent Gardens, (4) Myrtle Grove, (5) Back High Street, (6) Fern Dene Road, (7) Back Balmoral Avenue. Plans and specification may be seen and quantities obtained at the office of N. P. Pattinson, borough engineer, Town Hall. Tenders are to be sent in, sealed and endorsed "Tenders for Street Paving," on or before 2 p.m. on May 29.

May 30. Prestwich.—Private street improvement in Egeron Street, Heaton Park, and adjacent streets, and in Knott Lane, Prestwich, and the adjoining side street, within the urban district of Prestwich, subject to general conditions of contract, which can be inspected at the Surveyor's Office, Chester Bank, Prestwich, any morning between 9 and 11. The plans, specifications and quantities of the proposed works will be open for inspection at the office of the Surveyor, Chester Bank, between the hours above-mentioned. Copies of the bills of quantities and any further information that may be required can be obtained from the Surveyor on payment of £2 2s. Tenders must be sent in sealed envelopes, endorsed "Tender for Private Street Works," and must be delivered to Lewis A. Orford, clerk to the Council, Council Offices, Chester Bank, Prestwich, not later than 10 a.m. on May 30.

SANITARY.

May 17. Linton.—Sewerage contract No. 2. For the execution of all work involved by the connection of house drains to the new system of sewerage in the parish of Linton on the basis of a schedule of prices for the Repton R.D.C. Specification and schedule of prices may be obtained at the offices of the engineers, Willcox & Raikes, 63, Temple Row, Birmingham, on payment of a deposit of £2 2s. Sealed tenders, with schedule of prices filled in, in detail, on the form supplied, and endorsed "Linton House Connections," must be delivered at the office of C. F. Chamberlin, clerk to the Council, Union Offices, Burton-on-Trent, not later than 10 a.m. on May 17.

May 17. Mayfield.—Construction of sewerage and sewage disposal works for the village of Mayfield, for the Uckfield R.D.C. The said works include about 5,100 yds. of stoneware sewers from 6 in. to 9 in., all the necessary flushing tanks, ventilation, manholes &c., septic tanks, storm-water overflow disposal and sewer irrigation works, in accordance with plans and specification, which have been prepared by John Taylor, surveyor to the Council. The drawings and specification may be seen at the office of the Surveyor, Henley House, Uckfield, from whom copies of the bills of quantities, schedules of prices, and forms of tender may be obtained on payment of the sum of £2 2s. Sealed tenders, endorsed "Mayfield Sewerage Works," must be delivered at the office of F. Holman, clerk, 86, High Street, Lewes, on or before noon on May 17.

May 21. Dalkey.—Construction of about 340 yds. of a 12 in. sewer at Saval Park Road, for the U.D.C. Plan, specification and conditions of contract can be seen at the Council's Office on any weekday between 10 a.m. and 2 p.m. Tenders, including the names of two solvent sureties, to be under cover and marked "Tenders for Dwellings," must be lodged with J. P. Gahan, clerk of the Council, Town Hall, Dalkey, before noon on May 21.

May 23. Bodmin.—Tunnelling and laying 12 in. iron pipes therein, also stoneware pipes, constructing manholes, and other work, at the Cornwall County Lunatic Asylum, in accordance with plans, specifications and general conditions of contract, which may be seen at the offices of the engineers, S. W. Jenkin & Son, The Parade, Liskeard; or at the Steward's Office at the Cornwall County Lunatic Asylum, Bodmin. Intending contractors will have to deposit the sum of £3 3s. The successful contractor will be required to enter into a contract, and find two sureties in one half the sum of his tender, for the due performance of the contract. Sealed tenders, on printed forms supplied, are to be delivered at the office of M. F. Edyvean, clerk to the Visiting Committee, Bodmin, on or before noon on May 23.

May 24. Romford.—Works of sewerage in the parish of Collier Row, as hereunder, for the Romford U.D.C.:—About 2,978 ft. run of 12 in. foul sewer, Mawneys Road; about 955 ft. run of 6 in. foul sewer, Mawneys Road; about 928 ft. run of 10 in. foul sewer, Elm Road; about 1,426 ft. run of 10 in. foul sewer, White Hart Lane; about 1,090 ft. run of 7 in. foul sewer, Lowshoe Lane; about 30 ft. run of 10 in. foul sewer, Chase Cross Road;

about 1,717 ft. run of 9 in. foul sewer, Chase Cross Road; about 1,473 ft. run of 7 in. foul sewer, Chase Cross Road; about 1,070 ft. run of 10 in. foul sewer, across roads. With all manholes, ventilating columns, inverted syphons, sett paving, junctions, &c., required. Plans may be seen, and specifications, quantities, and forms of tender obtained, on application to H. T. Ridge, Council Offices, Romford, upon payment of £5. Sealed tenders, endorsed "Sewerage Works," must be sent in on the forms supplied, and delivered to Charles T. King, clerk to the Council, Council Offices, Romford, not later than May 24.

May 29. Bath.—Supply and delivery of glazed stoneware socket pipes for the period from 1st June, 1906, to 30th March, 1907, for the R.D.C., the pipes to be delivered on rail to Bath and in such quantities as may be required from time to time. Specification and form of tender can be obtained on application from R. H. Whittington, clerk to the Council, 5, Old King Street, Bath, to whom tenders, sealed and endorsed "Tender for Stoneware Socket Pipes," are to be delivered by May 29.

No date. London, E.—Drainage works at the workhouse in Bancroft Road, E., for the Mile End Old Town Guardians. Forms of tender and full particulars relating to the work can be had on application at the office of J. M. Knight, architect, 35, Bancroft Road, Mile End, E. Fair wages clause.

TIMBER.

May 30. Dublin.—Supply of 30,000 creosoted rectangular sleepers 8 ft. 11 in. by 10 in. by 5 in. (17,000 to be delivered in July, 1906, and 13,000 in March, 1907), for the Dublin, Wicklow and Wexford Railway Co. Specifications and forms of tender can be had on application to the Secretary. Tenders, marked "Tenders for Sleepers," and addressed to the Secretary, Dublin, Wicklow and Wexford Railway, Westlandrow Station, Dublin, to be forwarded so as to reach him not later than 10 a.m. on May 30.

June 1. Southampton.—Supply of deals and matched boarding, for the Director-General, Ordnance Survey. Applications for forms of tender and specification should be made to the Officer in Charge of Stores, Ordnance Survey Office, Southampton. All tenders must be submitted before noon on June 1.

MISCELLANEOUS.

May 17. Woolwich.—Supply of water-vans, slop-carts, sweeping machines, &c., as follows, for the Borough Council:—Three water-vans, one water-cart, ten slop-carts, two street-sweeping machines and one road scraper. Fair wages clause. Forms of tender and any information required can be obtained at the office of J. Rush Dixon, M.I.C.E., borough engineer, Town Hall, Woolwich. Tenders must be sent in envelope, sealed and endorsed "Tender for —," to Arthur B. Bryceson, town clerk, Town Hall, Woolwich, not later than noon on May 17.

May 19. Walsall.—Supply of the following stores for the Gas Department, during the period of one year from July 1:—Wrought-iron and galvanized tubes and fittings, lamps, iron, lead and compo piping, gasfittings, tin, ironmongery, glass and putty, brushes and oils. Forms of tender and further information may be obtained at the Gas Office, Council House. Tenders, sealed and marked outside "Tender for Gasworks Stores," are to be sent to John R. Cooper, town clerk, Council House, Walsall, on or before May 19, and on or before that day, in the cases specified in the form of tender. Samples of the respective articles, marked with a distinguishing number or letter, are to be sent to the Gas Office, Council House (Lichfield Street entrance). Samples will not be paid for by the Corporation.

May 21. Cheshunt.—Carrying out the following works within the district of the U.D.C.:—Erection of cart-sheds at the depot, Manor House; construction of about 162 yds. run of concrete retaining wall, with gulleys and other works, in Trinity Marsh Lane; supplying and erecting 238 yds. run of 4 ft. 6 in. high unclimbable iron fencing; constructing about 100 yds. run of 15 in. S.W. sewer, with man-holes, &c., at Turner's Hill; constructing about 92 yds. run of 6 in. S.W. sewer, with man-holes, &c., in York Road; laying about 300 yds. super. of tarpaving in Albury Grove Road. The drawings and specification can be inspected and forms of tender and envelopes obtained on application at the office of Reginald H. Jeffes, M.I.C.E., engineer and surveyor, Council Offices, Cheshunt, Herts, during office hours. Sealed tenders, endorsed "Tender for —," as the case may be, and addressed Chairman of the Council, to be delivered at or before 4 p.m. on May 21.

May 22. London, S.W.—Supply of the following articles, for the Secretary of State for India:—Brass boiler tubes, copper firebox plates and laminated bearing springs. The conditions of contract may be obtained on application to the Director-General of Stores, India Office, Whitehall, S.W., and tenders are to be delivered at that office by 2 p.m. on May 22.

May 23. Manchester.—Twelve months' supply of agricultural drain pipes, also twelve bales American oak, forty-five standards spruce deals, two standards red deals, and one standard pine deals. Specifications and particulars may be obtained upon application to Superintendent of the Cleansing Department, Town Hall, Manchester, and must be sent in before 10 a.m. on May 23.

June 7. Penrhybyr.—Supply of the following stores, for the Penrhybyr Navigation Colliery Co., Ltd., Penrhybyr R.S.O., Glam.:—Iron and steel; castings; bolts, nuts, rivets, iron washers and nails; miners' lamps and lamp glasses, electric lamps and fittings; steam, water and gun-metal fittings, &c.; ironmongery, files, saws, gouges, colliers' tools, knives, shovels and sundry stores; paints; brushes, brooms, &c.; pitch-pine deals, red pine, best quality, American birch boards and deals, poplar and elm curbs, elm, G. and T. match and flooring boards; wire ropes; lime and cement; oils. Forms of tender can be obtained on application to the Secretary, to whom tenders must be sent not later than June 7.

Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

DURING THE WEEK ending May 11th twenty failures in the building and timber trades in England and Wales were gazetted.

C. F. COOK, builder, Catford. R.O. May 1.
J. SHAW, builder, Crawley. Adj. April 30th.
J. W. VAUGHAN, builder, Colwyn. Deficiency £378.
I. TYSON, builder, Egremont. Gross liabilities £599; to rank £570; assets £347.

WHEATLEY & EASTON, builders, Whitkirk & Halton. Liabilities £1,270; assets estimated to produce £2,124.

G. YOUNG & Co., builders, Chiswick. P.E., Brentford Town Hall, June 8th, at 11.

C. STEARN & Co., builders, decorators and plumbers, Ipswich. Adj. May 3rd.

W. DRAKE, builder and contractor, Poulton-ley-Flde. P.E., Preston Sessions Hall, June 15th, at 11.

W. PREECE, senior, house decorator, Ledbury. P.E., Worcester Guildhall, May 22nd, at 2.

T. RHODES, joiner and builder, Macclesfield. R.O. May 2nd.

T. F. FINNEY, builder, Middleton-on-Row. First meeting, O.R.'s, Middlesbrough, May 16th, at 3. P.E., Stockton-on-Tees, May 16th, at 7.30.

J. MAKIN, builder, Belvedere. First meeting, 115, High Street, Rochester, May 21st, at 11.30. P.E., Rochester C.C., same day, at 2.30.

R. J. PARKER, contractor, London, N. First meeting, 14, Bedford Row, W.C., May 17th, at 12. P.E., Edmonton C.C., June 11th, at 11.30.

A. SUCKLING, builder and contractor, Halstead. Gross liabilities £5,679; expected to rank £3,814; assets estimated at £1,327.

Coming Events.

Wednesday, May 16.

ROYAL INSTITUTE OF PUBLIC HEALTH.—Mr. Carl Prausnitz on "The Bacteriology of Water, Milk and Tuberculosis," at 5 p.m.

JUNIOR INSTITUTION OF ENGINEERS.—Joint meeting with Architectural Association (Discussion Section), to continue the discussion on Mr. S. N. Bylander's paper on "Ferro-concrete," at 7.30 p.m.

SURVEYORS' INSTITUTION.—Annual dinner (Juniors), Trocadero Restaurant, at 6.30 p.m.

Thursday, May 17.

ARCHITECTURAL ASSOCIATION.—Annual Dinner, Georgian Hall, Gaiety Restaurant, at 7 p.m.

CHEMICAL SOCIETY.—Ordinary Meeting at 8.30 p.m.

SOCIETY OF ARCHITECTS.—Mr. Arthur Poley on "Some recent Law on Sewers and Drains," at 8 p.m.

WORSHIPFUL COMPANY OF CARPENTERS.—Mr. H. D. Searles-Wood, F.R.I.B.A., on "Timber and Half-timber Houses," at 7.30 p.m.

Saturday, May 19.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Visit to Bonnybridge Foundry, Stirlingshire.

JUNIOR INSTITUTION OF ENGINEERS.—Visit to Hornchurch, Essex, to inspect wharfing constructed in Ferro-concrete. Train leaves Fenchurch Street at 2.40 p.m.

NORTHERN ARCHITECTURAL ASSOCIATION.—Students' Sketching Club Excursion.

Monday, May 21.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.—Mr. Paul Waterhouse on "The London Traffic Commission Report," at 8 p.m.

Tuesday, May 22.

ARCHITECTURAL ASSOCIATION OF IRELAND.—Valedictory Address by the President, at 8 p.m.

WORSHIPFUL COMPANY OF CARPENTERS.—Mr. S. Barter on "Setting-out, Preparing and Fixing Joiners' Work," at 7.30 p.m.

ROYAL INSTITUTE OF PUBLIC HEALTH.—Mr. William R. Smith on "The Law of Public Health," at 5 p.m.

Wednesday, May 23.

ROYAL INSTITUTE OF PUBLIC HEALTH.—Mr. Carl Prausnitz's lecture (continued) at 5 p.m.

Friday, May 25.

ARCHITECTURAL ASSOCIATION.—Second Summer Visit, to Marsh Court, Hampshire.

ROYAL INSTITUTE OF PUBLIC HEALTH.—The Harben lectures at 5 p.m.

Monday, May 28.

SURVEYORS' INSTITUTION.—Annual General Meeting at 3 p.m.

ROYAL INSTITUTE OF PUBLIC HEALTH.—The Harben lectures at 5 p.m.

Wednesday, May 30.

ROYAL INSTITUTE OF PUBLIC HEALTH.—The Harben lectures at 5 p.m.

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THE BUILDERS' JOURNAL

AND ARCHITECTURAL ENGINEER.

May 23, 1906. Vol. 23, No. 589.

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A New Idea about Jerry-building.

Mr. G. K. CHESTERTON gives us a new idea about jerry-building. We should not say he knows very much about architecture, certainly not about modern architecture, but the criticism of laymen of ability is always interesting. Mr. Chesterton says that what we lack is not so much any good building as any good thing to build, and to his thinking he finds some consolation in the fact that the suburbs are jerry-built; the point about them is not so much that they are badly built as that they are not worth building well. Mr. Chesterton makes the charge that modern architecture is not modern, and he tells us that whereas if Michael Angelo were suddenly to wake and see a picture by Whistler or Manet he would call it "a new style," and would say the same about a story by Kipling or an opera by Wagner, if he looked upon the Gaiety Theatre or Westminster Cathedral he would exclaim, "Oh, I see you have the same style of architecture." Personally we find a difficulty in embracing the Gaiety Theatre and Westminster Cathedral as part of the same phase of architecture that Michael Angelo knew in his day, but Mr. Chesterton will have it so.

The Everlasting Campanile.

It has been quite refreshing to pass many months with never a word about the campanile of St. Mark's at Venice, but the golden silence has now been broken, immediately upon the removal of the hoarding round the foundations. The old argument about whether the tower should have been rebuilt or not is now dead, and nobody with any sense wants to rake up that matter again, but having decided upon the rebuilding the foundations can no sooner have been completed and a few courses of brickwork erected upon them than the howl begins again. This time it is of a more æsthetic nature than ever. A correspondent from Venice reminds us that, partly through the effects of time, partly through intentional efforts to raise it above the sea level, the pavement of the Piazza San Marco is now more than 2ft. 6ins. higher than it was originally, and consequently the bases of all the buildings are covered to that extent. The Campanile originally had five steps leading to it, while at the time of its fall only two-and-a-half were above ground. The architects of the new tower have copied the original five steps, which will, it is thought, when the Campanile is completed, make the other buildings in the Piazza, especially the Basilica of San Marco, already low, look very squat. Moreover, the offending five steps have been put in the same space occupied before by the two-and-a-half steps, "causing a grotesque and inartistic effect, which is heightened by the finished

and precise blocks of stone used in place of the original rough and irregular slabs. Both tower and piazza suffer immensely, the former because the space used for the steps is too narrow, and it is perched in an incongruous manner above the other buildings, and the latter because the basilica is lowered by comparison in such a way as to be out of all proportion." We should take these remarks with a considerable reservation. In our opinion, matters of this kind are very apt to be exaggerated by people who have not had their way in regard to them. We call to mind many such instances. Opinions about the rebuilding of St. Mark's Campanile are just as diverse now as they were at the time of the collapse, but we trust there is not going to be a persistent chorus of discord as every course of bricks is laid. We shall soon get very tired indeed of that.

Side Issues.

THE recent earthquake and fire at San Francisco has resulted in two rather amusing side issues so far as architects are concerned, which, however, are perhaps not so amusing to the architectural profession in America as they are to us here. It appears that the mayor of San Francisco, while the fire was still burning, telegraphed to the mayors of other cities asking them to provide, as one of our American contemporaries puts it, "not money, nor food, nor mechanics, but architects and architectural draughtsmen! Possibly the architects of the Golden State may think that this was quite needless, and that there is enough home talent to cope with the situation. It is possible, too, that, as the mayor is a union man—belonging to the musicians' union, we believe—and knows that there has been of late some friction between the city authorities and the San Francisco Chapter A.I.A., he may have felt that the architects of the city would actually go on strike in this hour of need, and that he would show wisdom in having strike-breakers on the scene early." The local architects will probably be most annoyed by the second instance of unnecessary interference from the city authorities. The official city architect has been appointed supervising architect of the new municipal buildings that will need to be erected. He will receive as his salary 2 per cent. commission on the cost of the building, and this amount will be deducted from the 5 per cent. which would be paid to the architects of the building. That is to say, they will receive 3 per cent. No wonder the Americans talk of the holding up of private practitioners, for whereas this individual used to receive 4,000 dols. as wages a year, he will apparently now have an annual income of 25,000 dols. to 35,000 dols.

SOME RECENT LAW ON SEWERS AND DRAINS.*

By Arthur P. Poley, Barrister-at-Law.

MY present object is not so much to examine the cases brought under the Public Health Acts, nor to criticize them, but to state results and to tell you what the effect of the recent decisions is, so that you can translate them into practice and, if called upon, to intervene in the interesting arguments that occasionally take place between clients and the local authority as to who is to pay for the repair of the thing—pipe or conduit, or whatever you like to call it for the purpose of avoiding the term "sewer" or "drain."

What is a Drain?

Now, I suppose most people who study the question at all are familiar with section 250 of the Metropolitan Management Act of 1855. It runs: "It is provided that in the construction of the Act the word 'drain' shall mean and include any drain of, and used for the drainage of, one building only, or premises within the same curtilage, and made merely for the purpose of communicating with a cesspool or other like receptacle for drainage, or with a sewer into which the drainage of two or more premises occupied by different persons is conveyed, and shall include any drain for draining any group or block of houses by a combined operation under the order of any vestry or district board (for which we may now read the order of any borough council), and the word 'sewer' shall mean and include sewers and drains of every description except 'drains' to which the word interpreted as aforesaid applies."

Now the drain is to drain one building only or premises within the same curtilage. If it drains more than one building it is a sewer, and if you can say on examination of a system of drainage that the drainage drains two buildings, unless there is an order of a vestry or district board in existence, or something else, which is not an order, but which

Judicial Ingenuity

has said is an order, you may safely say that the so-called drain is a sewer, which the local authority are bound to keep in order.

I call attention to judicial ingenuity, for I imagine anyone who knows anything of what sanitarians set before themselves in 1855 will know that their ideal was one house, one drain; they did not intend that a loose practice should grow up or be sanctioned of combined drainage in respect of new houses, except in special circumstances; if there was to be combined drainage it was to be under proper safeguards, and it was to be made by the order of the vestry or district board.

The Difficulty with Old Houses.

Now there were a number of old houses in existence in 1855 where there was already a system of combined drainage, and in respect of these a case of difficulty arose. They were built before the passing of the Act of 1855, and therefore there could be no order of a vestry or district board in regard to them: hence by the definition of a sewer as one that drained two or more houses these drains were sewers. Therefore the Legislature said it was never intended that the drains of all these houses should be sewers repairable by the vestry or district board; so we will make that clear by an Amendment Act: and accordingly the Act of 1862 was passed, and it declared that the word "drain," in addition to the definition I have already given, should include "any drain for draining a group or block of houses by a combined operation laid or constructed before January 1st, 1856, pursuant to the

order or direction, or with the sanction of the Metropolitan Commissioners of Sewers," who were created under that title in 1848.

The Application.

Therefore, in determining whether a drain draining two or more houses is a sewer, it is material to notice whether the houses were built before 1848. If they were you may be certain that the so-called drain is a sewer. If between 1848 and 1855, if there is no order or direction or evidence of the sanction of the Commissioners, then you may be also certain that the so-called drain is a sewer. If the drain draining two or more buildings came into existence subsequently to 1855 you must not lightly think that there must be an order of a vestry or district board in existence, as the Act in express words says "there may be evidence of an order, which the judges have said is just as good as an order."

How to decide the Point.

I can safely recommend any architect called in to advise on the point as to whether a drain is a sewer or not to examine what the evidence is in the surveyor's office of a metropolitan borough council before he expresses an opinion on the subject as to whether there is an order or not. If there is no note of a surveyor's approval, nor a minute of a vestry or district board, I think we may safely say there is no order, nor is there any evidence of an order, and if the drain drains two or more buildings it is a sewer.

The next point to ask is

What is a Building?

Two houses may constitute one building—a pair of semi-detached villas, in fact; this was so decided in *Humphrey v. Young* in 1903.

Another question that sometimes crops up is whether the premises are in the same curtilage. This is a question which largely depends upon the facts. The last case upon this point was *Harris and Others v. Scourfield* (T.L.R., Vol. 26, p. 268), decided in the latter part of 1904.

Part Sewer and Part Drain.

A practical matter of some difficulty often arises where three or four or more houses are drained by one drain, and by reason of there being no order or evidence of an order in existence the drain is a sewer. The question is as to whether any part of the sewer is a drain or not.

Let me take a case of three adjoining houses, numbered 1, 2 and 3 respectively: 1 draining into 2, and the joint drainage of 1 and 2 passing into 3. Is it a sewer from end to end? No. A pipe receiving the drainage of more than one building not being premises within the same curtilage is a sewer from and below the point where it receives the drainage of more than one such building: above that point it is a drain and not a sewer.

Justice Cave's Definition.

In *Beckenham District Council v. Wood*, 1896, 60 J.P., 490, Mr. Justice Cave said: "The general rule, as I understand it, is that where a drain receives the sewage of two or more houses it is a sewer; where it receives the sewage of one house only it may still remain a drain, though not necessarily, because it may be a sewer whether it takes the sewage of one house only or no house at all. A main sewer may be laid down by the local authority in a new street where no houses are built; but where it is intended houses shall be built subsequently the buildings may be commenced at the lower end of the street, and when the drains of one house are connected with the main sewer the connecting pipes will be drains and not sewers; but the sewer itself will no less continue to be a sewer although it receives only the drainage of that one house, and consequently a sewer without a drain at all will be a sewer."

Unauthorized Connections.

There is another matter to which I should like to allude before passing on to sewers and drains outside the Metropolis, and that is the unauthorized connections which builders sometimes make when the local authorities are careless in their supervision. Now, it would be very unfair that a builder who made such an unauthorized connection should turn round and say, when the drains required repairing: "I know this is an unauthorized connection. I admit I made it, but having made it between these two houses I have made a sewer, and you know it is not my business to repair a sewer." He cannot, however, act in this way, for it is a legal maxim that no one can take advantage of his own wrong, and a builder who made such a statement would be told that he would be stopped from raising such a defence. A late case has carried the principle a little further. *Heaver v. Fulham Borough Council*, 1904, 2 K.B., 383, decided that not only can the builder not raise it, but those to whom he has conveyed the property by voluntary conveyance cannot raise it, nor could the builder's executors or administrators. The best advice that one can give to a builder who has made an illegal connection between houses and, in fact, has constructed a sewer, is to get rid of the property as speedily as possible. A purchaser who buys it will be able to take advantage of the builder's wrong unless he chooses to be too inquisitive and wants to know all about it. As long as he is ignorant he is an innocent purchaser, and this is one of those cases "when ignorance is bliss, 'tis folly to be wise."

Recent Decisions Outside the Metropolis.

I must now turn to the subject of sewers and drains outside the Metropolis, and here it will be found that the recent decisions have been most important. The principal cause of trouble has arisen by reason of section 19 of the Public Health Acts Amendment Act, 1890, which provides that, where two or more houses belonging to different owners are connected with a public sewer by a single private drain, an application may be made under section 41 of the Public Health Act, 1875 (relating to complaints as to nuisances from drains), and the local authority may recover any expenses incurred by them in executing any works under the powers conferred on them by that section from the owners of the houses in such shares and proportions as shall be settled by their surveyor, or (in case of dispute) by a court of summary jurisdiction.

For the purposes of this section the expression "drain" includes a "drain used for the drainage of more than one building."

What a "Private" Drain is.

Now what does "private" mean? Well, it has been decided in *Thompson v. Eccles Corporation*, 1904, 2 K.B., 1, that "private" means a drain constructed on private ground, and private is not used by way of contrast to public, a view which had found acceptance with many of the judges. Therefore, where two or more houses belonging to different owners are connected with a public sewer by a single drain constructed on private ground, the section applies; that is to say, the machinery of the section can be employed to make the owner of that portion of the land through which the private drain which is out of repair runs put it in repair, or the local authority can do the work themselves in default of the owner and charge him with the costs.

Is a Private Drain a Sewer?

I think we can dismiss any idea as to whether the single private drain is a sewer or not. According to the judgment of Lord Russell, C.J., in *Bradford v. The Eastbourne Corporation*, which the Court of Appeal followed in the case of *Thompson v. The Eccles*

* Summary of a paper read before the Society of Architects on Thursday last, May 17th.

Corporation, the private drain is a sewer, and as such vests in the ordinary way in the local authority, but it is divested for the purposes of section 19, and for these purposes only. Now the term "vest" is one with which lawyers are familiar in connection with roads. The surface of a road vests in the local authority, but the soil is the property of the freeholders on each side of the road, and if it should happen that the local authority abandoned the road the surface would revert, or belong once more, to the freeholders. When this is understood it will be seen that the ordinary obligation of repairing a sewer, which, under section 13 of the Public Health Act, 1875, vests in the local authority, is transferred or divested for a special purpose, and as soon as that purpose is fulfilled the single private drain draining houses belonging to different owners reverts in the local authority again.

A Supposition.

Now, supposing that you discover the following state of things: a row of twelve houses belonging to one owner, each of the houses in the row draining at the rear into a pipe or conduit, and at a break in the row houses belonging to different owners, still a continuation of the row, also draining into a pipe or conduit in the rear, and a single private drain running at right angles to these pipes or conduits through the break in the row draining the drainage of all the houses into a public sewer. Is the pipe or conduit at the rear of the twelve houses, which would be a sewer by reason of the definition of a sewer, and not within the exception in section 19 of the Act of 1890, not a sewer because it drains into a single private drain?

The Wimbledon Urban Council in the case of *Jackson v. The Wimbledon Urban Council*, 1905, 2 K.B., 27, raised this contention. They said that since the sewage of all the houses ultimately traversed the single private drain, Mr. Jackson, who was the owner of the twelve houses I have given in the illustration, was liable for the non-repair of his pipe or conduit. The Court of Appeal said no! The place to be repaired could not be brought within the definition of a single private drain merely because sewage which was carried along it passed at some other part of its course through what could be properly called "a single private drain."

A Knotty Point cleared up.

The next case to which I will refer is that of *Joseph v. The Wood Green Urban District Council*, which was decided in August last year. There was a common pipe, which ran on private ground behind a row of sixteen houses. Six of these houses, belonging to the respondent, Joseph, drained into this so-called private drain or pipe, but the houses did not possess single drains, being drained in pairs, the drains of each connecting at the rear and thence running into the common pipe, which discharged into the public sewer. Now after the drains of each pair of houses had connected in the rear, the length of pipe which communicated with the alleged single private drain or pipe was a sewer. So there were six houses draining in pairs by three sewers into the alleged single private drain. Could the alleged single private drain be a single private drain in these circumstances? The Court thought not. They were of opinion that in these cases each house had a separate drain draining into the single private drain, and they decided that the alleged single private drain by reason of these three sewers discharging into it was not a single private drain at all, but a sewer.

Definition of a Sewer.

I should like now to pass from section 19 to refer briefly to some cases which are decided on the words of the definition of sewer and drain in the Public Health Act of

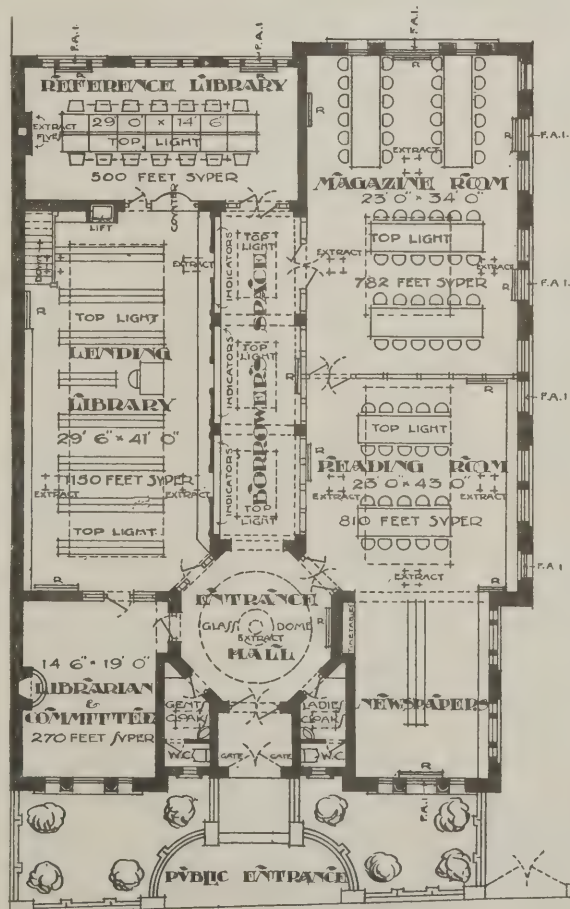
1875. The definition of "drain" is substantially the same as that I have already given in connection with this word under the Metropolis Management Act of 1855, but the word "sewer" includes sewers or drains of every description, except drains to which the word drain, interpreted as aforesaid, applies, and except drains vested in or under the control of any authority having the management of roads and not being a local authority under the Act. In other words, if you have not got a drain within the meaning of the definition of a drain, or a drain vested in or under the control of a road authority, your drain is a sewer, because every drain not within the excepted classes is a sewer. Therefore, if a house drains into a pipe, and the pipe receives the drainage of a field, the pipe from the place of junction is or should

be a drain which, as not coming within the exceptions, is a sewer. A recent case, the *Wincanton Rural District Council v. Parsons*, 1905, 2 K.B., 34, decides the contrary. The case has considerably puzzled me, and, with very great respect to the learned judges who decided it, I doubt its soundness. Nevertheless there it is, and architects called in to advise in respect of country houses where a similar state of things exists will do well to make a note of it.

New London Fire-station.—A new fire-station has been erected in Greycoat Place, Westminster, to take the place of the old station in Francis Street. It has been designed by Mr. W. E. Riley, F.R.I.B.A., superintending architect to the London County Council.



BANGOR LIBRARY.



FFORDD GWYNEDD

BANGOR FREE LIBRARY: FIRST-PREMIATED DESIGN.
A. E. DIXON, A.R.I.B.A., ARCHITECT.

WE illustrate on this page the selected design for the new free library to be erected at Bangor at a cost of £3,000. The architect is Mr. A. E. Dixon, A.R.I.B.A., of Messrs. Dixon & Potter, 65, King Street, Manchester. This design was awarded the first premium of £25 in the competition decided a few weeks ago, Mr. P. C. Thicknesse, F.R.I.B.A., of Liverpool, being the assessor. There is no need to describe the disposition of the rooms, as the plan clearly shows this. For the convenience of the staff a staircase from the lending library communicates with the basement which is arranged at the back of the building, as the ground falls in that direction; a staff and goods entrance are provided at this level, where also are a storeroom of ample size, a heating chamber, and store for coal and coke. It is proposed to carry out the elevation in red bricks with stone dressings and blue Welsh slates on the roof. The interior is intended to be finished with glazed tile dados in the principal rooms, floors of pitch-pine blocks on concrete, and marble and mosaic floors in entrance, vestibule and hall. The building is to be heated by hot water at low pressure, and ventilated by means of fresh-air inlets, ventilating radiators and roof ventilators, assisted by one or two electric fans. Lighting by electricity. We are indebted for the illustrations to the "North Wales Chronicle," of Bangor.

NOTES ON COMPETITIONS.

THERE is a bad epidemic of the non-assessor disease in the North. The past week has produced three cases, two of which are accompanied by complications which render hopes of recovery doubtful, in spite of their having been subjected to the most up-to-date treatment. The first case is that of the

New School at East Wemyss.

This is an open competition for a new elementary school and offices for senior pupils. Clause 2 of the conditions states: "After examining the plans submitted, the Board will forward the most suitable to the Scotch Education Department, whose decision will be final." It was a similar clause to this which led to all the trouble at Colchester, where competitors maintained that the plans selected by the Board were *not* the most suitable. Things go from bad to worse in clause 3, where "The Board does not, however, bind itself to carry out any one of the designs submitted." There are no premiums. Competitors are asked to visit and examine the ground for themselves and at the same time prepare for their own use a block plan of the site. Wemyss is in Scotland.

The second case is of the well-known "Carnegie" type and belongs to a

Proposed Free Library at Annfield Plain.

"Competitors must clearly understand that the committee's decision in the matter of the designs submitted are to be final and conclusive on all matters relating thereto." Thus definitely and ungrammatically commences the assessing clause. An objector has been informed that "it is not intended to call in any special expert assistance" and that "the members of the committee who have the matter in hand include a practical builder, a mining engineer and other practical persons." Truly a most practical committee, as is evidenced by the following clause, which is unique in its way, and worthy of adoption in that much under-assessed class of competition, "Carnegie" Libraries: "The competitors who signify their acceptance of these conditions and submit designs to the committee, by that act agree to accept the decision of the committee in the matter, and no competitor may or shall in any way have any legal cause for complaint or redress at the hands of all or any of the members of the committee for any decision or action on which the committee may by a majority of their number jointly determine." The picture of the committee crouched behind this fence in Annfield Plain, protected from the vituperative missiles of infuriated competitors, is humorous. Designs are to be sent in under motto.

The third case is at Durham, and is that of some

New Schools at Consett.

"The committee will select the plans which, in their judgment, will best meet their needs, and their decision shall be final and binding on all competitors." The effects of this clause are more limited than in the former instances, because competitors are being specially invited by the Education Committee, presumably from the environs of Durham. From information received, it appears that the Durham County Council is an old offender, and that the result of a former competition was anything but satisfactory. There is special need for expert assessing in this instance, for the school is not a small one; the accommodation required is for 1,100 children, at a cost of £10 per head, in addition to 15s. per sq. ft. of superficial area for central halls and science rooms.

In all the above cases representations have been made to the promoters in favour of the appointment of an assessor.

Secondary School, Liverpool.

The Competition Reform Society announces that it has received from the Town Clerk of Liverpool the following reply to its appeal on behalf of the appointment of an assessor in this competition: "I laid your letter of the 11th inst. before the Sites and Building Subcommittee at their meeting yesterday, when they desired me to say that they will appoint a professional assessor." This is satisfactory, and a reward which makes other cases not without hope.

The Peace Palace.

The selected design for the Peace Palace to be erected at the Hague has been pretty well circulated by now, and though it would seem to be highly admired by the public—being referred to, for example, in the "Graphic" as "a splendidly executed conception in the style of the chateaux of Northern France"—we are sure all architects in this country, at least, will marvel that such a hotch-potch should be the result of a competition like this, for which there were more than 200 competitors from all parts of the world. We have not had an opportunity of seeing the plan of the building, but it must indeed be of exceeding merit to cover the sins of the exterior, which exhibits at one and the same time the features of an hotel-de-ville in a second-rate French town and the unrestrained exuberance of a side-show at Earl's Court. Frankly we are amazed that such an atrocious design should have been awarded the first premium. We are glad to note, however, for the sake of this country, that Mr. Colcutt, the English representative on the jury, did not vote for it.

Society of Architects' Travelling Studentship Competition, 1906.

The subject of this competition was a country house costing not more than £3,000. Twenty-seven sets of designs were received from students of the Society, and the council has placed first the design by Mr. Victor H. Grist, of 4, Marlboro' Avenue, Reading, who thus becomes the first holder of the Society's Travelling Studentship, which is of the value of £25 and carries with it the silver medal of the Society. Some of the competitors considerably exceeded the limit of cost and were disqualified on that account, but in view of the number and general merit of the designs submitted the council has allocated a special prize, value £3 3s., placed at its disposal by the president (Mr. Albert E. Pridmore), to Mr. Alan G. Brace, of Sunny Croft, Knowle, Warwickshire. The following designs are specially mentioned:—No. 12, by Mr. Geoffrey Morland, of Croydon; No. 13, by Mr. Sydney G. Scales, of Westcliff-on-Sea; and No. 24, by Robert O. Jackman, of Kingston Hill. A public exhibition of the designs will be held at the Society's premises from May 28th to June 2nd inclusive, from 10 a.m. to 8 p.m., to which admission will be free on presentation of visiting card. Arrangements are also being made for the designs to be exhibited at Plymouth.

Branch Libraries, Sunderland.

The first premium in the competition for branch libraries at Sunderland has been awarded to Mr. Hugh Hedley, and the second premium to Mr. Clayton Green, both local architects.

New Technical Schools for Dublin.

At a recent meeting of the Dublin Municipal Council Alderman Kelly moved the adoption of the report of the Technical Education Committee with regard to the selection of an architect for the proposed new technical schools in Bolton Street, and asking for a suspension of the standing orders with a view to seeking competitive designs for the building from Dublin architects. Alderman Irwin said if they were to adopt this report it would mean the payment of £2,000 by way of a fee to an architect. Surely their own city architect should be entrusted with

the work, to be carried out in conjunction with the expert adviser of the Technical Education Committee. The Lord Mayor advised that the resolution and report should be allowed to stand over. They were already committed to the city architect. A question arose as to whether the standing orders were to be suspended to consider the resolution, and ultimately the Lord Mayor ruled the motion out of order, in accordance with the opinion of the law agent.

Competitions Open.

The following is a list of competitions open:—

DATE OF DELIVERY.	COMPETITION.
May 31	CHAPEL AND SCHOOLROOM AT MANSELTON, SWANSEA. Particulars from Mr. T. Roberts, 71, Brynhyfryd, Swansea.
June 26	NURSING AND CONVALESCENT HOME AT GLOSSOP, to cost £6,000. Premiums of £20 and £10. Particulars from Mr. T. W. Ellison, town clerk, Norfolk Chambers, Glossop.
" 30	ELEMENTARY SCHOOL AT EAST WEMYSS. Particulars from Mr. A. Watson Taylor, clerk to the School Board, East Wemyss, R.S.O., Fifeshire.
July 2	SECONDARY SCHOOL FOR GIRLS AT AIGBURTH VALE, for the City of Liverpool Education Committee. Limited to architects in Lancashire and Cheshire. Particulars from the Town Clerk, Municipal Offices, Liverpool.
" 4	SCHEME OF SEWERAGE AND SEWAGE-DISPOSAL WORKS AT WARBLINGTON. Premiums of £100 and £50. Particulars from Mr. J. W. Loader Cooper, clerk to the U.D.C., Queen Street, Emsworth.
Oct. 31	BOURSE AT CAIRO.—Premiums of £250 and £100. International competition. Designs to be submitted to the "Corporation des Agents de Change," Cairo, Egypt.
No date	DETACHED AND SEMI-DETACHED HOUSES AT CLIFTONVILLE, BELFAST.—Premiums £700. Particulars from R. J. McConnell & Co., 51, Royal Avenue, Belfast.

Obituary.

Mr. H. F. Froggatt, district surveyor for Hereford, died recently, aged 76.

Mr. G. C. Cornwall, one of the largest Government contractors in the Colonies, died recently in London, in his eighty-sixth year.

Mr. Thomas Wright, of Catford, died on May 11th, aged 84. For thirty-five years he was clerk of the works at Westminster Abbey, of which building he had a wonderful knowledge.

Mr. William Parrott, builder, of Chester, died recently in his eighty-first year. He had been in business in Chester for sixty years, and carried out some very important contracts.

Mr. Edward Salomons, F.R.I.B.A., the well-known Manchester architect, died on May 12th in his seventy-ninth year. A native of London Mr. Salomons had lived in Manchester since he was six years old, and had practised there as an architect since 1852. He was the architect for the Arts Treasures Exhibition at Old Trafford in 1887, and he also designed the Savings Bank in Booth Street, the Reform Club in King Street, the bank at the opposite corner of King Street and Brown Street, and the Prince's Theatre, besides warehouses in Peter Street, Portland Street, and other parts of the city. He was much sought after as an architect of large residences, and executed commissions of the kind in Cheshire and more distant parts of the country, as well as at Biarritz, Brussels, Amsterdam and other places on the Continent. Mr. Salomons' chief pastime was painting in oils and water colours. He was a founder of the Manchester Academy of Fine Arts and one of the founders of the Manchester Society of Architects, of which he was twice elected president.

A.A. MEMBERS' DINNER.

THE annual members' dinner of the Architectural Association was held on Thursday evening last at the Gaiety Restaurant, when about 140 guests were present, including Mr. E. Guy Dawber, F.R.I.B.A., the retiring president (who occupied the chair), Mr. R. S. Balfour (the new president), Sir Henry Tanner, Mr. Edwin T. Hall, Mr. Basil Champneys, Mr. H. T. Hare, Mr. J. Douglass Mathews, &c. After the Royal toast had been given, Mr. Arthur Keen proposed the toast of the R.I.B.A., to which Mr. Edwin T. Hall responded. Mr. Ryan-Tenison proposed "The Architectural Association," and Mr. Dawber, in replying, thanked the secretaries for the assistance they had rendered him during his year of office. He also referred with satisfaction to the reduction of the building debt, which was now practically wiped off. Mr. Walter Cave toasted "The Guests," for whom Professor Hulme responded.

THE PURPLE PATCH.

THE fourth spasm of "The Tufton Street Tatler, or The Purple Patch," is out upon us. We are getting to regard this effort of the wits of the Architectural Association with quite a tender affection, as, judging by the fund of ideas which our own pages afford the editors, its very being would seem to be bound up with our own; if we ourselves went in for a spasm and suddenly stopped publication it would go hard with the local convulsion at Westminster; meanwhile, we would remind our irregular and irresponsible contemporary (which, by the way, has had to raise its price from 6d. to 1s.) that accuracy is looked for even in its own pages, and that amateur editors are not exempted from spelling properly. Our own title is incorrectly given on p. 71, "Burnett" for "Burnet" on p. 73, "Caroe" for "Caröe" in several places, "J. O. Matthews" for "J. D. Mathews" and "F. T. Baggally" for "F. T. Baggallay" on p. 74, "Brunaleschi" for "Brunelleschi" on p. 86, &c. The number, however, is a good one. The next spasm will take place at the conversazione in November.

IN PARLIAMENT.

(By our Press Gallery Representative.)

The Perennial Question of Ventilation.

IN the Commons last week Mr. Dillon brought up again the question of the ventilation of the House, which, he complained, was still unsatisfactory.

Mr. Harcourt, replying, said that during the Easter recess he had had an exhaust tank placed on the roof of the Division Lobby which could extract 45,000 cub. ft. out of the Lobby in one minute. Enquiries by Dr. Haldane and Dr. Gordon into the ventilation of the House had not ceased, and an interesting bacteriological report on the experiments made would shortly be published. What was wanted was air large in volume but low in velocity. A velocity of about $1\frac{1}{2}$ ft. per second practically was not felt by anyone, and only very sensitive people felt a velocity of $2\frac{1}{2}$ ft. per second. Above that rate there was draught.

It was reckoned that the quantity of air requisite for a human being to enjoy good health was 50 cub. ft. per minute. The maximum accommodation of the chamber and its galleries was 900, and it was therefore necessary to drive through the chamber 45,000 cub. ft. of air per minute. The new input fans which were installed last year were worked at 47,000 cub. ft., the maximum speed being 58,000 cub. ft. The output fan had a similar exhaust capacity. He could change the air of the House without discomfort to members in four or five minutes.

Law Cases.

Workmen's Compensation.—In the King's Bench Division last week Mrs. E. G. Ward, of Shepherd's Bush, brought an action, on behalf of herself and her two children, to recover damages from Mr. T. L. Green, builder and contractor, on the ground that the death of her husband was due to the negligence of the defendant's servants. Early in 1904 defendant was building a new wing at the Boundary Road School, Camberwell, and plaintiff's husband was employed by Messrs. Pearson, who had contracted with defendant to supply and fix the necessary heating apparatus. Owing to a portion of the flooring of the third storey giving way, plaintiff's husband was precipitated to the ground. A radiator fell on him, and he received injuries from which he died. The jury found a verdict for the plaintiff and awarded £500 damages, £320 for the widow, £120 for the youngest son, and £60 for the elder son. The case had twice previously been tried, and on each occasion the jury had failed to agree.

R.I.B.A.

London Traffic Commission Report.

A MEETING of the Royal Institute of British Architects was held at No. 9, Conduit Street, on Monday evening, Sir John Taylor, K.C.B., vice-president, in the chair.

The death of Mr. Edward Salomons, elected an Associate in 1851 and a Fellow in 1860, was announced.

Mr. Paul Waterhouse, M.A., then read a paper on the London Traffic Commission Report. He dwelt chiefly on the proposal of the Commission that the traffic congestion of London should be relieved by certain alterations of existing streets, and notably by the construction of two new thoroughfares, one traversing the Metropolis from north to south, the other linking Bayswater with Whitechapel.

West-to-East Avenue.

Dealing with the west-to-east avenue, which it was proposed to strike north-eastward from Hyde Park at a point adjoining Victoria Gate, forming at that point a continuation of the Bayswater Road, which it was intended to widen all the way from Shepherd's Bush Station, Mr. Waterhouse pointed out the undesirable oblique junction of two important thoroughfares which would take place, and showed how by a slight deviation it could be overcome. In the case of Connaught Street, he recommended the destruction of both sides, so that Hyde Park Square might indicate the axis of the first straight length. Coming to the junction of Regent Street and Portland Place, he proposed the removal of Queen's Hall and the formation of a circular roadway round All Souls' Church.

As an alternative route, Mr. Waterhouse suggested that after passing through East Marylebone the avenue could glide between the churches of St. Andrew and All Saints, and cross Berners Street so nearly at right angles as to offer no undue disregard to the frontage of Middlesex Hospital. He also proposed that at certain points in the route new open spaces should be formed. The suggested route would lead through Russell Square and run parallel past the Foundling Hospital. The plunge through the Finsbury district, cutting through Finsbury Pavement House and the site of the displaced Roman Catholic church, involved the destruction of a mass of very costly new buildings and the mutilation of an attrac-

tive formation of frontage—the curve of Finsbury Circus—which seemed likely to result in a very heavy expenditure, not sufficiently balanced by compensating advantages. He further suggested that the proposed avenue, instead of passing along the south of Liverpool and Broad Street Stations, should cross the rails at a point north of the station buildings, where a road bridge already exists.

North-to-South Avenue.

As regards the north and south avenue, he suggested an entire change. Assuming that the Temple Pier was the point at or near which a new bridge was wanted, why not strike a nearly straight line for a magnificent street running from the great entrance of the Law Courts to the dome of Bethlehem Hospital? This street would, of course, be treated as regards level in the same way as Waterloo Bridge Road. That is to say, it would not descend to the level of the Embankment, but, retaining the high level secured at the Fleet Street or Strand end, it would pass over the Embankment Road, and would only descend on the south side of the river to pass under the railway lines near Waterloo Junction Station. The south end was sufficiently near the Elephant (the southern haven of the Commissioners), and the junction with the Strand was an approximation to the eastern horn of Aldwych. From Aldwych northward the avenue was ready made to Theobald's Road, and thence the bargain already effected between the London County Council and the Duke of Bedford for the widening of Southampton Row seemed to suggest that the avenue should take that line to Russell Square, where the two great avenues were to intersect.

North of Russell Square the line of route would continue along Woburn Place effecting the widening on the left-hand side so as to avoid injury to St. Pancras Church, and taking beyond the Euston Road the track of Seymour Street.

The lecturer claimed for his new route that it performed its purpose with more dignity, at less cost, and with far fuller efficiency than the Holloway-to-Elephant route of the Commissioners.

Architectural Design.

As regards the question of architectural design in the streets themselves, he deprecated any insistence upon uniformity of design on a large scale, referring to the failure of recent attempts to dispose of valuable frontage sites under conditions which barred the free exercise of personal architectural wishes and commercial requirements. Individualism in street architecture in London was by no means unsuccessful. He assumed, however, that if his or a similar scheme were eventually adopted certain points would be selected as demanding homogeneous and continuous design. If the proposed Traffic Board were appointed, it must certainly have as one of its chief duties the safeguarding and promoting of a concrete and definite plan of street improvement, and to do this he suggested the appointment of an architectural adviser to the Board. The architectural advisers should not himself design any portion of the new streets, unless in the matter of bare plan. For each building centre demanding continuous treatment a separate architect should be appointed; and on no consideration whatever should individual licence on the part of lessees or purchasers be allowed to prevail within the boundaries of such prescribed portions. Finally, on all parts of the new frontages perfect liberty of design and choice of architect should be allowed, subject to the control of the Board's architectural assessor or assessors, who should have absolute powers of censorship over all designs submitted.

Sir Melville Beachcroft proposed a vote of thanks, which Sir George Bartley seconded.

THE EFFECT OF FIRE ON BUILDING STONES.

A VERY interesting and valuable paper on this subject was read by Mr. W. R. Baldwin-Wiseman, M.Sc., before last week's meeting of the Surveyors' Institution. It set forth the results of a series of experiments made with the object of estimating the ultimate stability of a building after being subjected to a severe fire, by determining first the transverse and crushing strength of stone (a) when thoroughly dried, (b) when soaked in water, and (c) when made hot, and then either slowly cooled in air or suddenly plunged into cold water; and, secondly, determining the expansion of stone under heat, and its permanent alteration on subsequent cooling. In these experiments Mr. Baldwin-Wiseman was assisted by Mr. O. W. Griffiths, B.Sc., A.R.C.S., with whom he is now collaborating in another research on the physical properties of concrete and reinforced concrete.

In all, 24 classes of stone were experimented upon, 6 being sandstones, 9 limestones and calcareous freestones, 6 marbles, and 3 of igneous origin.

Sandstones.	Limestones.	Marbles.	Granite.
York.	Portland.	Carrara.	Red Peter-
Red Mansfield.	Monk's Park.	Rouge Royal.	head.
Aspatia.	Box Ground.	St. Anne's.	Grey Aber-
Quartzite.	Bradford.	Dove.	deen.
Daresbury	Bath.	Black.	Diabase.
(hard & soft).	Hopton Wood.	"Belgium	
Doubling.	Two chalks.	granite."	

How the Tests were Carried Out.

All the test pieces were dressed to strips 6 ins. by 1 in. by 1 in., excepting the marbles, which were 6 ins. by $\frac{3}{4}$ in. by $\frac{3}{4}$ in., the red granites 6 ins. by 1 in. by $\frac{3}{4}$ in., and the quartzites 6 ins. by $1\frac{1}{4}$ ins. by $1\frac{1}{4}$ ins. The marbles and granites were also polished on one face.

The heating of the stones was done in an electric furnace.

For the cross-breaking experiments the test piece rested on two thin pieces of rubber sheeting laid upon two rigid steel knife edges exactly 4 ins. apart; the test piece carried at its centre a steel saddle $\frac{3}{8}$ in. wide, rounded on the underside with a curve of large radius and terminating below in a hook, carrying a scale pan on which the load was placed in increments of 5 lbs. at a time. In the compression tests the test pieces were dressed to cubes of 1 in. side, and finished with smooth faces. These blocks were placed between two sheets of lead, 3 ins. by 3 ins. by $\frac{1}{8}$ in., to equalise the pressure, and crushed between the plates of an Olsen hand-fed triple-lever testing machine.

Results.

Considering first those experiments for determining the strength of the stone, many of the Doubling, Portland and Bradford test-pieces emitted a peculiar crackling noise during the first five minutes after insertion in and removal from the furnace. The York stone changed in colour from a straw yellow to a terra-cotta red, the diabase from a dark greenish-black to a dirty yellowish-green; while the Monk's Park, Portland, Hopton Wood and Box Ground stones became chalky in appearance and somewhat lighter in colour. The Aspatia test-pieces gave off a dense smoky cloud, which soon after flashed and burnt steadily for about a minute. Several stones, such as Doubling, disintegrated in the furnace or immediately after removal therefrom; while others disintegrated immediately on immersion in or removal from the water. Some, such as Doubling, Carrara marble, the red and (in a less degree) the grey granite, the Bradford and Bath oolites, and the Daresbury sandstone had but little cohesion, and crumbled to powder when touched or when more or less coarsely rubbed with the hand. Several Carrara marbles warped upon cooling, arching slightly; others, such as Hopton Wood,

Monk's Park and Box Ground stones retained a sharp arris, but the sides caved in, and cracks more or less deep developed at right angles to the direction of greatest length of the test piece.

SANDSTONES.

York.

As the results of these tests it was found that York stone, which has a crushing strength of 550 tons per sq. ft., and a transverse strength of 70 tons per sq. ft., or a strength only $\frac{1}{8}$ th of that in compression, deteriorates after subjection to high temperature, so that its resistance to crushing is only 36 per cent. of its original crushing strength when slowly cooled in air, or 40 per cent. when suddenly cooled in water, whilst its transverse strength is only 65 per cent. and 27 per cent. respectively, of its initial transverse strength when slow and fast cooled, so that if a fairly high factor of safety has been chosen in the original design a structure built of this stone may yet be serviceable, with certain safeguards, after a serious conflagration.

Red Mansfield.

Red Mansfield stone has a crushing strength of 160 tons per sq. ft. and a transverse strength of 40 tons, or a transverse strength only $\frac{1}{4}$ of that in compression; its crushing strength after subjection to a high temperature and the two modes of cooling is 100 per cent. and 87 per cent. respectively, whilst in cross-breaking the strengths for the corresponding conditions of cooling are 62 per cent. and 60 per cent., so that, although the deterioration in resistance to cross-breaking is material, it is not of such magnitude as to seriously impair the utility of a well-designed edifice; still less is this the case in regard to compressive stresses.

Aspatia.

The Aspatia stone is somewhat similar to Red Mansfield, in that its resistance to crushing and transverse stresses is 160 and 30 tons respectively, a ratio of 5 to 1, and the post-conflagration crushing strengths are 100 per cent. and 99 per cent. respectively, but it differs from Red Mansfield in that there is a more marked depreciation in its resistance to transverse stresses, to 20 per cent. and 15 per cent. respectively, so that if this material has to withstand crushing stresses only, its deterioration may in ordinary circumstances be negligible, but its depreciation in transverse strength so material as to necessitate grave consideration in the matter of its replacement.

Quartzite.

Quartzite, which has the moderately high crushing strength of 240 tons per sq. ft., and the phenomenally high transverse stress of 130 tons (more than twice the transverse strength of York and five times that of Aspatia), has a ratio of crushing to transverse stress of 8 to 5. It depreciates in compressive strength to 71 per cent. in both cases of slow and fast cooling from high temperature and in transverse stress to 89 per cent. and 93 per cent. respectively. The comparatively moderate diminution of its strength in compression and cross-breaking makes it a valuable stone, and as it is of a good colour and appearance, especially when polished, it should command an extensive market, not only for building purposes but also as road metal, for which its hardness and the cleanliness of its surface especially commend it.

Daresbury.

The soft Daresbury sandstone, with but little natural cementing material, has the comparatively low crushing and transverse strengths of 60 tons and 10 tons per sq. ft. respectively, a ratio of 6 to 1. Its resistance to crushing after both modes of cooling was practically nothing, as was likewise its resistance to transverse stresses when fast cooled; when slowly cooled, however, its

resistance to transverse stresses was about 48 per cent. of its original strength. As this soft stone is but rarely, if ever, used in building, it is not necessary to consider it further.

The hard Daresbury sandstone, being more coherent, offers a greater resistance to crushing and cross breaking, the breaking stresses being 130 tons and 20 tons per sq. ft. respectively, a ratio of 6 to 1; but after subjection to high temperatures its resistance to crushing, when cooled in any manner, is so trivial as to be negligible; so also is its resistance to transverse stresses when fast cooled. When slow cooled, however, its transverse strength is 21 per cent. of the maximum, so that, although initially twice as strong as the soft Daresbury sandstone, its depreciation of strength is twice as great, and both break under practically the same load; or in other words, the heat has the effect of entirely breaking down the efficiency of the cementing material on which its greater initial strength depended.

Doubling Stone.

Doubling stone, which has a crushing strength of 80 tons and a transverse strength of 20 tons per sq. ft., a ratio of 4 to 1, offers little or no resistance to crushing after subjection to high temperatures, for in most cases it fell into an incoherent mass of shelly fragments and sand in the furnace, or whilst cooling, or soon after placing on the table of the crushing machine. Under transverse loads its resistance fell to 2 per cent. and 7 per cent. respectively of its maximum strength, so that at a moderately high temperature it has no fire-resistance value whatever.

LIMESTONES.

Portland.

Portland base bed stone has a crushing strength of 260 tons, and a transverse strength of 90 tons per sq. ft., a ratio of 3 to 1. This subsequently depreciates after subjection to high temperature to 60 per cent., and 51 per cent. in crushing strength, and to 66 per cent. and 14 per cent. in transverse strength respectively, when slow and fast cooled, so that the local action of water in suddenly cooling the stone materially depreciates its strength under both conditions of loading.

Monk's Park.

Monk's Park stone, with a compressive strength of 100 tons and a transverse strength of 40 tons per sq. ft., a ratio of 10 to 4, depreciates in compression to 82 per cent. and 74 per cent. respectively, and in transverse strength to 43 per cent. and 37 per cent., so that, in sustaining crushing loads, it might within certain limits be trusted after a conflagration to perform its office, but could not be trusted to sustain any severe transverse stresses.

Box Ground.

Box Ground stone, with crushing and transverse strengths of 60 and 30 tons per sq. ft. respectively, a ratio of 2 to 1, depreciates in compression to 49 per cent. and 54 per cent. of its original strength, when slow and fast cooled, and depreciates in transverse strength to 2 per cent. and 24 per cent. respectively; so that, whilst it might with due precautions, serve again in compression, it could not be trusted to bear any transverse loads whatever.

Bradford.

Bradford stone, with crushing and transverse strengths of 60 tons and 30 tons per sq. ft., a ratio of 2 to 1, deteriorates so that its strength, after subjection to high temperature, is 50 per cent. and 40 per cent. of its initial compressive strength, and 34 per cent. and 23 per cent. of its initial transverse strength.

Bath.

Bath stone, with slightly greater resistances to crushing and transverse stresses of 70 tons and 40 tons per sq. ft. respectively, a ratio of 7 to 4, deteriorates similarly to 51 per cent.

and 45 per cent. in compression, and to 35 per cent. and 26 per cent. in transverse loading. The depreciation in strength of both the two previous stones is so great as to render them untrustworthy after subjection to a severe conflagration.

Hopton Wood.

Hopton Wood stone, with crushing and transverse strengths of 190 tons and 60 tons per sq. ft. respectively, a ratio of 3 to 1, depreciates in compression to 57 per cent. and 39 per cent. respectively, and when transversely loaded to 39 per cent. and 29 per cent.

Chalks.

The chalks, with their low initial strengths of 20 tons and 10 tons per sq. ft. respectively, had no residual strength whatever, after subjection to the high temperature, the expansion set up by the high temperature in all probability serving only to rupture the walls of the pores and break up the material.

MARBLES.

Carrara.

Carrara marble, with initial compressive and transverse strengths of 290 tons per sq. ft. and 50 tons per sq. ft., a ratio of 6 to 1, depreciates to 55 per cent. and 66 per cent., and to 19 per cent. and 9 per cent. of the respective strengths, when heated and cooled in the two prescribed modes.

Rouge Royal.

Rouge Royal marble with compressive and transverse strengths of 410 tons per sq. ft. and 120 tons per sq. ft. respectively, deteriorates to 55 per cent. of its initial compressive strength when cooled in either way, and to 33 per cent. and 24 per cent. of its transverse strength when slow and fast cooled.

St. Anne's.

St. Anne's marble, with compressive and transverse strengths of 590 tons and 140 tons per sq. ft. respectively, a ratio of 4 to 1, depreciates to 38 per cent. and 45 per cent. in compression, and to 34 per cent. and 27 per cent. in transverse strength; this stone is remarkable in that it depreciates in an almost identical ratio in both strengths when slowly cooled.

Dove.

Dove marble, with a compressive strength of 380 tons per sq. ft., and a transverse strength of 140 tons per sq. ft., a ratio of almost 3 to 1, depreciates in ratios somewhat similar to those for Carrara marble; its compressive strength diminishing to 50 per cent. and 41 per cent. respectively, and its transverse strength to 8 per cent. and 15 per cent. according to the two modes of cooling.

Black.

The black marble, with an initial resistance to crushing of 430 tons, and to transverse loads of 190 tons per sq. ft., a ratio of 2 to 1, depreciates in crushing strength to 61 per cent. and 70 per cent., and in transverse strength to 59 per cent. and 14 per cent. This marble and the Portland stone exhibit the most marked depreciation of resistance to transverse loads when suddenly cooled from a high temperature, and to a lesser extent the Belgian granite displays similar qualities.

Belgian Granite.

The Belgian granite, which has a considerable vogue owing to its uniformity of texture and its comparative cheapness, has a compressive strength of 350 tons per sq. ft. and a transverse strength of 130 tons per sq. ft., a ratio of about 3 to 1; it depreciates to 59 per cent. and 69 per cent. in compression, and to 46 per cent. and 22 per cent. respectively when transversely loaded.

GRANITES.

Red Peterhead.

This, with initial crushing and transverse strengths of 350 tons and 90 tons per sq. ft. respectively, a ratio of 4 to 1, depreciates to 8 per cent. and 6 per cent. in crushing strength and to 10 per cent. and 6 per cent. when

transversely loaded; at once indicating the absolute inutility of granite as a fire-resisting medium; comparable only in its utter depreciation with the poorer sandstones and calcareous freestones.

Grey Aberdeen.

The grey granite with slightly higher initial crushing and transverse strengths of 380 tons and 170 tons per sq. ft. respectively, a ratio of about 2 to 1, depreciates to 33 per cent. and 51 per cent. in crushing strength and to 11 per cent. and $\frac{1}{2}$ per cent. in transverse strength, so that this stone, although it greatly deteriorates, does not so utterly fail in compression as the red; doubtless owing to the somewhat smaller and more uniform size of its component crystals, giving rise to less internal disturbance during expansion and contraction; and it should be noted that, as with York stone, Box Ground, St. Anne's marble, Black marble and the Belgian granite, the crushing strength is slightly increased when suddenly cooled, compared with that when slowly cooled, doubtless because the sudden cooling at the surface gives rise to an intimately interlocked skin; but the grey granite fails more absolutely under transverse loads than does the red, owing to its smaller sized grains.

Diabase.

The diabase with compressive and transverse strengths of 300 tons and 120 tons per sq. ft. respectively, a ratio of 3 to 1, depreciates to 86 per cent. and 50 per cent. of its initial crushing strength, and to 24 per cent. and 5 per cent. of its initial transverse strength, when slow and fast cooled, so that it might within limits be trusted in compression after subjection to the high temperature of a conflagration, but could not be at all trusted under transverse loads.

EXPANSION.

The tests for expansion showed that the sandstones as a class have the greatest co-efficients of expansion in the first range of temperature from 20 degs. C. to 100 degs. C., the co-efficients varying from 9 millionths for Aspatia, to 16 millionths for Quartzite; in the higher or second range of temperature, from 100 degs. to 200 degs. C., there is an increase of the co-efficient to 1.5 times that at the lower range in the case of the Red Mansfield as the greatest rate of increase, and 1.1 times that at the lower range for the hard Daresbury as the least variable. In the highest or third range of temperature, from 200 degs. C. to 300 degs. C., there is a greater variation in the rate of change of the co-efficient than in the two previous ranges, the co-efficient for the Red Mansfield being 1.9 times that in the first range, whilst that for the Aspatia and the Quartzite remain practically constant at the value for the second range.

In general, the sandstones exhibit least variation in their rate of change at the higher temperatures, but the initial mean co-efficient of expansion in the lowest range is so high that the uniformity is more apparent than real.

The oolites exhibit a most marked diversity at all temperatures, the Doulting stone having the greatest co-efficients of expansion, in all three ranges, the values being 22.4, 26.2 and 26.7 millionths respectively.

The Bradford stone has the least co-efficient in the first range, the co-efficient being only 2.5 millionths, which is the least value in the co-efficient of all the stones upon which experiments were conducted: the Monk's Park, Box Ground, Portland and Bath stones having similarly low co-efficients of 3, 4, 5 and 5 millionths respectively. But with increase of temperature the diversity is most marked, the co-efficient of expansion from 100 degs. C. to 200 degs. C., considered as a ratio of that at the lower range, varying from 1.2 for the Doulting stone to 4.0 for the Bradford stone, with values of 1.6, 2.3, 2.3 and 2.5 respectively for the Portland,

Monk's Park, Box Ground and Bath stones; in the still higher range from 200 degs. C. to 300 degs. C. the co-efficient remains practically the same for the Doulting stone, but increases to 5.4 times the co-efficient in the first range for the Bradford stone, with intermediate ratios of 2.9, 3.5, 3.8 and 4.6 respectively for the Portland, Bath, Monk's Park and Box Ground stones.

In the case of the marbles, the greatest co-efficient of expansion, for the lowest range of temperature, from 20 degs. C. to 100 degs. C., is 9.2 millionths for Dove, and the least 4.4 millionths for St. Anne's; in the next range, from 100 degs. C. to 200 degs. C., the extreme ratios of the co-efficients to those in the lower range are 3.7 for St. Anne's and 1.8 for Hopton Wood; and in the higher range, from 200 degs. C. to 300 degs. C., the extreme ratios are similarly 4.1 and 2.1 times that of the lowest range, for St. Anne's and Dove respectively.

The igneous rocks in general possess co-efficients similar to those of the sandstones, the co-efficients being 10.2 millionths and 9.7 millionths respectively for the red granite and diabase, but with increase of temperature there is a material increase in the rate of expansion; the red granite having co-efficients of 17.0 millionths and 21.6 millionths in the higher ranges from 100 degs. C. to 200 degs. C., and from 200 degs. C. to 300 degs. C., the ratios being 1.0 to 1.7 and 2.1 respectively in the three ranges of temperature; whilst the diabase has co-efficients of 1.5 millionths and 1.6 millionths at the two higher ranges, giving corresponding ratios of 1.0, 1.5 and 1.6 respectively in the three ranges.

CONCLUSIONS.

It will be seen that stones which have almost identical co-efficients of expansion in one range of temperature have widely varying co-efficients in another, so that if two such stones are bonded together in a structure, and subjected to any considerable range of temperature, the varying expansion at identical temperatures will give rise, not only to severe molecular stresses within the material of the stone, but will also induce a disturbance in the distribution of the external stresses in the structure.

Furthermore, for example, Aspatia, Dove marble, red granite and diabase have co-efficients of expansion in the first range of temperature from 20 degs. C. to 100 degs. C. not greatly differing from those for iron, steel, &c.; but in the higher ranges of temperature there is a great diversity; so that in a combination of, say, granite and steel, as in the modern skeleton steel framework structure, with masonry exterior, most severe stresses must be set up during a fire by the variable expansion of the metal and stone alone, irrespective of the heat distortion of the unprotected ironwork, giving rise to a depreciation of the strength of the stone in addition to that produced by heat alone.

From these considerations it will be at once apparent that, although the incorporation of dissimilar stones in the fabric of an edifice may, by their contrast in colour and texture, materially contribute to the artistic and architectural effects, such a miscellaneous assemblage is not to be recommended from a fire-resistance point of view, and in a less degree this heterogeneity is not in the strictest sense advisable, bearing in mind that the diurnal and annual variations of temperature are not inconsiderable even in these climates.

Also, in designing for fire resistance, no masonry whatever should be carried on the upper boom of a plate girder, for not only are the molecular stresses set up by the variable expansion of metal and stone injurious, but the increased deflection of the beam, under increase of temperature, induces a settlement of the masonry above it and brings additional lateral stresses upon the masonry.

Enquiries Answered.

The querist's name and address must always be given, not necessarily for publication.

Gunter's Lines.

RUGBY.—A. H. A. writes: "Kindly explain or say where an explanation can be found of Gunter's lines on a 3 ft. rule."

The 3 ft. rule is probably a form of Gunter's rule including all kinds of scales, such as scales of chords, tangents, sines, &c. The scales to be found upon such rules are altogether too numerous to explain in these columns, but an explanation will be found in most books upon mathematical instruments. A book entitled "Mathematical Instruments and How to use them," by F. E. Hulme, F.L.S., F.S.A., and published by Kegan Paul, Trench, Trübner & Co., Paternoster House, Charing Cross Road, is particularly clear in its description of these scales. If this or some similar book does not contain all the information required we will further advise you if you will send us either the rule or accurate drawings of it.

H. Y. M.

Cottages for Farm Labourers.

CAMBRIDGE.—FEN-IAN writes: "I am proposing to erect a (bungalow) cottage for a farm labourer in the fen; to construct it of studwork set on a dwarf brick sill, covered on the outside with creosoted f.e. boards and inside with matchboarding, the roof to be of corrugated iron over felt. Kindly advise me as to (1) the material to fill in between the inside and outside covering of the studs; (2) a satisfactory substitute for any of the materials or method of construction proposed, e.g., Ruberoid for roof; (3) any special method of building the only heavy portion of the cottage, i.e., the chimneys, having regard to the foundation. I need hardly say that cost must be kept down to the lowest point possible."

(1) Clean dry wheat "hulls" or barley or oat chaff rammed in tightly is the cheapest thing I am acquainted with; it will be found quite satisfactory for the purpose.

(2) The only suggestion I make is that you should first board the roof (with unplanned boards), then batten it to carry the corrugated iron, and omit the felt. The air enclosed between the roof boards and the ceiling (which latter I should form of grooved and tongued boarding) will keep the house warm enough, and there will be an absence of the dry-rot which felt so often produces in roofs. (3) A very usual method of construction in fen districts is to build the heavy portion of such a building on the top of the ground (without excavation), because that is the only sound portion of the earth. You should spread the weight over as much surface as possible. I have found crossed planks or wattled hurdles useful in such a case.

F. S. I.

Bolton Abbey: Vaulting.

BOLTON.—H. W. H. writes: "Please name a book or set of plates, similar to Bowman & Crowther's, containing drawings of the Perpendicular west front of Bolton Abbey; also a book with illustrations on vaulting suitable for the R.I.B.A. testimonies of study."

There do not appear to be any plates of Bolton Abbey similar to those by Bowman & Crowther. A good plan of the Abbey with a key to the dates of its various parts and a fine perspective of the west front by Mr. J. A. Slater were published in the "Builder" of May 4th, 1895. The most useful book with illustrations suitable for your practical masonry sheet of testimonies of study is "Practical Masonry," by W. R. Purchase, published by Crosby, Lockwood & Son, 7, Stationers' Hall Court, Ludgate Hill, 1904, 7s. 6d. Other books worth referring to are the following:—"Stereotomy," by French & Ives; "Examples of Groined Vaults," by J. Battye; "Gothic

Architecture," by Bond; "History and Development of Vaulting in England," by E. W. M. Wonnacott; "Construction of Vaults," by R. Willis; "Gothic History and Development," by G. H. West; "Vaults and Vaulting," by C. Babcock and T. H. Eagle; "Vaults and Bridges," by S. Ware; "King's College Chapel," by C. Fowler and F. Mackenzie; "Misure delle volte volte et oblique," by P. Lucci; "Architecture des Voutes," by F. Derart; "Banstine," by I. C. Von Lassanex; and "Geometry," by Sparton. Some of these will be found in any architectural library, and all will be found at the library of the R.I.B.A.

H. Y. M.

The Albert Hall.

A. C. F. writes: "Who designed the Albert Hall? What is the interior diameter of the building, taken at the spring of the cupola, and what is the height of the interior, taken from the pavement to the summit of the aperture or border of the interior of the cupola? When was the building completed?"

The Albert Hall was originally designed by Captain Fowke, who, dying, was succeeded by Major-General H. Y. D. Scott, C.B., as architect. The latter considerably altered the original scheme of the former. The roof was designed by Mr. R. M. Ordish. The frieze of monochrome inlay representing the triumphs of Art and Science was designed by the Academicians, H. W. Pickersgill, Armitage, Marks and Poynter. The work done by each of the above artists will be found fully explained in a paper read before the R.I.B.A. by Major-General Scott on Monday, January 22nd, 1872, and printed in the "Transactions" of the Institute. The building is an ellipse on plan, the total length being 266ft. from outer wall to outer wall, and the total breadth 232ft. Drawings or descriptions giving details of the dimensions required do not appear to have been published. The building was completed in May, 1871.

H. Y. M.



FRAMLEY URBAN DISTRICT
COUNCIL OFFICES at CAMBERLEY

Scale for ELEVATIONS
Feet

Scale for PLANS
Feet



SIDE ELEVATION.

FRONT ELEVATION.

Architect
J. R. B. D. G. C. G. G.



(Royal Academy Exhibition, 1906.)

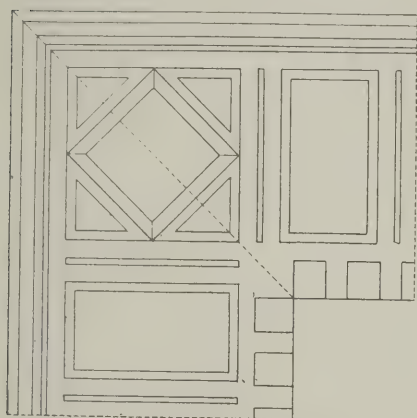
S.K. EXAMINATIONS IN BUILDING CONSTRUCTION.—STAGE I.

[Not more than seven questions to be answered. The value attached to each question is shown in brackets. Time of examination, four hours.]

THESE answers are not intended to be exhaustive. It is attempted to suggest to students the mode of answering. The examiner does not ask the questions in order to be enlightened by the student on the subject of building construction: he wants to know how much the student knows of the subject, and the student should exhibit this with the least possible trouble to the examiner. Answers should be as concise as possible.

*1. Make a neat tracing in ink of the drawing given, with the writing: the lines should be firm and solid and should finish accurately at the proper points. (15)

THEATRE OF MARCELLUS.



Soffit of Cornice.

[Note.—This drawing fairly tests the candidate's experience with a drawing-pen: the exact stopping of lines at the points of meeting, uniformity of thickness, and ink sufficiently thick and black. It would be easy to criticize the drawing—for example, the triangles surrounding the square are not equal, that at the left lower corner being noticeably larger than the others; however, the candidate has nothing to do with this; his business is to accurately trace lines which will exactly cover lines on the drawing.]

2. Describe fully what you know of blue lias lime, its origin, manufacture, preparation and the precautions to be taken in its use. (12)

Lias is the name of a geological division of rocks. The limestone from lias strata in England is found, when burnt, to produce a more or less "hydraulic" lime. The unburnt stone is of a dark-blue colour; hence the name blue lias. It has been worked at Lyme Regis in Dorset, Watchet in Somerset, at Rugby, Barrow-on-Soar and Whitby. Lias limestone is carbonate of calcium with an irregular proportion of clay included in it. It should be ground after burning, like Portland cement. The blue lias limestone after being quarried is broken like road metal; it is then burnt in a suitable kiln—Hoffmann for preference; then ground fine in a mill and afterwards made up in bags for distribution. If the lime is put into work too fresh after applying water to it, the action of slaking continues after the wall is built, with the result that the work is disturbed and broken: if kept too long before using, its value as a hydraulic lime is diminished. (Hydraulic limes, compared with rich limes, are slow in slaking.)

This is a somewhat long answer; perhaps a shorter one would get full marks.

3. What are the essential properties of a good brick? Distinguish between the following bricks, and state for what purpose they are chiefly used: Fletton, gault, red rubber, blue Staffordshire. (12)

A good brick should be strong to resist crushing, it should take good hold in the wall, successfully resist the disintegrating powers of frost and weather, and be of proper shape and proportions. Portland cement should adhere well to it: faces which show in work should be smooth and true. (These qualities assume that the clay from which the brick is made is suitable, that it has been properly worked, and that the brick has been properly burnt.) A good brick from a heap of bricks having a common origin has kept its shape, is small in size, uniform in colour and easily picked out by its appearance; when taken up in pairs the pair of bricks should be struck together.)

"Fletton," a cheap brick suitable for internal work, not uniform in colour nor well suited for facing bricks.

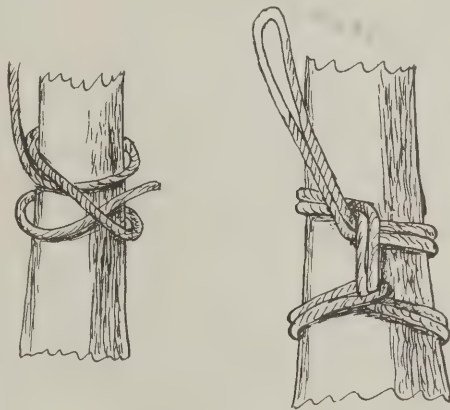
"Gault," a heavy hard white brick made from the clay known to geologists as gault, at Burnham, Aylesford, Hitchin, &c.; good for any kind of strong work in walls.

"Red rubber," a soft red brick suitable for cutting and rubbing to special shapes; not a strong brick, but homogeneous and of uniform colour throughout.

"Blue Staffordshire," made from clays in Staffordshire which contain iron; a hard heavy dark blue-black brick, very durable, used for paving, channels, coping, &c., and for any kind of heavy and strong brickwork, sheeting of bridges, &c.

[Note.—"Fletton" is not to be found in most of the text-books. As the name of a place it is not found in the Encyclopædia Britannica. It is the name of a parish near Peterborough. The bricks are made from clays which are geologically very recent; they are known in London as "Flitters." An elementary student should be let off lightly if he failed to answer "Fletton."]

4. Show by a sketch on your squared paper how a pole should be slung by a rope for lifting vertically. (12)



It is advisable usually to keep the centre of gravity of the pole well below the point of attachment of the rope.

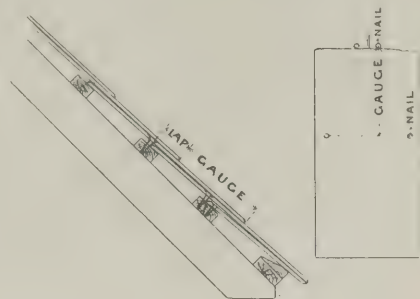
5. What is the size of a countess slate? Describe clearly and fully what is meant by "lap" and "gauge" in a slated roof, and illustrate your answer by sketches. (14)

20 ins. by 10 ins. The "lap" in slates nailed near the centre is the distance between the tail of any course and the head of the course next but one below it. In slates nailed near the head it is the distance between the tail of any course and the nail-hole of the next course but one below it. The "gauge" is half the difference between the length of the slates and the lap ("length" in head-nailed slates being the distance between the nail-hole and the tail), or gauge = $\frac{\text{length} - \text{lap}}{2}$

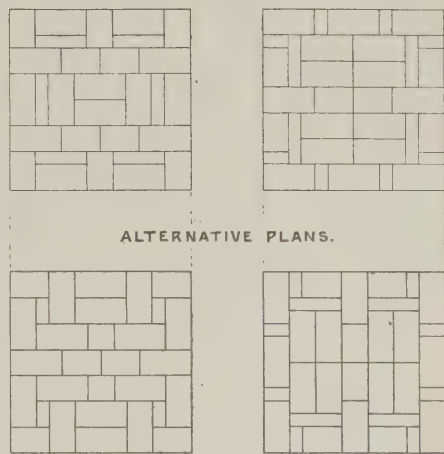
in slates nailed near the centre, and
total length (inches) — 1 — lap (inches)
2

in slates nailed near the head. "Gauge," in other words, is the depth of the "margin." Laths are spaced to the gauge, centre to

centre. The sketches show slating nailed near the centre.



6. Draw to a scale of $\frac{1}{12}$ (1 in. to a foot) the plans of two consecutive courses of a square $3\frac{1}{2}$ -brick pier in Flemish bond: the joints may be shown by single lines. (14)



ALTERNATIVE PLANS.

A.

B.

Of the alternative plans shown, "A" is the better bonded and stronger pier; there is also less waste in cutting.

7. You have the choice of the following stones in building a mansion with stables attached: state in what parts you would use them, giving your reasons: Granite, Whinstone, Hard York, Craigleith, Portland Whitted, Box Ground, Hopton Wood, Derbyshire marble. (14)

Granite.—Polished columns, plinths, &c., for outside. A good silicious granite stands the weather well as a polished stone. Granite is good for heavy walling, but is not used for fine carving owing to the expense of cutting it. Good for setts for stable and yard; when of the right kind it does not wear too smooth.

Whinstone.—Not usually polished; rubble foundations; may be used for pavements, but does not hammer-dress so easily and regularly as granite; not so obviously crystalline as granite.

Hard York.—A sandstone; dressings, rubbed ashlar, landings, sills, &c. A good building stone fairly easily worked with mallet and chisel.

Craigleith.—A silicious bound sandstone. A very excellent building stone for nearly every purpose, except very fine carving. Dressings, landings, steps, sills, &c.

Portland Whitted.—Best Portland; comparatively easily worked; good for carving; stands the weather well. Capitals, hood-moulds, arches, piers, columns, &c.

Box Ground.—Similar to Portland, also an oolite (Bath stone), used for same purposes as Portland; a softer, coarser stone, but a good stone.

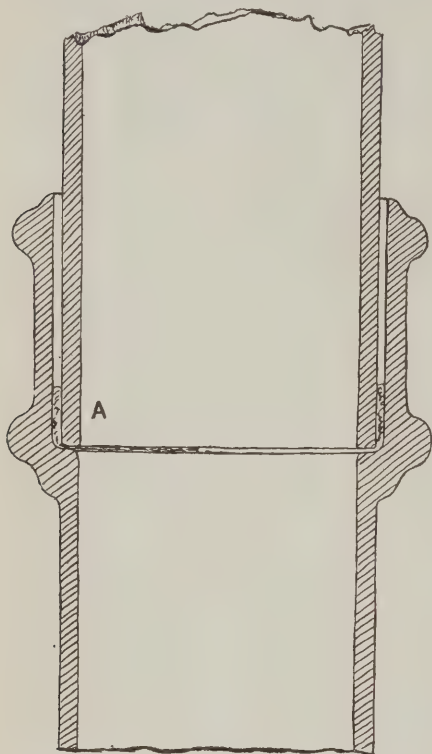
Hopton Wood.—Shelly limestone; good for steps and ornamental purposes, mantel-pieces, &c.; polishes and retains polish indoors.

Derbyshire Marble.—Somewhat similar to Hopton Wood, but richer and better entitled

to be called marble. Mantels, staircases, &c., dados, stone balusters, &c.

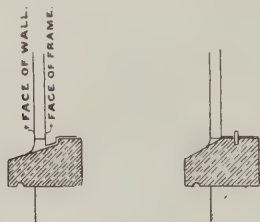
8. Sketch full size on your squared paper a vertical section through the junction of two 3in. round cast-iron rainwater pipes, and describe the method of jointing. (14)

Very frequently rainwater pipes, called by Scotch plumbers "conductors," are "jointed" without any cementing material. If they are used as ventilators to drains the joints should be made close. "Rust joint" is made by filling the space between spigot and socket with iron filings and sal ammoniac.



A leaded joint with gaskin and lead set requires a stronger socket than is usual for rainwater pipes. The joint may be filled with glazier's putty or white lead (and red lead). It is well in case of any kind of filling to put a light yarning indicated at A on the sketch.

9. A York stone sill is described as "7ins. by 4½ins. rubbed, weathered, and throated." Draw to a scale of ½ (1½ins. to a foot) a cross-section of this sill, and describe in their proper order the operations of the mason in preparing it. (14)



Alternative sections shown. A sill 4½ins. deep does not course with ordinary brick-work, though it would course with the 2½in. Ruabon bricks.

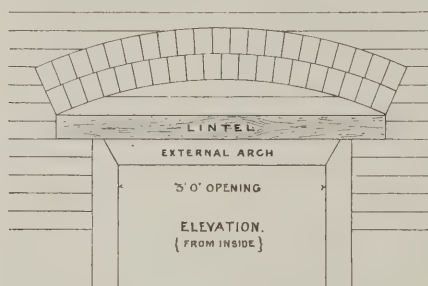
Operations in Dressing.—First take one bed out of twist or "wind" by chisel drafts, sighting by parallel lath, punching off to a rough level, and dressing with "boaster" between the drafts made. Gauge thickness and dress the other bed in similar manner, doing least work necessary in the case of the top bed, where to be weathered. Mark off width of nose and line along top bed for top of weather, dress weather, throat and groove, finish seatings, joint, and rub smooth the exposed surfaces with rubbing tool.

10. If lead weighs 710 lbs. per cub. ft., what is the thickness of 6 lb. sheet lead? What weight lead should be used for flats, dormer cheeks, flashings, hips and valleys, soil pipes? (12)

Lead weighing 710 lbs. per sq. ft. might be called 710 lb. lead, and 710 lb. lead is 12ins. thick. 710 lbs. : 6 lbs. :: 12ins. : 10ins. 72 = 101.

On flats lead has to be strong to bear frequent walking upon and to bear the pull of expansion and contraction. On the other places lighter (thinner) lead is sufficient. For flats, 6 lbs. to 8 lbs.; dormer cheeks, 5 lbs. to 6 lbs.; flashings, 3 lbs. to 5 lbs. (depending upon width, aspect, &c.); hips, 5 lbs. to 7 lbs. ("secret" flashings to hips, 3 lbs. to 4 lbs.); valleys, 6 lbs. to 8 lbs.; soil pipes, 10 lbs. to 16 lbs.

11. A window opening 3ft. wide is spanned by a wooden lintel 4ins. deep with 6ins. bearing at each end. Draw to a scale of 1/12 (1in. to a foot) an elevation of the opening and the lintel with a segmental discharging arch over it in two half-brick rings. (12)



12. A compound girder is composed of a 12in. by 5in. rolled steel joist with a gin. by ½in. steel plate top and bottom. Sketch on your squared paper one-quarter full-size (3ins. to a foot) a section through this girder: the rivets need not be shown. (15)



NEW LONDON BUILDINGS.

AT yesterday's meeting of the London County Council the Building Act Committee reported the following applications under the London Building Act, 1894, their recommendations as to consent or refusal being appended in *italics* :—

Buildings on the southern side of High Street, Clapham, to abut also upon Aristotle Road and Cato Road, on the application of J. Donkin, on behalf of the trustees of the Foster Estate. (Consent.)

Retention of a show case in front of No. 340, King Street West, Hammersmith, on the application of G. H. Vardell. (Consent.)

Projecting clock in front of Griffin & Son's premises, Kemble Street, Holborn, on the application of J. J. Griffin & Son, Ltd. (Consent.)

Retention of a wooden oriel window at No. 3, Holland Lane, Kensington, abutting upon Holland Park Road, on the application of J. A. Minty, on behalf of W. T. Lord. (Consent.)

Projecting porches over the doorways of Nos. 32 & 34, Oakcroft Road, Lewisham, on the application of Kennard Brothers. (Consent.)

Projecting porch in front of No. 16, Oakcroft Road, Lewisham, on the application of Kennard Brothers. (Consent.)

Addition at the rear of No. 33, Vancouver Road, to abut upon Hurstbourne Road, Lewisham, on the application of T. Harris, on behalf of C. E. Bennett. (Consent.)

Porches and bargeboards to twelve houses on the eastern side of Cranston Road, Forest Hill, southward of No. 12, on the application of A. R. Westworth. (Consent.)

Station buildings on the northern side of St. John's Hill, Battersea, on the application of C. L. Morgan, on behalf of the London, Brighton & South Coast Railway Co. (Consent.)

Completion of a one-storey shop commenced to be erected on the forecourt of No. 650, Wandsworth Road, Clapham, abutting upon Queen's Road, on the application of W. C. Poole, on behalf of M. Jones. (Consent.)

Show case at No. 224, Regent Street, at less than the prescribed distance from the centre of the roadway of Argyle Place, on the application of F. Sage & Co., Ltd., on behalf of T. & J. Perry. (Consent.)

Projecting oriel window to a building in course of erection at the corner of Oxford Street and Davies Street, and projecting shop fronts to the Oxford Street and Davies Street frontages of such building, on the application of W. A. Lewis, on behalf of Perry Brothers. (Consent.)

One-storey shop on the forecourt of Victoria Station, Pimlico, on the application of L. W. Livesey, on behalf of the London, Chatham and Dover Railway Co. (Consent.)

Addition over the existing porch in front of No. 10, Carlton House Terrace, Westminster, on the application of D. Blow and F. Billerey, on behalf of Viscount Ridley. (Consent.)

Projecting clock and sign in front of the Lyceum tavern, No. 354, Strand, on the application of Brown & Barrow, on behalf of Henekey. (Refusal.)

Extension of the periods within which the erection of a warehouse building on the site of Nos. 74 and 76, De Beauvoir Crescent, Kingsland, with external walls at less than the prescribed distance from the centre of the roadway of Hertford Road, was required to be commenced and completed, on the application of G. H. Lovegrove, on behalf of J. King & Co., Ltd. (Consent.)

Addition to the Newport Market Army Training School, Coburg Row, Westminster, at less than the prescribed distance from the centre of the roadway of the street on the application of E. T. Hall, on behalf of the Committee of the Newport Market Army Training School. (Consent.)

Addition to a coach-house on the eastern side of Shepherd's Walk, Rosslyn Hill, Hampstead, with a boundary wall at less than the prescribed distance from the centre of Shepherd's Walk, on the application of F. R. Hasluck, on behalf of W. Clark. (Consent.)

Building at the rear of No. 168, Camden Road, St. Pancras, at less than the prescribed distance from the centre of the roadway of Camden Mews, on the application of G. Stapley, on behalf of J. Boulting. (Consent.)

Projecting one-storey shop in front of No. 14, Montpelier Vale, Blackheath, on the application of A. Roberts, on behalf of E. F. Blow. (Consent.)

Addition with half-timber work, in front of "West Lodge," Love Lane, Blackheath, with a forecourt fence at less than the prescribed distance from the centre of the roadway of Love Lane, on the application of G. F. Havell, on behalf of Mrs. Penn. (Consent.)

Addition at the side of No. 90, St. Ann's Hill, to abut upon All Farthing Lane, on the application of W. West, on behalf of F. R. Turtle. (Refusal.)

Retention of a greenhouse and covered-way at the rear of No. 33, Middleton Road, Hackney, abutting upon Mayfield Road, on the application of J. Hamilton, on behalf of A. Maskall. (Consent.)

One-storey stables and water-closets on the western side of Raymouth Road, Rotherhithe, in front of railway arch No. 28, on the application of J. Barrett. (Refusal.)

Two new streets for carriage traffic, one to lead out of the northern side of McLeod Road and the other to be in continuation eastward of Blithdale Road, Bostall estate, Abbey Wood, Plumstead, on the application of W. B. Sheppard, on behalf of the Royal Arsenal Co-operative Society, Ltd. (Consent.)

Deviation from the plans approved on 30th August, 1905, for the formation or laying-out of new streets for carriage traffic on the Furzedown Park estate, Back (or Rectory) Lane Streatham, so far as relates to an alteration in the direction of a portion of the road, on the application of W. J. Janes, on behalf of R. H. Miller. (Consent.)

New street for carriage traffic on the southern side of Downhill Road, Hither Green, Lewisham, on the application of R. Stewart. (Refusal.)

Modification of the provisions of that section with regard to open spaces about buildings, so far as relates to the erection of No. 20, Brightside Road, Hither Green, with an irregular open space at the rear, on the application of Norfolk & Prior, on behalf of J. Laird. (Consent.)

Building, to be known as the Piccadilly Hotel, on a site abutting upon Piccadilly Place, Piccadilly, Vine Street, Regent Street and Air Street, on the application of W. Woodward & W. Emden. (Refusal.)

Building to exceed in extent 250,000 cub. ft. and to be used for the purposes of a garage for motor omnibuses on land at the rear of Shrubland Road, Hackney, on the application of F. Boreham & Son, on behalf of the Motor Bus Co., Ltd. (Refusal.)

The Glasgow Technical College Architectural Craftsmen's Society now has a membership of 127.

The Scheme for a Great Marine Station at Dover has now been decided upon. The Admiralty Pier, having been considerably lengthened, is to be increased in width to the extent of 215ft., and a section about the same area as the Charing Cross terminus is to be covered by an iron and glass roof so as to form a vast marine station, the most extensive of the kind in the world. Work is to be commenced as soon as the Royal assent has been given to the unopposed Bill in Parliament this session, and it is hoped to complete the station in less than three years.

Complete List of Contracts Open.

WITH a few exceptions, news of Contracts Open are not repeated after they have been published once in these columns, so that readers will find particulars in our previous issues of other contracts that still remain open.

Unless expressly stated to the contrary all deposits required for bills of quantities, &c., are returned on receipt of *bona-fide* tenders.

The words "Fair Wages Clause" inserted in certain paragraphs signify that persons tendering must conform to a fair-wages clause in the contract, which requires them to pay the rates of wages current in the district.

BUILDING.

May 24. Invercharron.—Mason, carpenter, slater, plumber and plaster-works of renovations to the steading, and a servant's cottage, on the farm of Culrain. Plans and specifications can be seen with A. Maitland & Sons, architects, Tain, and offers to be lodged with them on or before May 24.

May 24. Sunderland.—Supplying and fixing movable partitions at Diamond Hall Infants' School. Drawing and specification may be seen and form of tender obtained at the Borough Surveyor's Office, Town Hall. Sealed tenders addressed "To the Chairman of the Education Works Sub-Committee," and endorsed "Tender for Partitions, Diamond Hall Infants' School," must be delivered at the Town Clerk's Office, Town Hall, before noon, on May 24.

May 24. Dorchester.—Repairs and alterations at the Dorchester County Hospital. Specifications, prepared by Walter J. Fletcher, A.M.I.C.E., may be seen at the boardroom of the hospital. Tenders must be sent, marked outside "Tender for Repairs," to Walter E. Groves, clerk, not later than May 24.

May 24. Monquhitter.—Mason, carpenter and slater works of Steading, Maryland, Tillymauld, Monquhitter. Plans and specifications may be seen with the tenant and with James Duncan & Son, architects, Turriff, and attendance will be given at Maryland on May 22 at 3 p.m., to show the site to intending contractors. Sealed tenders to be lodged with the Architects on or before 10 a.m. on May 24.

May 24. Maldon.—Erection of a new secondary school and pupil teachers' centre for the Education Committee. Builders desirous of submitting tenders are requested to forward their names to the architect, P. M. Beaumont, High Street, Maldon, on or before May 24.

May 24. Luxulyan.—Erection of a new cloakroom to Luxulyan school according to plan and specification, which may be seen at the school or at the office of B. C. Andrew, architect to the Committee, Biddicks Court, St. Austell. Forms upon which all tenders must be made may be had from the Architect or Secretary. Sealed endorsed tenders to be sent to F. R. Pascoe, secy., Education Office, Truro, on or before May 24.

May 25. London, S.E.—Erection of additional class-rooms and science rooms, cloak-rooms, lavatories, gymnasium, and alterations and additions at the Roan Girls' School, Devonshire Road, Greenwich, S.E., for the Governors. Drawings and specifications may be seen at the offices of the architect, Alfred Roberts, F.R.I.B.A., 92, London Street, Greenwich, S.E., from whom bills of quantities may be obtained on payment of a deposit of £5. Sealed tenders, on the form and in the envelope supplied, must be delivered at or before 9 a.m. on May 25 at the architect's office.

May 25. London, N.—Erection of a new sorting office at Palmer's Green, N. Drawings, specification and a copy of the conditions and form of contract may be seen on application to J. Wager, H.M. Office of Works, Westminster, S.W. Bills of quantities and forms of tender may be obtained at the Office of Works on payment of £1 rs. Tenders must be delivered before noon on May 25, addressed to the Secretary, H.M. Office of Works, &c., Storey's Gate, London, S.W., and endorsed "Tender for Palmer's Green Sorting Office."

May 25. West Hartlepool.—Infirmary extension, and new laundry to be erected within the union grounds, for the Guardians. Quantities can be obtained on deposit of £1 rs. for each set, and plans and specifications seen at the office of J. J. Wilson, architect, Tower Street, West Hartlepool. Tenders, properly endorsed and sealed, to be sent to G. Kilvington, clerk, Guardians' Offices, Hart Street, West Hartlepool, not later than noon on May 25.

May 25. Barrow-in-Furness.—Erection of four teen houses in Thwaite Street and Brewery Street, for the Barrow Co-operative Society, Ltd. Bills of quantities may be obtained at the office of the architect, Henry T. Fowler, A.R.I.B.A., 6, Cornwallis Street, Barrow. Tenders to be forwarded to James Clarkson, Barrow Co-operative Society, Ltd., Abbey Road, not later than noon on May 25. Fair wages clause.

May 25. Penzance.—Alterations and additions at the Public Free Library. Plans and specification may be seen at the office of the Borough Surveyor, Public Buildings, to whom tenders are to be sent not later than May 25.

May 25. Aberdare.—Erection of a villa residence at Llwyddoc, Aberdare, for W. M. Jones. Plans and specification may be seen and bills of quantities obtained on deposit of £1 rs. at the office of J. Llewellyn Smith, architect, Aberdare. Sealed endorsed tenders to be sent to W. M. Jones, 2, Victoria Square, Aberdare, not later than May 25.

May 25. Litton Mills.—Proposed Council school, Litton Mills, near Miller's Dale, to accommodate eighty children. Builders wishing to tender for the work are to communicate at once with the architect, where plans, specifications and conditions of contract may be seen. Bills of quantities will be supplied on payment of £1 rs. Sealed tenders, with the schedules, in envelopes provided for the purpose, sealed and endorsed "Tenders, Litton Mills," to be posted to John B. Mason, architect and surveyor, Duffield, near Derby, by the evening post on May 25.

May 25. Navan.—Erecting fourteen two-storey cottages on the Kells Road, Navan, in accordance with plans and specification prepared by R. Barnes, A.M., I.C.E.S., which may be inspected on any day between 10 and 5 o'clock at the office of the U.D.C., Trimgate Street, Navan. Copy of specification, bill of quantities and forms of tender are to be had from the Clerk on payment of £1. Sealed tenders, covering priced bill of quantities, are to be endorsed "Tender for Cottages," addressed to the Chairman of the Council, and delivered to the Clerk of the Council not later than noon on May 25.

May 26. Greete.—Erection of a combined parish room and cottage at Gr-etle, near Tenbury, for Col. Hope Edwardes. For particulars apply in writing to W. W. Robinson, architect, Hereford. Sealed tenders, marked "Tender for Greete Parish Room," to be sent to W. S. Davies, solicitor, Tenbury, not later than May 26.

May 26. Chedzoy.—Improvements to latrines and ventilation at the Council School, Chedzoy. Plans, specification and further information at the office of Samson & Cottam, architects, Bridgwater. Sealed tenders must reach the County Education Office, Weston-super-Mare, before noon on May 26.

May 26. Cookstown.—Building of twenty-six labourers' houses, in six single houses and ten double house blocks, for the R.D.C., as under:—Double house, in Cluntyferagh, on the land of John Reid; double house, in Clare, on the land of James Steele; double house, in Moveagh, on the land of Mrs. Burnside; single house, in Edendoit, on the land of Edward M'Court; double house, in Cavanakeeran, on the land of Repts. Peter M'Guone; single house, in Allen, on the land of R. P. M'Gowan, J.P.; double house, in Desertcreat, on the land of Robert Hassard, J.P.; double house, in Templereagh, on the land of William Stewart; single house, in Drumagullion, on the land of Repts. of Joseph M'Quade; single house, in Ballywholan, on the land of John Joyce; single house, in Gortigal, on the land of Thomas Harbison; double house, in Killycolpy, on the land of John W. Macky; double house, in Kilmascally, on the land of Lewis O'Neill; double house, in Annetter More, on the land of Felix O'Neill; double house, in Kinturk, on the land of Edward M'Lernon; single house, in Sessia, on the land of Robert Young. Plans and specifications can be seen at the office of Henry Shillington, M.A., M.E., Lurgan, or at the Office of the Clerk of the Council, Cookstown. Tenders will be received and considered for one or more single houses, also for one or more double house blocks, but in no case for single houses being part of double house blocks. Tenders to be lodged with H. A. Mann, clerk of Council, Board-room, Cookstown, not later than 10 a.m. on May 26.

May 28. Cilcennin.—Alterations and repairs to the school for the Cardigan County Education Committee. Plan and specification or copies of the same can be seen either at the school building in charge of the headmaster, or at the office of the architect, G. Dickens-Lewis, county architect, 12, Terrace Road, Aberystwyth. Tenders, sealed and endorsed "Cilcennin School Repairs," are to be delivered at the office of B. C. Jones, clerk to the District Education Committee, Aberystwyth, not later than noon on May 28.

May 28. Rhymney.—Works for the U.D.C.:—Retaining wall, about 100 cub. yds.; barbed wire fencing, about 2,200 yds.; post and tube fencing, 1½ in. and 2 in., about 320 yds. Plans and specifications may be seen at the office of the Council, No. 61, High Street, Rhymney, between 9 and 10 and 4 and 5 any days except Thursday and Saturday, 9 and 10 only. Tenders to be sent to L. Reynolds, solicitor, Milbourne Chambers, Merthyr Tydfil, sealed and endorsed, "Fencing, &c.," not later than noon on May 28.

May 28. Bolsover.—Proposed Council school, Bolsover, to accommodate about 640 children. Persons desirous of tendering for the work may see the drawings, specification, agreement, &c., at the office of the Architect to the Committee, St. Mary's Gate, Derby, between 10 and 4, except on Saturday, when they will be on view from 10 to 12. A copy of the bill of quantities, specification, conditions of contract and form of tender can be obtained at the Architect's Office upon payment of £1 rs. Sealed tenders in envelopes provided for the purpose, and endorsed "Tender for New Council School, Old Bolsover," must be delivered to George H. Widdows, A.R.I.B.A., architect to the Committee, County Education Offices, St. Mary's Gate, Derby, not later than 5 p.m. on May 28.

May 28. Pemberton.—Erection of the Carnegie library, Pemberton, for the borough of Wigan. Quantities may be obtained, and plans, &c., inspected on application to J. B. & W. Thornley, architects, College Chambers, Wigan. Tenders, endorsed "Carnegie Library," to be delivered to Harold Jevons, town clerk, not later than May 28.

May 28. Pontypridd.—Restoring, including new chancel screen, reredos, re-seating, flooring and heating, &c., at St. Mary's, Glyntaff, Pontypridd. Plans and specifications may be seen at the office of Arthur Lloyd Thomas, engineer and architect, Church Street Chambers, Pontypridd. Sealed and endorsed tenders to be sent to the Rev. Gomer Jones, M.A., The Rectory, Glyntaff, on or before May 28.

May 28. Ross.—Erection of stabling, &c., near the Stock Market, according to the plans and specifications, which may be seen at the Council Offices. Tenders, endorsed "Stabling," to be delivered at the Council Offices not later than noon on May 28.

May 29. Newcourt.—Alterations and repairs to the school, for the Cardigan County Education Committee. Plan and specification or copies of the same can be seen either at the school building in charge of the headmaster or at the office of the architect, G. Dickens-Lewis, county architect, 12, Terrace Road, Aberystwyth. Tenders, sealed and endorsed "Newcourt School Repairs," are to be delivered at the office of Tivy Jones, clerk to the District Education Committee, Lampeter, not later than noon on May 29.

May 29. London, E.—Erecting a school on the Janet Street site, Westferry Road, Poplar, E., for sixty mentally defective children, for the London County Council. Persons desiring to submit tenders may inspect the drawings and specification and obtain the bills of quantities, form of tender and other particulars at the Education Offices (Architect's Department), Victoria Embankment, W.C., upon payment to the cashier of a sum of £3. Tenders must be upon the official forms, and the printed instructions contained therein must be strictly complied with. Fair wages clause. Tender must be enclosed in an envelope (which will be provided), and delivered at the Education Offices (Room 148), Victoria Embankment, W.C., not later than 11 a.m. on May 29.

May 29. Senghenydd.—Erection of sixty houses and road-making, &c., at Senghenydd, for the Lewis Merthyr Consolidated Collieries, Ltd. Drawings and specifications can be seen at the office of John H. Phillips, F.R.I.B.A., Clive Chambers, Windsor Place, Cardiff, to whom sealed tenders, endorsed "Senghenydd," are to be delivered on or before May 29.

May 29. London, S.E.—Supply of roofing complete for platforms of new station in Madras with sheltering shed and footbridge, for the South Indian Railway Co., Ltd. Specifications and forms of tender may be obtained at the Company's offices. A charge, which will not be returned, will be made of £1 for each copy of the specification. Copies of the drawings may be obtained at the office of Sir George B. Bruce, 3, Victoria Street, Westminster, on payment of 5s. per sheet. Tenders addressed to the Company marked "Tender for Roofing" must be left with Henry W. Notman, managing director, 55, Gracechurch Street, E.C., not later than noon on May 29.

May 30. Colchester.—Erection of a school in Greenstead Road, to be known as the East Ward Council School. Plans and specifications may be seen and bills of quantities obtained at the architect's, Goodey & Cressall, Victoria Chambers, Colchester, on payment of a deposit of £5. Fair wages clause. Tenders, under seal, must be on the form supplied, endorsed "Tender for School, East Ward, Colchester," and delivered at the Education Offices, 8, East Stockwell Street, Colchester, not later than noon on May 30.

May 30. Durham.—Rebuilding premises at the rear of 61, Saddler Street, Durham. Plans and specifications may be seen and quantities obtained at Rushworth's Art Gallery. Sealed and endorsed sole tenders to be delivered to Rushworth & Son not later than May 30.

May 30. Rye.—Erection of an Isolation Hospital, for the R. and U.D.C. Plans and specifications may be seen at the office of E. J. Cory, F.S.I., High Street, Rye, between 10 and 4 (Saturdays excepted). Tenders, under cover, endorsed "Hospital Tender," must be delivered to Walter Dawes, clerk, Bank Chambers, Rye, not later than noon on May 30.

May 30. Abram.—Erection of a new public elementary school at Lilly Lane, Bryn Gates Abram, near Leigh. The plans may be seen and bills of quantities obtained at the office of the County architect, Henry Littler, 16, Ribblesdale Place, Preston, by payment of a deposit of £2. Tenders must be delivered before noon on May 30, sealed and endorsed, to W. Aspinall, Rockleigh, Ashton-in-Makerfield.

May 31. Truro.—Erection of new stores, &c., on the site of the old smelting works, Trafalgar Square, Truro, for W. G. Goodfellow, according to plans and specifications, which may be seen at the office of A. J. Cornelius, M.S.A., architect, Truro. Sealed endorsed tenders to be sent to W. G. Goodfellow, The Parade, Truro, on or before May 31.

May 31. Mountain Ash.—Erection of buildings to be used in connection with the Workmen's Institute, Mountain Ash, for the Committee. Plans, &c., may be seen at our Offices, 1, Jeffrey Street, Mountain Ash, or 42, Canon Street, Aberdare. Endorsed tenders to be sent to Morgan & Elford, not later than May 31.

May 31. Sudbury.—Erection of additional accommodation, consisting of nurses' bedrooms, isolation ward, &c., at St. Leonard's Hospital. Drawings, specification and conditions may be seen at the office of the architect, Alfred Howard, Cornard Road, Sudbury, from whom further information can be obtained. Tenders, which are to be sent in by May 31, should be sealed and endorsed "Tender for Additional Accommodation at St. Leonard's Hospital," and addressed to Joseph Alexander, Esq., secretary of the St. Leonard's Hospital, Sudbury.

June 1. Port Patrick.—Erection of a dwelling-house at Port Patrick, in the county of Wigtown. Copies of the bill of quantities will be supplied on application to the Superintendent Engineer, H.M. Naval Establishment, Kossyth, Inverkeithing, N.B. The drawings, specifications and conditions of contract may also be seen there, and at Port Patrick Coastguard Station and the Office of the Director of Works Department, Admiralty, at which latter place tenders are to be deposited before noon on June 1.

May 25. Huddersfield.—Construction of engine foundations at the Power Station, Longroyd Bridge. Plans, specifications and general conditions may be seen, and bills of quantities and forms of tender obtained, on application at the offices of K. F. Campbell, M.I.C.E., borough engineer and surveyor, 1, Peel Street. Sealed tenders, endorsed "Tender for Engine Foundations," signed in the handwriting of the tenderer or his agent, and addressed "Town Clerk, Town Hall, Huddersfield," must reach him not later than 10 a.m. on May 25.

May 25. Edinburgh.—Asphalte roofing proposed to be executed at the new police and fire station at Saunders Street, Stockbridge, according to plans and specification which may be seen at the Public Works Office, where also schedules of quantities may be obtained. The estimates must be sent, sealed and marked "Tender for Asphalte Roofing, Saunders Street Police and Fire Station," to R. Morham, city architect, Public Works Office, City Chambers, Edinburgh, by 10 a.m. on May 26.

May 29. Underbarrow.—Rebuilding the Middle Road Bridge over the River Pool in Underbarrow. Plans and specifications for the work may be seen on application to James Willison, Tullithwaite Hall, and tenders must be sent to Alfred Leeming, the drainage superintendent, Brigsteer, on or before May 29.

May 31. Bristol.—Erection of Wesley Memorial church, Bryant's Hill, Bristol. Plans, &c., may be seen any weekday from 9.30 a.m. to 4.30 p.m., on application to G. Peters, Kingscote House, Bryant's Hill, St. George, Bristol. Quantities obtained of W. Huggill Dinsley, architect, Chorley, Lancs., on deposit of 10s. 6d. Tenders to be delivered to the Rev. W. J. Clarke, Elmira Villa, Hanham, near Bristol, not later than noon on May 31.

June 1. Leeds.—Erection of a woollen mill adjoining Dewsbury Road, Beeston, Leeds, for W. Douglas Persons, desirous of tendering for the various works required should send in their names to T. A. Buttery & S. B. Birds, 1, Basinghall Square, Leeds. Plans and specifications may be seen and quantities obtained on and after May 25. Sealed and endorsed tenders to be sent to T. A. Buttery and S. B. Birds, 1, Basinghall Square, Leeds, before 4 p.m. on June 1.

June 2. Arnside.—Erection of a residence at Arnside, for W. F. Bolton. Plans and specifications may be seen and particulars obtained at the office of G. L. Hoggarth, architect, Kendal and Arnside, to whom tenders are to be sent by June 2. Preference will be given to the contractors who can commence and complete the work in the shortest time.

June 2. Priddy.—Alterations and additions to the Council school, Priddy, during the summer holidays. Drawings and specifications are at the offices of Price & Jane, Weston-super-Mare. Sealed tenders must reach the County Education Office, Weston-super-Mare, before noon on June 2.

June 2. Leigh.—School. The Corporation of Leigh invite builders desirous of tendering for the erection of a new school in Windermere Road to send in their names to the architects, J. C. Prestwich & Son, Bradshaw Gate Chambers, Leigh. The drawings, general conditions and specification may be inspected, and the bill of quantities with the form of tender annexed, obtained at the offices of the Architects on deposit of £1. Tenders on the form provided, addressed to the Chairman, School Buildings Committee, Town Hall, Leigh, and endorsed "Tender for Council School," must be sent to Stanley Wilson, town clerk, Town Hall, Leigh, before noon on June 2.

June 4. Kinloss and Findhorn.—Mason, carpenter, slater, plumber, plasterer and painter works of alterations and additions at the schools of Kinloss and Findhorn. Plans and specifications may be seen with Peter Fulton, architect and surveyor, North of Scotland Bank Buildings, Forres, who will receive tenders up to 10 a.m. on June 4.

June 4. Ludlow.—Extension of the Infirmary at the Union Workhouse, and for the execution of works of drainage at the same workhouse. For plans and specifications apply to B. Weale, architect, East Hamlet, Ludlow. Separate tenders for each of the works must be sent in to Arthur W. Weyman, clerk to the Guardians, Ludlow, on or before June 4.

June 4. Durham.—Improvements to Middleston Moor School. Plans, specification and conditions of contract may be seen and forms of tender obtained at the School or the Architect's Office. Sealed endorsed tenders to be delivered to W. Rushworth, F.R.I.B.A., architect, County Education Offices, Shire Hall, Durham, on or before June 4.

June 4. Taunton.—For the following works in accordance with the specifications, &c., prepared by the borough surveyor:—Erection and putting up of a mortuary and post-mortem room at the Coal Orchard Yard; paving (with bricks), curbing and channelling of one side of Leslie Street, Rowbarton; painting, &c. of the outside woodwork and ironwork at Lambrook Farm. Plans, specifications and other particulars can be obtained at the Borough Surveyor's Office during the usual office hours, on depositing £1 1s. Tenders, on the prescribed form only, must be addressed, in sealed envelopes, to the Town Clerk on or before June 4, and endorsed on the outside "Tender for —."

June 4. Croydon.—Erection of small first-floor additions to the workshops at the workhouse, Queen's Road, Croydon. The plans, specification and conditions of contract may be seen, and bills of quantities with form of tender obtained at the office of Henry Berney, architect, 104, George Street, Croydon, surveyor to the Guardians, upon depositing the sum of £3 3s. Tenders, sealed and marked "Tender for Additions to Workshops," to be addressed to Harry List, clerk to the Guardians, Union Offices, Mayday Road, Thornton Heath, Surrey, and delivered by June 4.

June 5. Caerphilly.—Erection of thirty or more cottages near Penyrheol, Caerphilly, for the Bargoed and Abertridwr Building Club. Plans and specifications can be seen at the office of P. Vivian Jones, P.A.S.I., architect and surveyor, Hengoed. Endorsed tenders to be sent in to David Phillips, Hanbury Hotel, Bargoed, on or before June 5.

June 5. Mortlake.—Alterations, additions and repairs to be carried out at the Technical Institute (formerly known as Worple House), North Worple Way, Mortlake, for the Barnes U.D.C. Plans and specifications can be inspected at the Surveyor's Office, the Council House, High Street, Mortlake. Tenders for the work must be sent, endorsed "Alterations to Technical Institute," so as to be received by W. T. Goodale, secy. to the Committee, the Council House, High Street, Mortlake, before noon on June 5.

June 6. Huddersfield.—Conversion of buildings at Birkby into schools, &c.; additions to Outlane council school. Plans, specifications and general conditions may be seen, and bills of quantities and forms of tender obtained, on application at the offices of K. F. Campbell, M.I.C.E., borough engineer and surveyor, 1, Peel Street. Sealed tenders, endorsed "Tender for Conversion of Buildings," or as the case may be, signed in the handwriting of the tenderer or his agent, and addressed "Town Clerk, Town Hall, Huddersfield," must reach him not later than 10 a.m. on June 6.

June 9. Snodland.—Building a mortuary at the cemetery, for the Parish Council. Plans and specification can be seen at the office of S. Hilder, clerk, Pelham House, Snodland, to whom tenders endorsed "Tender for Mortuary" must be returned by June 9.

June 9. Dunblane.—Mason, iron, oiner, plumber, slater, plaster, painter and glazier work for the erection and completion of the Queen Victoria School and Memorial to Scottish Sailors and Soldiers, houses connected therewith and offices; also for drainage, fencing and laying-out of ground; and for roads, sewers, water and gas supplies, and relative works. The relative schedules may be had on application to the architect, J. A. Campbell, 124, St. Vincent Street, Glasgow, where the plans and drawings, specifications and measurements will be exhibited and explained. Printed copies of the conditions of contract, specifications and measurements and general conditions will be supplied to intending offerors on a deposit of £2. The schedules shall be priced and extended, but it is intended to accept a lump sum from one offeror for the whole work. No offers for separate works will be entertained by the Executive Council, but contractors will be allowed to sub-contract with the approval of the Building Committee. The schedules and tender must be sent in a sealed envelope, which will be supplied to intending offerors, and addressed to "The Executive Council, Queen Victoria School, care of R. Addison Smith, Esq., honorary treasurer, 19, Heriot Row, Edinburgh," not later than June 9.

June 11. Little Heath.—Erection and completion of a new elementary school and teachers' residence. Persons desirous of tendering for the work may see the drawings, specification, agreement, &c., at the County Surveyor's Office, Hatfield, on and after May 28 between 10 and 4, except on Saturday, when they will be on view from 10 to 12 noon. A copy of the schedule of works and prices (quantities) and form of tender can be obtained at the County Surveyor's Office upon payment of £2 2s. Sealed tenders, endorsed "Tender for School and Teachers' Residence, Little Heath," must be delivered to Urban A. Smith, county surveyor, County Surveyor's Office, Hatfield, not later than 5 p.m. on June 11.

June 12. London, S.W.—Erection of a storehouse for boats at Battersea Park, S.W., for the London County Council. Persons desiring to submit tenders may inspect the drawings, and obtain the specification, bills of quantities, form of tender, and other particulars at the Architect's Department, 15, Pall Mall East, S.W., upon payment to the Cashier of the Council, at the County Hall, Spring Gardens, of £1. Tenders must be upon the official forms, and the printed instructions contained therein must be strictly complied with. Fair wages clause. Each tender is to be delivered at the County Hall, in a sealed cover, addressed to the Clerk of the London County Council, Spring Gardens, S.W., and marked "Tender for the erection of a Boat-house at Battersea Park." No tender will be received after 10 a.m. on June 12. Any tender which does not comply with the printed instructions for tender may be rejected.

No date. Hatfield.—New laundry. Persons wishing to submit tenders for the erection of a new laundry at the Union Workhouse, Hatfield, may send their names to Charles Smith & Son, architects, Reading, together with a deposit of £1 1s., when bills of quantities and other information will be supplied.

No date. Bradford.—Villas. Tenders required for the joiner's, plumber's, plasterer's and slater's work necessary in the erection of a pair of semi-detached villas, Bolton Road, Bradford. Contractors willing to tender must apply for quantities to J. Young & Co., architects, 62, Market Street, Bradford.

No date. North Wingfield.—Erection of four cottages. Builders wishing to tender may obtain quantities and see plans and specifications by applying to T. S. Wilcockson, architect and surveyor, Knifesmith Gate, Chesterfield.

No date. Hereford.—Additions to the Sanitary Laundry, Ledbury Road, Hereford. For particulars apply in writing to W. W. Robinson, architect, 10, King Street, Hereford.

No date. Bowness.—Walling, joiner's, and plasterer's work in the erection of four cottages on the Craig Estate, Bowness, for T. Russell. Plans and specifications may be seen at the office of Joseph Pattinson, architect, Bowness.

No date. Skelton.—200 yds. of brick-wall for burial ground. Particulars to be obtained from Rev. A. Fisher, Skelton Rectory.

ENGINEERING.

May 24. Hull.—Heating by high-pressure system of the school building proposed to be erected in Selby Street West. Blue prints of plans, conditions, &c. (which must be returned together with other particulars) can be obtained at the City Architect's Office, Town Hall. Tenders with schemes, sealed and endorsed "Heating Selby Street West School," are to be addressed to the Chairman of the Finance and General Purposes (Education) Sub-Committee, and delivered at the Town Clerk's Office, Hull, before 10 a.m. on May 24.

May 23. Chertsey.—Heating apparatus for Congregational church, Chertsey. Sealed tenders to be sent by noon on May 23 to Mr. Bartholomew, Holly Bank.

May 23. Dublin.—Supply of sub-station switchboards and accessories, transformer pillars. Specifications, with general conditions and form of tender, can be obtained from the City Electrical Engineer, Fleet Street, Dublin, on payment of £1 1s. for each specification. Tenders, addressed "Chairman of the Lighting Committee, 3, Cork Hill, Dublin," and marked "Tender for Sub-station Switchboards, Transform Pillars, &c.," to be delivered not later than May 28.

May 29. Birkenhead.—Supply, delivering and erection of the undermentioned plant:—Specification No. 31. —Booster-balancer and extensions to switchboard. Specification No. 32. —Travelling-crane. Copies of the specifications, with forms of tender and general conditions of contract, can be obtained at the office of the borough electrical engineer, William Bates, M.I.C.E., Craven Street, Birkenhead, on payment of a deposit of £2 2s. for each specification. Fair wages clause. Tenders, which must be on the printed form supplied, sealed and endorsed, "Tender for —," must be sent in so as to reach Alfred Gill, town clerk, Town Hall, Birkenhead, not later than 9 a.m. on May 29.

May 29. Tyldesley-with-Shakerley.—Alterations to hydraulic drains including new gas-tar and liquor take-off pipes and erection of two tar towers, for the U.D.C. Plan of same may be seen at the Gasworks, Tyldesley, and specification and tender form obtained from the engineer, R. H. Gimman. Sealed endorsed tenders, on official forms only, to be sent to W. J. Matthews, clerk to the Council, Council Offices, Tyldesley, not later than noon on May 29.

May 29. London, S.W.—Hot-water heating apparatus in the lower administration block at the South-western Fever Hospital, Landor Road, Stockwell, S.W., for the Metropolitan Asylums Board, in accordance with drawing and specification prepared by W. T. Hatch, M.I.C.E., M.I.M.E., engineer-in-chief. Drawing, specification, conditions of contract and form of tender may be inspected at the Office of the Board, Embankment, London, E.C., and can be obtained upon payment of a deposit of £1. Tenders, addressed as noted on the form, must be delivered at the Office of the Board not later than 10 a.m. on May 29.

May 30. Mansfield.—Execution of the following works in connection with the Corporation Electricity Supply Undertaking:—Section M.—Battery of Accumulators and reversible booster. Section N.—Switchgear. Tenderers are at liberty to tender for either section, but not for part of a section. The specification, with terms and conditions, forms of tender, and form of contract, may be inspected at the offices of Robert Hammond & Son, consulting engineers to the Corporation, 64, Victoria Street, Westminster, London, S.W., and may be obtained there on making a deposit of £5 5s. Extra copies of the specification may be obtained by bona fide tenderers at a charge of 5s. per copy, which will not be refunded. Tenders, sealed and marked "Tender for Mansfield Electricity Works," must be delivered to J. Harrop White, town clerk, Town Clerk's Offices, Mansfield, before noon on May 30. Each tender must contain the names of two sureties who will be prepared to execute a joint and several bond for the due performance of the contract in the sum of 10 per cent. of the contract amount.

June 1. Torquay.—Electricity supply extensions.—Contract No. 3: Supply, delivery and erection complete of condensing plant, consisting of one surface condenser and steam-driven air and circulating water pumps, together with the necessary pipework connections between the existing pipes and the above plant, and sundry other ironwork. The specification and form of tender can be obtained on application to Town Clerk, Town Hall, Torquay, on payment of a fee of £2 2s. A copy of the specification, general conditions and drawings may be inspected (but not obtained) at the offices of the consulting engineers, Kincaid, Waller, Manville & Dawson, 29, Great George Street, Westminster, S.W. Sealed tenders, endorsed "Electricity Extensions, Tender for Contract No. 3," must be forwarded to Frederick S. Hex, town clerk, Town Hall, Torquay, at or before noon on June 1.

June 2. South Shields.—Installation of electric light in the Senior Department of the Westoe Road Schools. Copies of the drawings, specification and form of tender can be obtained from J. H. Cawthra, M.I.E.E., borough electrical engineer, South Shields. Tenders on the form supplied must be delivered to the Secretary to the Education Committee at his office, Ocean Road, South Shields, on or before noon on June 2, endorsed "Tender for Wiring Westoe Road Schools."

June 8. Devonport.—Completion of the Embankment road and sewers at Camel's Head, Devonport. Drawings and specification may be seen, form of tender, bill of quantities and all further particulars obtained, on application to James Diggle & Son, civil engineers, 14, Victoria Street, Westminster; or at the Clerk of Works' Office, Sewage-disposal Works, Camel's Head, Devonport. Sealed tenders, endorsed "Camel's Head Embankment," to be sent to R. J. Fittall, town clerk, Town Clerk's Office, Devonport, not later than noon on June 8.

June 10. Egypt.—Supply of various pumps, pipes and pump fittings, for the Egyptian State Railways Department. A copy of the list, conditions, plan, &c., may be obtained, price 4s., from Lieut-Colonel Western, Queen Anne's Chambers, Broadway, Westminster, S.W. Tenders to be sent in by June 10.

June 11. Burnham.—Supply, delivery and erection of a suction gas plant, gas-engine and treble-ram pump, in connection with the waterworks, for the U.D.C. Specification and drawings may be obtained from the waterworks engineer, W. H. Chowias, Manor Gardens, Burnham, on payment of £2 2s. Tenders, on the prescribed form only, endorsed "Tender for Machinery," must be delivered to D. S. Watson, clerk, Town Hall, Burnham, Somerset, on or before June 11.

June 18. Bristol.—Construction and maintenance for twelve months after completion of the following works at the Royal Edward Dock, Avonmouth, now in course of construction:—Two upper storied transit sheds, each

500ft. long; one single floor transit shed, 450ft. long; a granary to contain 50,000 quarters of grain. Parties desiring to tender may submit tenders for:—Any one of the four buildings alone; the two upper storied transit sheds together in one tender; the whole of the four buildings together in one tender; any other combination of two or more buildings in one tender. Tenders for the upper storied sheds are invited for one or both of the following alternative methods of construction:—(1) Steel construction; (2) Ferro-concrete construction. Tenders for the granary are invited for any or all of the following methods of construction:—(1) Brick construction; (2) ferro-concrete construction; (3) timber construction. Copies of the specification, form of tender, form of contract and copies of contract drawings, of which there are three sets, namely, one for the two upper storied sheds, one for the single floor shed and one for the granary, can be obtained from W. W. Squire, engineer, Engineer's Office, Cumberland Road, Bristol, on production of a receipt from secretary of the Docks Committee showing that £3 has been paid as deposit on each set of drawings applied for. Tenders must be enclosed in a sealed envelope, endorsed "Tender for Sheds and Granary, Royal Edward Dock," and addressed to the Secretary of the Docks Committee, 19, Queen Square, Bristol, and must be delivered to him accompanied by the prescribed documents before 10 a.m. on June 18.

June 30. Cairo.—*Supplies and works in connection with the water supply of Menouf, including engine-houses, pumping machinery, motors, conduits, and steel water tower and reservoir.* Specifications, plans, &c., may be seen at the Ministry of the Interior, Cairo. Tenders will be received by the European Secretary of the Ministry of the Interior, Cairo, up to June 30.

IRON AND STEEL.

May 28. Ross.—*Iron roofing, &c. of new stabling, and the fire-engine station; also for additional calves' pens at the stock market, according to the plans and specifications which may be seen at the Council Offices.* Separate tenders for each work, endorsed "Stabling," "Fire Engine Station," or "Calves' Pens," to be delivered at the Council Offices, Albion Chambers, Ross, not later than noon, on May 28.

May 30. Salford.—*Cast-iron pipes, &c., for roughing filters at the Salford Sewage Works.* The drawings may be seen and forms of tender, with specification and quantities, obtained at the Borough Engineer's Office, Town Hall, Salford. Tenders, endorsed "Pipes for Roughing Filters," addressed to the Chairman of the River Committee, must be delivered to L. C. Evans, town clerk, Town Hall, Salford, not later than 4 p.m. on May 30.

June 6. Ipswich.—*Supply and fixing of three iron staircases at the Union Workhouse, at Barham, to the outside faces of the wings—two on the men's side and one on the women's side; the work to be completed in accordance with sketches, details and specifications, which, together with the form of contract to be entered into for the execution of the work, may be inspected at the offices of the Guardians, 6, Providence Street, Ipswich.* Orders to view the premises will be forwarded on application to the Clerk. Tenders should reach the offices of the Guardians, 6, Provident Street, Ipswich, by June 6.

June 11. Nottingham.—*Supply of the under-mentioned goods, for the ensuing year, for the Water Department:—Cast-iron double-faced sluice-valves and hydrants; cast-iron main pipes; lead piping, lead ingots; gunmetal taps and ferrule fittings. Specifications and drawings, together with samples, weights, &c., may be seen and other information obtained at the office of the water engineer, F. W. Davies, St. Peter's Churchside, and forms of tender may be obtained at that office on payment of £1 rs. Tenders, endorsed "Tender for Valves," "Tender for Pipes," "Tender for Lead," "Tender for Taps," to be delivered to Samuel G. Johnson, town clerk, Guildhall, Nottingham, on or before June 11.*

PAINTING AND PLUMBING.

May 24. Chesterfield.—*Painting and cleaning the Christ Church National School, Stonegraves.* Specification of the work to be done and form of tender may be had on application to C. J. Kerslake, secy., Education Offices, Chesterfield, by whom tenders will be received up to May 24.

May 24. Chesterfield.—*Painting and cleaning the cookery and laundry departments of the Central School.* Specification of the work to be done and form of tender may be had on application to C. J. Kerslake, secy., Education Offices Chesterfield, to whom tenders should be sent by May 24.

May 25. Carlisle.—*Painting and other works required to be done at four of the elementary schools, such works to be commenced on July 2 and completed not later than July 21 next. Specification and full particulars may be obtained from the surveyor on payment of 10s. 6d. Sealed tenders, endorsed "Tender for Painting, &c.," to be delivered to Henry C. Marks, M.I.C.E., surveyor, 36, Fisher Street, Carlisle, not later than 10 a.m. on May 25.*

May 25. Cardiff.—*Painting, decorating, papering, &c. to the Avondale and Lord Wimborne Hotels, Cardiff, for Crosswell's Brewery Co., Ltd.* Particulars and specification can be obtained at the offices of A. O. Evans, Williams & Evans, architects, Pontypridd, to whom sealed and endorsed tenders must be sent by May 25.

May 26. Lancaster.—*Painting at the Abbey Light houses and other property at Glasson Dock and Lancaster for the Port Commissioners.* Particulars may be had at the Tonnage Office, Lancaster, and tenders should be in by May 26.

May 26. Edinburgh.—*Painting the Reference Library at the Central Library, George IV. Bridge according to specification, which may be seen at the Public Works Office, and schedules of quantities, which may be had on personal application. The estimates must be sealed and marked "Tender for Painter Work, Public Library," and sent to R. Morham, city architect,*

Public Works Office, City Chambers, Edinburgh, by 10 a.m. on May 26.

May 26. West Bromwich.—*Cleaning and painting of the interior of the Town Hall and offices, in accordance with specification and conditions of contract, to be seen on application to the Borough Surveyor. Sealed tenders, properly endorsed "Tender for Painting Town Hall," on the form provided, to be forwarded to Albert D. Greatorex, M.I.C.E., borough engineer and surveyor, Borough Surveyor's Office, Town Hall, West Bromwich, not later than noon on May 26.*

May 28. Dartford.—*Painting and renovating the interior of certain of the workhouse buildings in accordance with a specification which may be seen at the office of the master of the workhouse. Tenders to be delivered at the office of J. C. Hayward, clerk, Sessions House, Dartford, on or before 2 p.m. on May 28, endorsed "Tender for Painting."*

May 28. Govan.—*Painter work required for new laundry block at Merryflatts, Govan. Plans can be seen and copies of schedules had on application to the architects, Thomson & Sandilands, 4, Jane Street, Blythwood Square, on payment of £1 rs. Schedules to be filled up and returned sealed and marked "Offer for Painter Work, New Laundry Block," to John Thomson, governor, Merryflatts, Govan, not later than noon on May 28.*

May 29. Grays.—*Painting and distempering at the Free Library. Specifications may be seen at the office of the Council's Surveyor. Tenders endorsed "Tender for Painting," to be delivered to F. W. Saxton, librarian, Free Library, Grays, by noon on May 29.*

May 30. Ramsbottom.—*Painting and decorating work required at Peel Brow Council School, Ramsbottom. Specification and form of tender may be had at the Education Offices, Market Place, Ramsbottom. Tenders to be sealed, and endorsed "Tender for Painting Peel Brow Council School," and delivered to W. Dilworth, clerk, Education Offices, Market Place, Ramsbottom, on or before May 30.*

May 30. Pontygarth.—*Painting Pontygarth footbridge, which adjoins the Taffs Well Railway Station, for the Llandaff and Dinas Powis R.D.C., in accordance with a specification which may be obtained on application to the surveyor, James Holden, A.M.I.C.E., 20, Park Place, Cardiff. Tenders, sealed and endorsed, to be sent to M. Warren, clerk, Park House, Cardiff, not later than noon on May 30.*

May 30. London, N.—*Internal and external cleaning and painting works, at the Northern Convalescent Fever Hospital, Winchmore Hill, London, N., for the Metropolitan Asylums Board, in accordance with specification prepared by W. T. Hatch, M.I.C.E., M.I.M.E., engineer-in-chief. Specification, conditions of contract, bill of quantities, and form of tender may be inspected at the office of the board, Embankment, London, E.C., and bill of quantities and form of tender can then be obtained upon payment of a deposit of £1. Tenders addressed as noted on the form, must be delivered at the office of the board not later than 10 a.m. on May 30.*

June 5. London, S.E.—*Painting at infirmary, Brook Street, Kennington Road, S.E., for the Guardians of the parish of Lambeth. Tenders, which will be received only on the printed form, sealed and endorsed "Tender for Painting at Infirmary," must be sent by post to the Clerk on or before June 5, and will be opened at the board-room at noon on the following day, when all persons tendering, or their authorised agents, must be in attendance. Forms of tender may be obtained, and draft of contract may be inspected, at the Guardians' Board-room and Offices, Brook Street, Kennington Road, S.E., on any day between 10 and 5. Specification and estimate will be supplied on personal application, and on payment of £2 in respect thereof.*

June 13. Bury St. Edmunds.—*Painting the Bell Temperance Hotel, &c., and executing certain other work as set forth in the specification prepared by the Borough Surveyor, and which may be examined at his office. Sealed tenders, endorsed "Tender for Painting Temperance Hotel," to be sent to Walter D. Harding, borough surveyor, Town Hall, Bury St. Edmunds, not later than 9 a.m. on June 13.*

No date. London, E.—*Distempering and painting works at the workhouse, St. Leonard's Street, Bromley-by-Bow, E., for the Guardians of Stepney Union. Printed form of tender and specification can be obtained upon application to T. G. Stacey, clerk, Guardians' Offices, Barnes Street, Stepney, E.*

ROADS AND CARTAGE.

May 24. Torpoint.—*Stone for the U.D.C. in the following quantities:—Notter stones, machine broken 500 tons, gravel 80 tons. For forms of tender and further particulars apply to F. A. Clark, surveyor to the Council, 83, Old Town Street, Plymouth, to whom tenders should be sent by noon on May 24.*

May 24. Isle of Wight.—*Supply of materials for the repair of roads and highways in districts numbered 13 and 14, known as Totland and Freshwater district respectively, for three years, for the R.D.C., in accordance with conditions and specifications which have been revised and approved by the Council. Copies of such conditions and specifications and forms and conditions for tender and approximate estimates of the quantities required may be obtained on application at the offices. Each tender must be on one of the forms supplied, and must be enclosed separately in a sealed envelope marked on the outside "Tender for No. (—) District," and must be delivered at the R.D.C. Offices, Pyle Street, Newport, I.W., before 5 p.m. on May 24.*

May 24. Friern Barnet.—*Supply of about 500 tons hardcore, 500 tons hoggins, 1,500 tons of gravel, and 1,000 tons of broken Leicester granite at New Southgate (Great Northern) Railway Station, and such further quantities as may be required until March, 1907. Also for cartage of material and general horse hire for a period of twelve months. Further information and forms of tender may be obtained from E. J. Reynolds, A.M.I.C.E., the Council's surveyor. Sealed tenders, endorsed "Tenders for —," or, as the case may be, addressed to Edwin Goodship,*

clerk of the Council, Council Chambers, Beaconsfield Road, Friern Barnet, together with samples, must be delivered at the Council Chambers before noon on May 24.

May 26. Audenshaw.—*Sewering, paving, kerbing, flagging, &c., of Canning Street and Chatham Street, for the U.D.C. Plans and specifications may be seen and form of tender obtained at the office of William Clough, engineer and surveyor to the Council, upon payment of £1. Tenders must be endorsed "Chatham Street," and reach F. Hamer, clerk, Council Offices, 2, Guide Lane, Audenshaw, not later than May 26.*

May 28. Surbiton.—*Private street works at Ravenscar Road and Cranes Drive, in the urban district of Surbiton. Plans and specifications can be inspected at the offices of the Council during office hours, and a copy of the estimated quantities will be supplied at the request of those who have examined the plans. Sealed tenders, made out on the forms and enclosed in the envelope supplied, must be delivered at the District Council Offices, Surbiton, before 10 a.m. on May 28.*

May 28. Portsmouth.—*Laying and maintaining compressed asphalt pavement in certain streets. A lithographed copy of the specification, form of tender and schedule of prices may be obtained on application at the Town Hall, Portsmouth, on payment of £2 2s. The form of tender, with schedule of prices attached to the specification, must be filled in, and the whole sent, under cover, to Alexander Hellard, town clerk, Town Hall, Portsmouth, not later than 10 a.m. on May 28. Fair wages clause.*

May 28. Urmston.—*Flagging and kerbing of the footways of Station Bridge, Urmston, and its approaches, for the U.D.C. Plans, specifications and forms of tender may be obtained from James Heath, surveyor to the Council. Sealed tenders must be delivered to T. J. Rowland, clerk to the Council, Council Offices, Urmston, not later than 4 p.m. on May 28.*

May 28. Wallsend.—*Cementing of footpaths or parts of footpaths in certain of the streets in the borough as may from time to time be ordered to be done up to the end of September, 1906. Specification for the work may be seen, and particulars and forms of tender may be obtained on application to George Hollings, borough surveyor, Corporation Offices, Wallsend. Tenders, sealed and endorsed "Tenders for Cementing," to be sent to W. V. Mulcaster, town clerk of Wallsend, 28, Sandhill, Newcastle-on-Tyne, on or before noon on May 28.*

May 29. Huddersfield.—*Carting away of ashes and for the general carting in connection with the Electricity Department. Particulars and forms of tender may be obtained upon application to the Borough Electrical Engineer, St. Andrew's Road, Huddersfield. Sealed tenders, endorsed "Tender for Carting Work," signed in the handwriting of the tenderer or his agent, and addressed to Town Clerk, Town Hall, Huddersfield," must reach him not later than May 29.*

May 29. Stratford-on-Avon.—*Supply of broken and unbroken road metal required for the maintenance of the borough roads during the ensuing year, according to specification to be obtained, together with form of tender, on application to Roden Dixon, A.M.I.C.E., borough surveyor, Municipal Offices, Stratford-upon-Avon, with whom tenders endorsed "Tender for Stone" are to be delivered not later than May 29.*

May 29. St. Neots.—*Road material for the U.D.C. Supply of and delivery to St. Neots Station, G.N.R., of about 1,000 tons broken granite and 50 tons ironstone slag. Particulars and forms of tender can be obtained on application to John Edey, surveyor, South Street, St. Neots, Hunts, to whom sealed and endorsed tenders and samples are to be delivered by 4 p.m. on May 29.*

May 29. West Hartlepool.—*Construction of Tankerville Street Footpath (Grange Road to Milton Road), and Back Grange Road and Hutton Avenue, in two portions. Plans, sections and specifications can be seen and forms of tender with approximate quantities obtained upon application at the Borough Surveyor's Office. Tenders, endorsed "Construction of Streets," and addressed to the Chairman of the Works Committee, are to be delivered at the office of the Town Clerk, 78, Church Street, not later than 4 p.m. on May 29.*

May 30. Kingston-upon-Thames.—*Supply of 1,500 tons of gneiss, Guernsey, or other granite, suitable for road-making, 1,000 tons to be broken so as to pass through a ring having a 2in. internal diameter, and the remainder through a 1½in. ring. The above sizes will be strictly enforced. Tenders to be on forms to be obtained of the Borough Surveyor, at the Municipal Offices, where samples must be left. Sealed tenders, endorsed, to be delivered at the Municipal Offices, Kingston-upon-Thames, on or before May 30.*

May 30. Worksop.—*Supply of 120 tons of granite, broken to 2½in. gauge, and 80 tons of granite, broken to 1½in. gauge, delivered at Worksop Station. Tenders must be sent in to George H. Featherston, clerk, Town Hall, Worksop, by May 30.*

May 31. Stocksbridge.—*Road material:—Granite or whinstone about 300 tons; dress (or cinder) about 600 tons; screenings about 200 tons. Particulars, with forms of tender, to be had from J. Marsden, clerk to the Council, Council Offices, Stocksbridge, to whom sealed tenders, endorsed "Material," must be sent before May 31.*

May 31. Habrough.—*Repair of the playgrounds of the council school either (1) with tar macadam, (2) asphalt or (3) with gravel. Tenders to be sent to the Rev. C. C. Marriss, Habrough Vicarage, Lincs., not later than May 31.*

June 2. Chingford.—*Making-up and paving certain portion of the Station Road, for the U.D.C., and for certain other works in connection therewith, in accordance with plans and specifications prepared by the Council's Surveyor, copies of which may be obtained on application and upon payment of a deposit of £2 2s. Tenders, which are to be sealed and endorsed "Tender for Street Improvements," to be delivered to Leonard C. Bowen, clerk to the Council 34, Station Road, Chingford, on or before noon on June 2.*

(Continued on p. xxvi.)

Notes and News.

A Subway to the Albert Hall is proposed to be constructed by the Metropolitan District Railway.

The Proceedings of the Devon and Exeter Architectural Society for 1905-6 have just been issued.

The Ruskin Museum at Sheffield was visited by more than 40,000 people during the past year.

Messrs. Sheen & Wells, heating engineers, of Sheffield, have received instructions to fix their improved small-pipe hot-water heating apparatus in St. Saviour's Church, Retford.

Mr. R. McG. Dawkins is the successor of Mr. Bosanquet in the directorship of the British school at Athens. Mr. Bosanquet having been appointed recently to the Chair of Archæology at Liverpool University.

Mr. T. E. Colcutt, F.R.I.B.A., is nominated as the new president of the Institute, in succession to Mr. Belcher. For the eighteen members of council there are thirty-eight nominations. The results will be made known on June 11th.

Society of Architects' Scholarship.—Thirteen candidates presented themselves for the competitive examination in architectural history and freehand drawing held on May 10th, in London, and the scholarship (value £10 per annum, tenable for three years) has been awarded by the council to Mr. Harold Fletcher Trew, of the Gables, Tuffley, Glos.

Sheffield Society of Architects and Surveyors.—At the annual meeting of this Society held last Thursday Mr. E. Holmes was re-elected president; Mr. W. C. Fenton vice-president; Council (Fellows): Messrs. H. Coverdale, C. B. Flockton, W. J. Hale, H. L. Paterson, A. E. Turnell and J. B. Mitchell-Withers; (Associates): Messrs. W. G. Buck, C. F. Innocent and H. I. Potter.

Surveyors' Institution: Junior Dinner.—The annual dinner held in connection with the junior meetings of the Surveyors' Institution took place at the Trocadero Restaurant on Wednesday last, the chair being occupied by Mr. G. P. Knowles. During the evening a presentation was made by the members of the committee to Mr. Sydney A. Smith, the hon. secretary, to commemorate his term of office.

A new Central Fire-station for Croydon is being erected on a site 62ft. by 168ft. at the corner of Park Lane and Park Street. The building contract has been let to Messrs. Hudson & Co., of Westminster, for £8,575. The total cost of the station will be £10,500. The heating installation will be carried out by Messrs. Wenham & Waters, of Croydon. The plans of the building have been prepared in the borough engineer's office, with the architectural assistance of Mr. Holder.

The Central Arcade at Newcastle was opened on Saturday. Thus the triangular block of buildings bounded by Grey Street, Grainger Street and Market Street will at last fulfil its legitimate function—that of purely business purposes. The elevations towards the arcade are designed in a phase of Renaissance and have been executed in Burmantofts faience, the various tints of which give a refined and restful appearance to what it is hoped will become a favourite shopping resort. The arcade shops have lofty basements lined with white-glazed bricks, and approached by a separate subway from Market Street. The upper floors are partly devoted to offices. The greater portion, however, is occupied by the Central Exchange Hotel. The architects of the new arcade were Messrs. J. Oswald & Son, of Newcastle, and the contractors Messrs. R. Veitch & Sons.

A new Chapel at Taunton School is being erected at an estimated cost of £10,000. Mr. Frank Wills, F.R.I.B.A., of Bristol, is the architect, and Messrs W. Cowlin & Sons are the contractors.

A new Spooling Mill, 243ft. by 120ft. and three storeys high, with basement, is to be erected at Paisley by Messrs. Coats.

A new Mechanics' Institute has been erected at Pontardulais at a cost of £2,000 from designs by Mr. W. Beddoe Rees, architect, of Cardiff.

New Sewage-disposal Works on the bacteriological system have been constructed by the Corporation at Newcastle-under-Lyme at a cost of £25,000.

The Restoration of St. William's College, York—the ancient buildings in the shadow of the Minster—is now nearing completion. Mr. Temple Moore is the architect in charge.

A new Roman Catholic Church at Eastbourne is to be built on a vacant piece of ground adjoining St. Joseph's Roman Catholic Schools in Whitley Road. Mr. P. D. Stonham is the architect for the building, which is to seat about 350 worshippers.

The Public and Architecture: R.I.B.A. Pronouncement.—The Royal Institute of British Architects hope shortly to issue definite information which will assist in the education of the public in regard to architecture, "and to adopt other means to increase the knowledge of those qualities which should be looked for in good architecture."

OUR PLATES.

THE Mount, Sunningdale, is built on a good site with fine views to the south and west. The walls are covered externally with rough plaster, and the roof is of "Eureka" green slates. The windows on the south and west sides have external louver shutters. Messrs. J. Oldrid Scott & Son, of 2, Dean's Yard, Westminster, were the architects, and Messrs. Morris & Son, of Sunningdale, the contractors.

The Frimley Urban District Council Offices have just been erected at Camberley, Surrey, from designs (selected in competition) by Messrs. H. R. and B. A. Poulter, architects, of Camberley. The site is a very restricted corner one, with no possibility of lighting from the west side. The accommodation consists of a basement containing heating chamber, coal store and a large storage room for cycles, approached by a sloping way from the entrance lobby; ground floor containing entrance hall with corridor on left to surveyor's public and private offices, medical officer's laboratory, sanitary inspector's office, cloakroom and lavatory accommodation; first floor containing council chamber (well lit by four semicircular dormer windows piercing a plaster barrel ceiling, and two side windows), committee room and retiring room. The whole of the building internally is finished in white plaster with the woodwork painted dark brown. The building is carried out in local overburnt bricks relieved with local red facing bricks. The window frames and main cornice are of wood painted white. The central part of the front elevation is executed in Monk's Park stone. The roof is covered with local red tiles. These offices have been most soundly and carefully built for the low price of £2,339 (exclusive of the clock turret, which has been omitted) by Mr. William Watson, builder, of Ascot, under the personal supervision of the architects. The heating was carried out by Messrs. Renton Gibbs, of Liverpool. The iron casements and lead lights were by Mr. J. A. Girdler, of Reading. The drawing illustrated is exhibited at the Royal Academy.

Current Market Prices

FORAGE.

		£	s.	d.	£	s.	d.
Beans	per qr.	1	12	0	1	14	0
Clover, best ...	per load	4	0	0	4	7	6
Hay, good	do.	3	12	6	3	17	6
Sainfoin mixture ...	do.	3	10	0	4	0	0
Straw	do.	1	8	0	1	14	0

MISCELLANEOUS.

Bricks Stocks, d/d to job	per 1,000	1	14	0	—
Do. Flettons on rail ...	do.	1	4	0	—
Do. Pressed Wire Cuts, d/d to job	do.	1	16	0	—
Do. Blue brindled wire cuts ...	do.	1	1	0	—
Do. do. wire cuts ...	do.	1	5	0	—
Do. do. pressed facings ...	do.	1	17	6	—
Coke Breeze, into carts at gasworks	per load	0	2	0	—
Do. d/d to job	do.	0	4	0	—
Sand	per yard	0	7	6	—
Ballast	do.	0	6	6	—
Granite Chippings ...	do.	0	10	6	—
Do. do. 2 1/2 in.	do.	0	11	6	—
Cement	per ton	1	11	6	—
Lime	do.	1	4	0	—
Granite Broken, 1 1/2 in.	do.	0	15	6	—
Do. do. 2 in.	do.	0	15	0	—
Do. do. 2 1/2 in.	do.	0	14	6	—
Do. Kerb, Norwegian, 6 x 12 and 12 x 6 in river	per foot	0	1	2	—
Do. do. do. circular	do.	0	1	5	—
Do. do. do. 12 x 8 in river	do.	0	1	5	—
Do. do. do. circular	do.	0	1	8	—
Glass, English Sheet, in crates of stock sizes, Do. do. do. 3rds	do.	0	0	6	—
Do. English patent plain rolled plate in stock crates 1/8	do.	0	0	2 1/2	—
Do. do. do. 1/4	do.	0	0	2 1/2	—
Do. do. do. 1/2	do.	0	0	2 1/2	—
Castor Oil, French	per cwt.	1	1	10	1 2 0
Colza Oil, English	do.	1	5	9	—
Copperas	per ton	2	0	0	—
Lard Oil	per cwt.	2	15	0	2 17 0
Lead, white, ground, carbonate	per ton	16	0	0	—
Do. red	do.	15	0	0	0 19 0
Linseed Oil, barrels	per cwt.	1	1	10 1/2	—
Petroleum, American	per gal.	0	0	6 1/2	0 0 6 1/2
Do. Russian	do.	0	0	5 1/2	0 0 6
Pitch	per barrel	0	8	0	—
Shellac, orange	per cwt.	9	8	0	—
Soda, crystals	per ton	3	2	6	3 5 0
Tallow, Town	per cwt.	1	7	6	1 8 3
Tar, Stockholm	per barrel	1	5	0	—
Turpentine	per cwt.	2	9	1 1/2	—

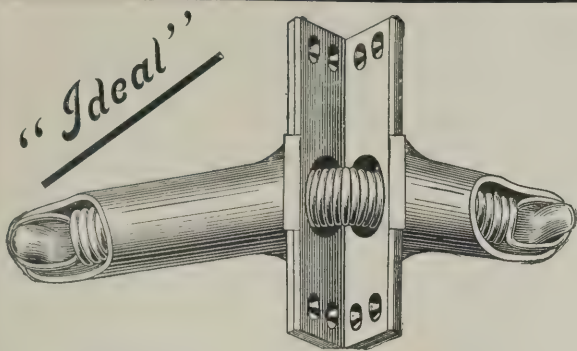
METALS.

Standard Copper	per ton	85	10	0	86	0	0
Do. Strong sheets...	do.	99	0	0	100	0	0
Lead, Soft Foreign	do.	17	5	0	17	10	0
Do. English	do.	17	10	0	17	15	0
Do. pipes	do.	20	5	0	20	10	0
Do. sheets	do.	19	15	0	20	0	0
Galvanised Corrugated sheets	do.	12	7	6	12	10	0
Spelter G.M.	do.	27	0	0	27	10	0
Angles, Scotland...	do.	6	15	0	7	0	0
Bars	do.	7	15	0	8	0	0
Marked bars, Staffs	do.	9	0	0	—	—	—
Common bars	do.	6	15	0	7	0	0
Angles, M'boro.	do.	6	10	0	6	12	6
Joists	do.	6	5	0	6	7	6
Angles, Midlands	do.	6	10	0	6	12	6
Joists	do.	7	0	0	7	5	0
Girder plates, Midlands	do.	7	10	0	7	12	6
Angles, Foreign, c.i.f. Thames	do.	6	5	0	6	10	0
Tees	do.	6	10	0	6	15	0
Joists	do.	6	1	6	6	2	6
Channels	do.	6	2	6	6	5	0
Nails, Wire	do.	9	0	0	—	—	—
Tin, Foreign	do.	200	0	0	205	0	0
Do. English ingots	do.	200	0	0	202	0	0
Zinc, sheets, Silesian	do.	27	0	0	—	—	—
Do. do. Vieille Montaigne	do.	27	5	0	—	—	—

TIMBER.

Soft Woods.

Deals, Blankaholm, Yellow, 1st, 4 x 9	per std.	10	0	0	10	10	0
Do. do. do. 1st, 4 x 6	do.	9	5	0	—	—	—
Do. do. do. 2nd, 4 x 9	do.	9	5	0	—	—	—
Do. do. do. 2nd, 4 x 7	do.	9	0	0	—	—	—
Do. do. do. 2nd, 4 x 6	do.	8	15	0	—	—	—
Do. Stockholm, White, Unsoured, 3 x 11	do.	9	0	0	9	15	0
Do. Gothenburg, Yellow, 5th, 3 x 11	do.	7	15	0	—	—	—
Do. Umba, Yellow, 3rd, 3 x 9	do.	11	5	0	—	—	—
Do. Sandarne, Yellow, 4th, 3 x 9	do.	11	10	0	—	—	—
Do. Mobile, Extra Prime Pitch Pine, 3 x 9	do.	17	10	0	—	—	—
Do. Gamleby, White, Unsoured, 3 x 9	do.	9	5	0	—	—	—
Do. Soroka, Yellow, 2nd, 3 x 9	do.	15	10	0	—	—	—
Do. Skutskar, Yellow, 1st, 2nd & 3rd, 3 x 9	do.	16	0	0	—	—	—
Do. Nederkalix, Yellow, low, 3rd, 3 x 7	do.	7	10	0	—	—	—
Do. Sandarne, Yellow, 5th, 3 x 7	do.	9	0	0	—	—	—



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Electrical Notes.

The Electrical Standards Laboratory.

This laboratory, in Whitehall, is one of very great interest, as it comprises so much apparatus of the most marvellous delicacy. There are the standard ampere balance and standard 100-volt voltmeter, the former measuring to 65 parts in a million and the latter to 84 parts in a million. By means of other balances and shunts currents up to 10,000 amperes can be measured, and there are other voltmeters which register up to 12,000 volts. Smaller currents and pressures are measured by potentiometers. In a very small room, which is kept at a constant temperature by an automatic device, the standard ohm and other important resistance coils may be seen and the process shown for the comparisons of ohms to the exactitude of 1 part in a million. The testing of meters is carried out in the verification room, where many different types may be seen undergoing the exhaustive test for official approval of "construction and pattern." Outside in the area is a battery room, a rheostat for controlling 10,000 amperes, and a dynamo and booster room.

Electric Power and Nuisance.

The Commissioners of Works have issued a memorandum in regard to possible injury to trees and flowers in the public parks of London by reason of the products of combustion emitted by electricity generating works; and they are not free from doubt as to whether the great national treasures in museums and picture galleries may not also be affected. They have thought it right, therefore, in view of the introduction of legislative schemes, to draw the attention of Parliament to the point, so that the matter may be fully taken into account in any enquiry regarding those projects. The case is not entirely one of the emission or con-

sumption of black smoke or sooty or tarry matters. The other products of combustion, such as sulphurous and sulphuric acid, with solid particles of mineral matter or ash, are very deleterious to vegetation, to buildings, and to pictures, marbles, &c. The Commissioners consider that the cluster of stations arising in the near neighbourhood of Regent's Park and other works growing up elsewhere may cause them peculiar uneasiness on account of their situation. Many furnaces and chimneys are, it is admitted, abolished by the institution of great electrical works; but the enormous amount of coal used by such works is equal to the consumption of tens of thousands of houses or small factories. This is a very serious matter when many of these works chance to be gathered within a limited area. The general condition of the atmosphere of London cannot be ignored. There is, too, the question of vibration.

How Small a Plant can be Made Profitable.

In how small a town is it possible to successfully operate an electric-lighting plant? That question formed the subject of a paper delivered recently before the Dublin Local section of the Institution of Electrical Engineers by Mr. R. B. Forster, A.M.I.E.E. Mr. Forster did not bring forward a series of arguments for and against, but gave details of a small plant which actually had been, and is still, successful in a town of 800 inhabitants, in competition with a gas company. The example cited was, as one might expect, in America—the village of Western Springs, Illinois, to wit, about seventeen miles west of Chicago. The conditions under which it is worked are by no means ideal, coal having to be hauled some distance. There are three horizontal tubular boilers and the engine is 100 h.p. belt-coupled to a 1,000 volt 60 k.w., two-phase S.K.C. dynamo; the field current being supplied by a

1½ k.w. exciter driven by a belt off the dynamo shaft. The outside work is carried out on the usual American plan, i.e., overhead bare conductors strung on wooden poles. There are two pairs of mains, one pair connected to each phase of the dynamo. One pair is used for private lighting and other for street lighting, the line and voltage in each case being transformed from 1,000 to 110 volts by means of transformers fixed on the poles. On the street-lighting mains there are 100 32 c.p. and 6 Jandus arc lamps, the lights in nearly all cases being suspended over the middle of the street. On the private lighting mains there are eighty consumers. This plant made a profit on the annual turnover, the price for current to the consumer being 10 cents (5d.) per kilowatt-hour. One of the chief drawbacks to the use of electric lighting in private houses, said Mr. Forster, was the cost of installation; and if we had cheaper wiring we should find electricity more generally used. In this connection he referred to

Cleat Wiring

or concealed wiring by means of porcelain tubes. Cleat wiring, he said, although not used much in this country made a very good job if properly installed. The chief objection to it was its unsightly appearance. This, however, was reduced to a minimum if the first and last pairs of cleats were put in at the start, then the wires pulled tight, and the intermediate cleats put in last. By this means all the cleats were brought into line. When the installation was to be carried out in a building during construction the joists were bored with a brace, porcelain tubes were slipped in, and the wires strung through these, tassings being taken off for the lights and switches. In this system the wires could be kept a good distance apart throughout their entire length, only coming in contact with the porcelain tubes, so that the insulation resistance was as perfect as possible.

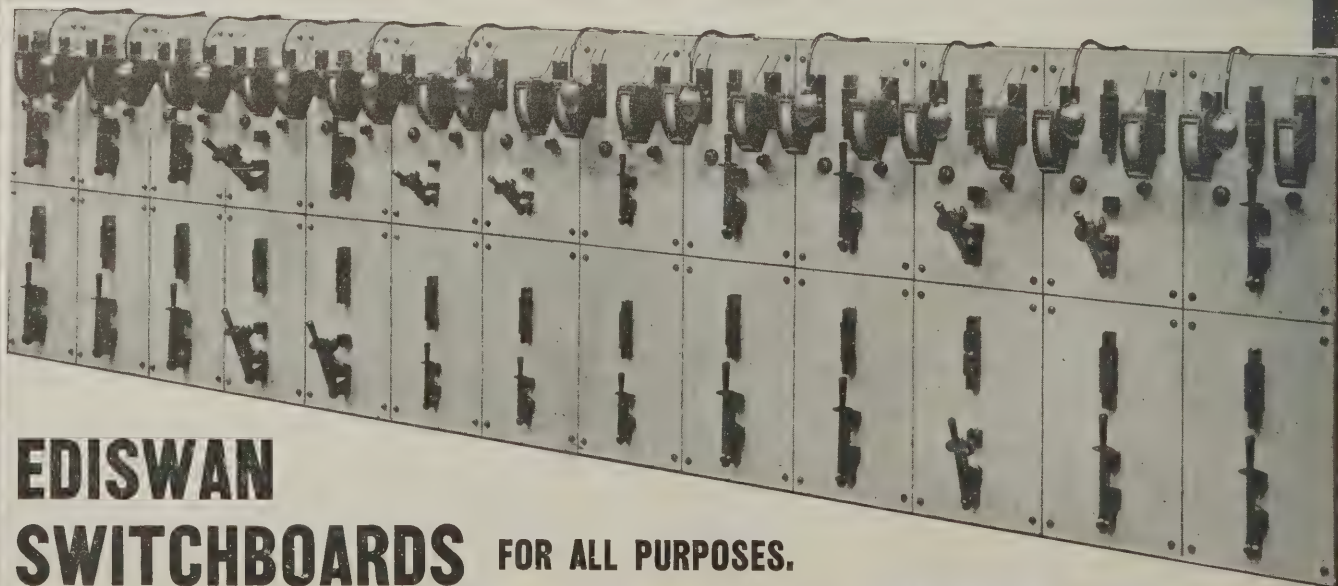


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Do. do. do. do. 1st. 2nd & 3rd, 3x8	do.	8	5 0	—	
Do. do. do. do. 1st, 2nd & 3rd, 3x7	do.	8	0 0	—	
Do. St. John, Spruce Unsorted, 1st, 2nd & 3rd, 3x9 ...	do.	9	5 0	—	
Do. do. do. do. 1st, 2nd & 3rd, 3x7	do.	8	0 0	—	
Do. Montreal, Red Pine, 1st, 3x11	do.	14	0 0	14	15 0
Battens, Montreal, Spruce Unsorted, 1st, 2nd & 3rd, 3x6 ...	do.	7	15 0	—	
Do. do. do. do. 1st, 2nd & 3rd, 3x5	do.	7	10 0	—	
Floorings, Sundswall, Yellow, 1st & 2nd, 1½x5½ ...	per square	0	12 0	—	
Do. do. do. 2nd, 1x7	do.	0	11 3	—	
Do. Porsgrund, Yellow, 1st, 1x7	do.	0	10 9	—	
Do. Dram, Yellow, Unsorted, 1x6½	do.	0	9 6	—	
Do. Hudikswall, Yellow, 2nd, 1x6½	do.	0	11 0	—	
Do. Gefle, White, Unsorted, 1x6	do.	0	9 0	—	
Do. Fredrikstad, Yellow, Unsorted, 1x5½ ...	do.	0	9 9	—	
Do. do. do. do. 1x5	do.	0	9 3	—	
Do. do. White, Un- sorted, 2x4½	do.	0	8 9	—	
Fir, Dantzic and Memel	per load	2	10 0	5	0 0
Pine, Quebec, Yellow ...	do.	4	0 0	7	5 0
Do. Pitch, American	do.	2	16 0	5	0 0
Laths, log, Dantzic ...	per cu. fath.	4	0 0	6	0 0

Tenders.

Addressed postcards on which lists of tenders may be stated will be sent post free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Fetter Lane, E.C. Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Badminton.—For the erection of a recreation hall, schools, cottages, &c., for the Badminton Estate. Mr. Frank W. Wills, F.R.I.B.A., architect, 8, St. Stephen Street, Bristol:—

E. S. Bennett, Staple Hill	£2,224	9	1
J. Perkins & Son, Bristol	2,178	0	0
S. & J. Cole, Badminton	2,134	8	0
R. F. Ridd, Bristol	2,118	0	0
W. Jones, Gloucester	1,995	0	0
W. Cowlin & Son, Bristol	1,960	0	0
E. Clark & Son, Fishponds	1,945	0	0
Adams & Jefferies, Oldland	1,902	0	0
G. Humphreys & Son, Bristol	1,900	0	0
J. Hatherly, Bristol	1,895	0	0
E. Preece, Filton	1,894	0	0
Stephens, Bastow & Co., Bristol	1,875	0	0
A. Dowling, Bristol	1,875	0	0
E. Love, Bristol	1,871	0	0
J. G. Norman, Swindon	1,851	12	0
W. Webb, Bath	1,838	0	0
T. R. Lewis, Bristol	1,818	0	0
J. Long & Sons, Bath	1,759	0	0
Hayward & Wooster, Bath	1,757	0	0
F. Chown, Bristol	1,717	0	0
Orchard & Peer, Stroud	1,680	0	0

* Accepted.

Bathampton.—For the erection of dwellings at Bathampton, for Colonel Allen. Mr. W. J. Willcox, architect:—

Long & Sons	£1,160
Webb	1,153
Chancellor	1,150
Erwood & Morris	1,097
Wills & Sons	1,096
C. Wibley*	1,094

* Accepted.

Bexley Heath.—For the erection of a new police station at Bexley Heath. Mr. J. Dixon Butler, architect, surveyor to the Metropolitan Police, New Scotland Yard, S.W. Quantities by Messrs. Thurgood, Son & Chidgey, Charing Cross Chambers, Duke Street, Adelphi:—

Spencer & Son	£9,650
H. L. Holloway	9,473
Thomas & Edge	9,149
C. Ansell	9,000
Graham & Co.	8,999
Mowlem & Co.	8,958
H. Kent	8,897
Lathey Brothers	8,889
Holloway Brothers	8,889
Lascelles & Co.	8,831
F. & H. F. Higgs	8,670
Higgs & Hill	8,594
Grover & Son	8,472
Godson & Sons	8,393

Beckenham.—Accepted for the erection of the second portion of St. Michael's and All Angels' Church, Beckenham. Mr. A. H. Hoole, architect, 25, Great James Street, Bedford Row, W.C.:—

F. & G. Foster, Clifford Road, Norwood	£1,835
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Coventry.—For the erection of proposed nurses' home, for the Coventry and Warwickshire Hospital Committee. Messrs. A. H. Tiltman, F.R.I.B.A., 1, Raymond Buildings, Gray's Inn, London, W.C., and Herbert W. Chataway, Trinity Churchyard, Coventry, architects:—

G. F. Smith & Sons, Milverton	£6,100	0	0
A. A. Wincock	5,900	0	0

Kelley & Son	£5,872	16	0
C. Wright, Leicester	5,840	0	0
C. Garlick	5,820	0	0
A. A. Clarke, Northampton	5,700	0	0
J. Parnell & Son, Rugby	5,641	0	0
Gowing & Ingram, Birmingham	5,597	0	0
T. Hickman, Market Harborough	5,570	0	0
W. Hopkins, Birmingham	5,500	0	0
C. G. Hill*	5,378	0	0
R. Fenwick, Ltd., Birmingham	5,375	0	0
Johnson & Son, Leicester	5,369	0	0
T. Higgins, Northampton	5,065	4	0

* Accepted. [Rest of Coventry.]

Gillingham (Dorset).—Accepted for the erection of a reservoir, engine house tanks and chambers, on the Fifehead Magdalen Estate, Gillingham, for Colonel Percy J. Browne, C.B. Messrs. Hudson & Martin, architects, Gillingham:—

S. Curtis, Stalbridge ... £594

Guildford.—For the enlargement of Guildford Post Office, for H.M. Office of Works, &c.:—

Hylett & Hammond	£5,997	Cr.	£75
Cropley & Sons	5,200	70	
A. Johnson	5,075	68	
T. Robinson	4,950	100	
A. & F. Gammon	4,900	79	
D. Fry	4,865	15	
Drowley & Co.	4,747	82	
A. J. Colborne	4,712	25	
Potter Brothers	4,712	162	
F. Deacon & Son	4,467	90	
Haslemere Builders	4,375	144	
Gosby & Co.	4,298	150	
God & Son	4,292	160	
n & Co.	4,290	54	
llis & Son	4,238	160	
llis, Wells & Co.	4,220	220	
H. Lindfield & Son	4,188	188	
F. & G. Foster	4,128	75	
Rowland Brothers	4,048	149	
R. Cook & Sons	4,014	115	
McC. E. Fitt*	3,965	187	
R. Smith	3,850	25	

* Accepted.

Hereford.—For the erection of a villa residence on the Highfield Building Estate, Tupsley, for Mr. E. C. Withersone. Messrs. Groome & Bettington, architects and surveyors, Hereford:—

R. Taylor, Hereford	£480	0	0
J. T. Jones, Hereford	434	0	0
E. W. Wilks, Hereford	415	0	0
W. Powell, Hereford	389	0	0
C. Cooke,* Hereford	366	10	0

* Accepted. [Architects' estimate, £368.]

Kingswinford.—Accepted for the erection of the Glynn Council school, for the Staffordshire Education Committee:—

G. Meanley & Son, Kingswinford ... £1,073 19 0

Leicester.—For the erection of a new house at Knighton. Mr. J. Woodhouse Simpson, architect, Berridge Street, Leicester:—

A. & W. Chambers	£2,699	0	0
H. Herbert & Sons	2,694	10	0
J. Bentley & Co.	2,648	0	0
G. Dunsbury & Co.	2,628	12	6
T. Herbert*	2,395	0	0

* Accepted. [All of Leicester.]

London, W.—For the erection of the proposed one-room tenements in Hesketh Place and Thomas Place, for the Kensington Borough Council:—

E. J. Clayton	£3,300	0	0
F. Eatwell	3,261	0	0
J. Garrett & Son	3,170	0	0
Rowe & Co.	2,864	0	0
T. Almond & Son	2,675	0	0
W. J. Dickens	2,670	0	0
Martin, Wells & Co.	2,633	0	0
Patman & Fotheringham	2,600	0	0
Cowley & Drake	2,597	0	0
B. Colley & Sons	2,540	0	0
F. & G. Foster	2,491	0	0
H. Lovatt, Ltd.	2,440	0	0
Perry Brothers	2,429	0	0
Herbert & Co.	2,420	0	0
J. Barker & Co.	2,377	0	0
J. H. Bywaters	2,245	15	0
A. Hudson & Co.*	2,175	0	0
J. & W. Drake	2,164	0	0

* Recommended for acceptance.

London, N.—For the enlargement of the Kingsland Secondary School, Hackney, N., for the London County Council:—

Stevens & Son, Holloway	£9,726	0	0
W. H. Hyde, Norwood Junction	9,668	0	0
J. & M. Patrick, Wandsworth	8,978	0	0
G. E. Wallis & Sons, Ltd., Maidstone	8,588	0	0
J. & C. Bowyer, Upper Norwood	8,586	0	0
Treasure & Son, Holloway	8,570	0	0
W. Lawrence & Son, Waltham			
Cross	8,494	0	0
Martin, Wells & Co., Ltd., Vauxhall	8,473	10	8
B. E. Nightingale, Albert Embankment	8,433	0	0
A. E. Symes,* Carpenter's Road, Stratford	8,258	0	0

[The architects (Education) estimate, £8,973.]

* Recommended for acceptance.

London, S.E.—For improvements at the Alverton Street school, Deptford, for the London County Council:—

T. D. Leng, Deptford	£9,966
Sabey & Son, Ltd., Islington	8,899
W. Lawrence & Son, Tottenham	8,849
Martin, Wells & Co., Ltd., Vauxhall	8,811
Treasure & Sons, Upper Holloway	8,810
J. & M. Patrick, Wandsworth	8,799
E. Triggs, Clapham	8,765
G. E. Wallis & Sons, Ltd., Maidstone	8,647
J. & C. Bowyer, Upper Norwood	8,556
W. Johnson & Co., Ltd., Wandsworth	
Common	9,538

[The architect's (Education) estimate, £9,441]

* Recommended for acceptance.

Northwich.—Accepted for the enlargement and alteration of Weavenham Council Schools:—

S. Appleton, Northwich ... £3,700

Nottingham.—Accepted for the erection of a house, Lucknow Drive, Mapperley Park. Messrs. A. R. Calvert & W. R. Gleave, architects, 18, Low Pavement, Nottingham:—

W. Crane, Ltd. ... £1,398

Perth.—Accepted for the works of new church to be erected at Feus Road, for St. Mark's Congregation. Mr. John Walker Smart, architect, 28, York Place, Perth:—

Mason—Fraser & Morton, Perth ... £1,701

Joiner—Fraser & Morton, Perth ... 870

Plumbing, gasfittings and ventilation—

Frew & Sons, Perth ... 212

Plaster, cement and tilework—J. Sharp,

Perth ... 203

Slater and tilework—A. Drysdale ... 193

Glazier—G. R. Douglas & Son, Perth ... 100

Iron railings—MacGregor, Perth ... 95

Plymouth.—For alterations and additions to Messrs. Picken & Co.'s licensed premises, Whimpey Street. Mr. T. Rogers Kinsell, architect, A.R.I.B.A., Plymouth:—

A. Andrew, Plymouth ... £4,300

W. E. Blake, Plymouth ... 4,200

G. B. Turpin, Plymouth ... 4,200

A. J. Allen ... 4,141

G. P. Finch, Plymouth ... 4,097

Pearn Brothers, Plymouth ... 3,945

Pearce Brothers, Plymouth ... 3,820

W. T. Stevenson & Co. ... 3,788

F. Stanbury, Plymouth ... 3,769

Pethick Brothers,* Plymouth and West-

minster ... 3,769

* Accepted.

Sheffield.—For the erection of a new home for the Little Sisters of the Poor in Heeley Bank Road. Mr. Edmund Winder, M.S.A., architect, Corn Exchange Chambers, Sheffield:—

W. Wade & Co., Leeds ... £28,000 0 0

Finder Brothers & Boul, Intake ... 27,098 0 0

S. Vickers & Son, Nottingham ... 26,650 0 0

E. & W. Oxley ... 25,730 0 0

J. & H. Whelan ... 24,536 0 0

Willerman Brothers, Hyde, Lancashire ... 24,315 0 0

W. & A. Forsdyke ... 24,300 0 0

Boat & Son, Sheffield ... 24,200 0 0

Lee & Kirk, Chesterfield ... 24,000 0 0

H. Freckingham, Wicker ... 23,990 0 0

Hollingsworth & Bedford ... 23,866 0 0

J. Eschelby & Son ... 23,825 0 0

Thornton & Son, Rotherham ... 23,804 0 0

D. O'Neill & Son ... 23,650 0 0

T. Wilkinson & Sons ... 22,800 0 0

J. Lonsden & Son ... 22,720 0 0

T. Roper & Sons, Mowbray Street, Sheffield ... 22,505 10 0

* Accepted. [Rest of Sheffield.]

South Shields.—Accepted for the erection of Council schools in Dean Road:—

Sheriff, Stephen & Sons, South Shields ... £12,048 0 11

Taunton.—For the erection of a new house for Mr. C. Fear, in Greenway Road, Taunton. Mr. F. W. Roberts, architect, 2, Hammet Street, Taunton:—

Weaver Brothers, Trull, Taunton ... £935 0 0

Hart & Poole, Norton Fitzwarren, Taunton ... 834 17 6

G. Handford, Taunton ... 830 0 0

Manning & Son, Taunton ... 770 0 0

H. G. Smith, Taunton ... 759 12 0

F. Small,* Taunton ... 750 0 0

* Accepted.

(Continued on p. 283.)

June 2. London, W.—*Providing and laying complete upon the main roads about 3,200 lineal yds. of 12in. by 6in. Norwegian granite kerbing and 12in. by 6in. Norwegian granite channelling, and about 3,200 sq. yds. of Victoria stone paving, and all other incidental works, for the Heston and Isleworth U.D.C. Plans and specifications can be seen and forms of tender, together with bills of quantities and any other particulars, obtained from P. G. Parkman, A.M.I.C.E., engineer and surveyor, Council House, Hounslow, W., upon payment of a deposit of £2 2s. Sealed tenders, endorsed "Main Road Paving," must be sent to H. J. Baker, clerk to the Council, Council House, Hounslow, W., not later than June 2.*

June 2. Cramlington.—*Materials, for the U.D.C. Contract No. 1: The supply of about 1,500 tons of machine broken whinstone, to be delivered at Cramlington Station and Dam Dykes Siding. Contract No. 2: The cartage of and haul stone on to the highways, and the provision of a horse and man for watercart. Contract No. 3: The hire of a steam roller, and watercart or carts. Full particulars, specifications, conditions, and form of tender relating to the above contracts can be had on application to W. J. Coulson, surveyor, Council Office, Cramlington. Sealed tenders, endorsed "Tender," must reach the office of Robert Nicholson, solicitor and notary public clerk to the Council, 51, Bridge Street, Morpeth, not later than June 2.*

June 5. Bishop's Stortford.—*Paving and improving various footpaths in the district, for the U.D.C. Plans and specifications can be seen at the office of the Council's surveyor, R. S. Scott, A.M.I.C.E., 7, North Street, Bishop's Stortford. Tenders, endorsed "Tender for Street Works," to be sent to Thomas Swathbridge, clerk, Council Offices, 7, North Street, Bishop's Stortford, by 4 p.m. on June 5.*

June 6. London, E.C.—*Laying of about 1,070 yds. of tar pavement in the Finsbury Circus Gardens, for the Corporation. Further particulars to be obtained upon application to the City Engineer, Guildhall, E.C. Tenders must be addressed, Town Clerk, Public Health Department, Guildhall, E.C., and delivered at the office of the Hallkeeper, Guildhall, on or before June 6.*

June 6. London, W.—*Making-up of the following roads:—Belsize Avenue; Kingsley Avenue (2nd portion); Leighton Road (2nd portion); Corfton Road (2nd portion). The drawings and specification may be seen and form of tender, together with schedule of quantities and other particulars, obtained from Charles Jones, M.I.C.E., borough engineer, Town Hall, Ealing, W., any day during office hours upon payment of a deposit of 10s. 6d. for each road. Sealed tenders, in the envelopes provided, endorsed "Tender for Making-up," must be delivered at the office of George E. Brydges, town clerk, Town Clerk's Office, Town Hall, Ealing, W., not later than 9.30 a.m. on June 6.*

June 6. London, N.—*Sewering, levelling, paving, channelling, &c., Preston's Court, within the borough of Hornsey. Forms of tender, &c., and all information can be obtained from E. J. Lovegrove, borough engineer and surveyor, Municipal Offices, 99, Southwood Lane, Highgate, on any morning between 10 and 12. Tenders must be on the prescribed form, and be delivered or sent by post (sealed and endorsed), so as to be deposited in the tender-box in the Town Clerk's Office by 4 p.m. on June 6. Quantities, duly completed, must accompany the tenders.*

June 6. Hove.—*Executing paving and other works in Lawrence Road (between Rutland Gardens and Raphael Road) and Tamworth Road (between Portland Road and Montgomery Street). Further particulars may be obtained, and plans and specifications seen at the office of the Borough Surveyor. Tenders, on forms supplied, endorsed "Tender for Lawrence Road" or "Tamworth Road," as the case may be, will be received by H. Endacott, town clerk, Town Hall, Hove, up to 6 p.m. on June 6.*

June 6. Romney Marsh.—*Supply and delivery of 300 yds. of quartzite of zin. gauge to the parishes and roads hereunder stated:—100 yds. Guldeford Road, Brookland; 100 yds. Straight Road, Brookland; 100 yds. Snaive Road, Brenzett. The above material to be delivered before September 15, 1906, and yarded at the expense of the contractor in such a manner and in such quantities as the surveyor may direct and subject to his measurement. Tenders, endorsed "Quartzite," to be delivered to W. B. Smith, district surveyor, New Romney, not later than June 6.*

No date. Ross.—*Making a new road to The Coppice, Bishopswood. Contractors can see the plans and specification upon application to Arthur H. Pearson, architect, Ross.*

No date. Calverley.—*Granite, limestone, dress, &c., for the U.D.C. Particulars and forms of tender can be obtained from W. Walker, surveyor, Council Offices, Calverley.*

SANITARY.

May 24. Brentwood.—*Connecting certain premises on Shenfield Common, Brentwood. To the sewer there, for the Billericay R.D.C., according to plans and specifications to be seen by appointment with S. J. Shelley, Junction Road, Brentwood. Tenders to be securely sealed, and marked "Tender for Connections," and sent to C. Edgar Lewis, clerk, Brentwood, by May 24.*

May 25. Manchester.—*Construction of pipe sewers, manholes, &c., on the new roads, Blackley Estate. Drawings may be seen and specification, bill of quantities, and form of tender obtained on application at City Surveyor's Office, Town Hall, Manchester, on payment to the City Treasurer of £2 2s. All cheques or postal orders are to be made payable to the order of "The Corporation of Manchester." Tenders, enclosed in the official envelope and addressed to the chairman of the Sanitary Committee, to be delivered at the City Surveyor's Office not later than 10 a.m. on May 25.*

May 23. Ross.—*Sewerage along Greytree Road, Merryyn Lodge to Palmerston House (Ashfield), and from Tudorville to Duxmere, according to the plans and specifications, which may be seen at the Council Offices.*

Separate tenders for each work, endorsed "Sewer Market Road," "Sewer Ashfield," or "Sewer Tudorville," to be delivered at the Council Offices, Albion Chambers, Ross, not later than noon on May 28.

May 28. Wells.—*Constructing new surface and storm water drains at the Union Workhouse. The plan and specification may be seen at the office of C. Brown, city surveyor, from whom all information may be obtained. Sealed tenders must be sent to Alfred George Russ, Poor Law Offices, High Street, Wells, on or before May 28.*

May 29. Methley.—*Construction of the work contained in the Methley Junction Extension, for the U.D.C. Plans and specifications may be seen, and quantities with form of tender obtained, from the engineer, John Stocks Richardson, C.E., East Parade Chambers, Leeds, on payment of £1 1s. Tenders endorsed "Tender for Sewerage Works," must be delivered to Robert S. Wigin, clerk, 83, Albion Street, Leeds, not later than noon on May 29.*

May 28. Bootle.—*Construction of public conveniences on the east side of Miranda Road continuation, adjoining the Bootle Cricket Ground. Plans and specification may be seen and bills of quantities obtained at the office of the Borough Engineer. Tenders, sealed and endorsed "Public Conveniences, Miranda Road," to be delivered to J. Henry Farmer, town clerk, Town Hall, Bootle, not later than 10 a.m. on May 28.*

June 2. Guildford.—*Construction of about the following lengths of surface-water drainage in the Charlottetown and Guildford Park Estates, inclusive of all necessary manholes, gulleys and connections, outfall, &c.:—95 yds. run of 45in. by 30in. armoured egg-shaped concrete tubes; 180 yds. run of 30in. armoured concrete tubes; 490 yds. run of 24in. armoured concrete tubes; 830 yds. run of 18in. armoured concrete tubes; 132 yds. run of 15in. armoured concrete tubes; 180 yds. run of 9in. stoneware pipe. Plans and sections may be seen and copies of the specification, bill of quantities and form of tender obtained on application to C. G. Mason, A.M.I.C.E., borough engineer and surveyor, upon payment of £3 3s. Sealed tenders, endorsed "Tender for Charlottetown and Guildford Park Surface-Water Drainage," are to be sent to F. S. Miller, town clerk, Town Clerk's Office, Bridge Street, Guildford, on or before noon on June 2.*

June 6. London, W.—*New relief effluent water sewer from southern works to River Thames, and manholes &c., in connection therewith, as under:—about 3,700 ft. of 24 in. pipe. The drawings and specifications may be seen, and forms of tender, together with schedule of quantities and other particulars, obtained from C. Jones, M.I.C.E., borough engineer, Town Hall, Ealing, W., any day during office hours, upon payment of a deposit of £3 3s. Sealed tenders, in the envelope provided, endorsed "Tender for New Relief Effluent Water Sewer," must be delivered to George E. Brydges, town clerk, Town Clerk's Office, Town Hall, Ealing, W., not later than the first post on June 6.*

June 7. Cheadle.—*Construction of about 400 lineal yds. of 9in. and 37 lineal yds. 12in. earthenware pipe sewers, with manholes, &c., at Grove Lane, Cheadle Hulme, for the R.D.C. Plans and drawings may be seen, and copies of the specifications and bill of quantities obtained on application to E. Sykes, C.E., between 10 and 12 daily until the 31st May (Saturdays excepted), on deposit of £1 1s. Tenders, duly sealed, and endorsed "Tender for Sewers," may be addressed to Arthur Briggs, clerk to Cheadle and Gatley U.D.C., Council Offices, Cheadle, near Manchester, on or before June 7.*

June 9. Glasgow.—*Construction of Sewer No. 1 (Contract No. 1a), extending from Moss Road, North of Cardonald Station, to a point near Paisley Road, South of Ibrox Station, for the Corporation. Plans, specifications, and working drawings may be seen, and specifications and schedules of quantities and forms obtained, on application to the City Engineer at his office, City Chambers, 64, Cochran Street, Glasgow, on payment of a fee of £5 5s. Sealed offers, marked outside "Tender for Sewer No. 1 (Contract No. 1a)," must be lodged with A. W. Myles, town clerk, City Chambers, Glasgow, not later than June 9. The resident engineer will meet intending offerers at Cardonald Station on the arrival of the 10.35 train from St. Enoch Station on May 25.*

June 11. Fenton.—*Sewage-disposal works, for the U.D.C. Outfall sewers comprising about 1,800 yds. of 15in. stoneware pipes and about 2,800 yds. of 15in. cast-iron pipes, including manholes where required, also the construction of liquefying tanks and bacteria beds, pump well, erection of engine-houses and manager's house and other incidental works in connection therewith. Plans and specification of the proposed works may be seen and bills of quantities obtained on application at the office of S. A. Goodall, surveyor to the Council, Town Hall, Fenton, Staffordshire, on payment of a deposit of £5. Plans, specification and a copy of the bill of quantities may also be inspected at the offices of Willcox & Raikes, consulting engineers, 63, Temple Row, Birmingham. Sealed tenders, endorsed "Fenton Sewage-disposal," to be delivered at the office of R. T. Adderley, clerk to the Council, Town Hall, Fenton, Staffs., not later than noon on June 11.*

June 15. Huddersfield.—*Construction of Sewage disposal works at Berry Brow, for the Honley and South Crosland Joint Sewerage Board. The works comprise bacteria continuous filter beds, circular tanks, mud bed, laying out storm water and land filtration areas, with carrier, &c., small pumping station, the construction of new road, &c. The plans may be seen and quantities and form of tender obtained at the office of the "Engineer," W. H. Radford, C.E., Albion Chambers, King Street, Nottingham, on deposit of £3 3s. Sealed and endorsed tenders must be sent in to Alfred I. Slocombe, clerk to the Joint Board, Huddersfield, on or before June 15.*

No date. Frosterley.—*Draining of the bottom level of Harehope Quarry, Frosterley. About 270 yds. of open cutting will be necessary, and about 400 yds. underground. The watercourse will have to be 4ft. 6ins. high and 4ft. wide. Full particulars, forms of tenders, &c., may be obtained on application to the Secretary, Harehope Mining and Quarrying Company, Ltd., Frosterley, R.S.O., Weardale, co. Durham.*

TIMBER.

May 29. London, W.—*Supply of 100 fathoms of best yellow deal ends, to be delivered cartage free at the Workhouse, Isleworth, for the Guardians. Tenders, upon forms which may be obtained at the office of William Stephens, clerk to the Guardians, Union Offices, Isleworth, W., to whom tenders must be sent by 4 p.m. on May 29.*

May 30. Dublin.—*Supply of 30,000 creosoted rectangular sleepers 8ft. 11ins. by 10ins. by 5ins. (17,000 to be delivered in July, 1906, and 13,000 in March, 1907), for the Dublin, Wicklow and Wexford Railway Co. Specifications and forms of tender can be had on application to the Secretary. Tenders, marked "Tenders for Sleepers," and addressed to the Secretary, Dublin, Wicklow and Wexford Railway, Westlandrow Station, Dublin, to be forwarded so as to reach him not later than 10 a.m. on May 30.*

June 1. Southampton.—*Supply of deals and matched boarding, for the Director-General, Ordnance Survey. Applications for forms of tender and specification should be made to the Officer in Charge of Stores, Ordnance Survey Office, Southampton. All tenders must be submitted before noon on June 1.*

June 2. South Hetton.—*Supply of all kinds of colliery timber from July 13, 1906, to the June 30, 1907, for the South Hetton Coal Co., Ltd. Forms of tender, with full conditions, may be obtained on application to J. R. Lambert, South Hetton, near Sunderland. Tenders, addressed to the South Hetton Coal Co., Ltd., South Hetton, near Sunderland, will be received up to June 2.*

June 20. Egypt.—*Supply of 200,000 oak and 100,000 pine sleepers, for the Egyptian State Railways Department. Copies of the specification may be had, price 2s. each, from Lieut.-Col. Western, Queen Anne's Chambers, Broadway, Westminster, S.W. Tenders will be received up to June 20.*

MISCELLANEOUS.

May 30. London, E.C.—*Supply of builders' engineers', smiths', plumbers', gasfitters' and miscellaneous ironmongery and electrical accessories, for the Metropolitan Asylums Board. Form of tender upon which alone tenders will be received, giving all particulars, can be obtained at the Office of the Board, Embankment, London, E.C., where tenders duly filled up must be delivered not later than 10 a.m. on May 30. Those whose tenders are accepted will be informed accordingly in due course.*

June 5. Failsworth.—*Supply of the under-mentioned materials and stores during the period of twelve months ending June 11, 1907: paving setts, curbs, flags, Portland cement, earthenware pipes, bends, junctions, and gulleys, Buxton lime, green crystal coppers, disinfectants, and galvanised sanitary pails. Forms of tender and further particulars may be obtained at the office of G. F. Gray, surveyor, Council Offices, Failsworth. Sealed tenders on forms supplied, and endorsed "Tender for—," must be delivered to H. C. Broome, clerk to the Council, Failsworth, not later than noon on June 5.*

June 7, 9 and 12. Copenhagen.—*Supply of (1) cables, and (2) electric light meters to the Copenhagen Lighting Department; and (3) 4,400 cast iron pipes to the Copenhagen Water Works. The conditions (in Danish) may be inspected at the offices of the Commercial Intelligence Branch of the Board of Trade, 73 Basinghall Street, London, E.C. Copies of Conditions for (1) and (2) may be obtained from the Director of Public Lighting, No. 22, Vestre Boulevard, Copenhagen, at which address tenders must arrive by mid-day on June 7 and 9, respectively. Copies of (3) may be obtained from the office of the Water Works, Copenhagen, where tenders will be received up to mid-day on June 12.*

June 7. Penrikyber.—*Supply of the following stores, for the Penrikyber Navigation Colliery Co., Ltd., Penrikyber R.S.O., Glam.:—Iron and steel; castings; bolts, nuts, rivets, iron washers and nails; miners' lamps and lamp glasses, electric lamps and fittings; steam, water and gas-metal fittings, &c.; ironmongery, files, saws, gouges, colliers' tools, helves, shovels and sundry stores; paints, brushes, brooms, &c.; pitch-pine deals, red pine, best quality, American birch boards and deals, poplar and elm curbs, elm, G. and T. match and flooring boards; wire ropes; lime and cement; oils. Forms of tender can be obtained on application to the Secretary, to whom tenders must be sent not later than June 7.*

June 8. Thornaby-on-Tees.—*For the under-mentioned works, for the Corporation:—Contract No. 1: Laying-out, levelling, roadmaking, turfing, railbase, &c. Contract No. 2: Wrought-iron railings, gates, &c. Plans, specifications, and bills of quantities may be seen, and forms of tender and other particulars obtained, at the Borough Engineer's Office, Town Hall, Thornaby-on-Tees, during the usual office hours, on depositing cheque or postal order value £2. Tenders, on the prescribed form only, must be sent to the Town Clerk in sealed envelopes provided for the purpose, on or before June 8.*

June 13. Cape Town.—*Supply of: 3-ton bronze wire, No. 18; 5 m/fe bronze wire, braided steel No. 18; 2,200 yds. cable V.I.R., 20/10; 2 pairs; 1,100 yds. cable, V.I.R., 20/10; 8 pairs; 440 yds. cable, V.I.R., 12 pairs; 440 yds. cable, V.I.R., 16 pairs; 440 yds. aerial cable, dry core, 52 pairs; 4-ton wire galvanised steel No. 11. For particulars apply to the Controller of Stores, G.P.O., Cape Town. Tenders to be sent in to the Chairman of the Tenders Board, Control and Audit Office, Parliament Street, Cape Town, by June 13.*

June 16. Radcliffe.—*Supply of the following materials, for the U.D.C.: Granite setts; steel girder tramrails, fishplates, tie-bars, bolts, nuts, points and crossings, and other special trackwork. Specifications and forms of tender may be obtained on application to W. L. Rothwell, engineer to the Council, on payment of a fee of £2 2s. Tenders, endorsed "Tramway Materials," to be sent to S. Mills, clerk, Council Offices, Radcliffe, on or before June 16.*

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Coming Events.

Wednesday, May 23.

SOCIETY OF ARTS.—Mr. James N. Shorland, B.A., M.I.C.E., on "The General Supply of Electricity for Power and other Purposes," at 8 p.m.
ROYAL INSTITUTE OF PUBLIC HEALTH.—Mr. Carl Prausnitz's lecture (continued) at 5 p.m.

Thursday, May 24.

INSTITUTION OF ELECTRICAL ENGINEERS.—Annual General Meeting, Society of Arts, 8 p.m.

Friday, May 25.

ARCHITECTURAL ASSOCIATION.—Second Summer Visit, to Marsh Court, Hampshire.
ROYAL INSTITUTE OF PUBLIC HEALTH.—The Harben lectures at 5 p.m.

Saturday, May 26.

ROYAL SANITARY INSTITUTE.—Meeting at the Municipal Council Chamber, Bournemouth. Discussion on "Sanitary Administration in a Health Resort."

Monday, May 28.

SURVEYORS' INSTITUTION.—Annual General Meeting at 3 p.m.
ROYAL INSTITUTE OF PUBLIC HEALTH.—The Harben lectures at 5 p.m.

Wednesday, May 30.

ROYAL INSTITUTE OF PUBLIC HEALTH.—The Harben lectures at 5 p.m.

Thursday, May 31.

WORSHIPFUL COMPANY OF CARPENTERS.—Mr. S. Barter on "Setting-out, Preparing and Fixing Staircases and Handrails," at 7.30.

Bankruptcies.

(Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.)

DURING THE WEEK ending May 18th thirty-one failures in the building and timber trades in England and Wales were gazetted.

J. H. WATSON, painter, Willington. R.O. May 9th.

F. W. REEVE, builder, Whitefield. R.O. May 10th.

F. S. GREEN, carpenter and builder, Paddock Wood, P.E., Tunbridge Wells Town Hall, July 2nd, at 12.

A. W. JAGGERS & Co., builders and contractors, Crofton Park. Adj. May 8th.

JONES & COULSON, builders, Leicester. P.E., The Castle, Leicester, June 1st, at 10.

H. C. SOPER, plumber and decorator, Camden Town, P.E., London Bankruptcy Court, June 19th, at 11.30.

SMITH & PUFFETT, painters and house decorators, Oxford. P.E., Banbury Town Hall, June 6th, at 10.

J. HIGGINS, junr., jobbing decorator, Plumpton. R.O. May 11th.

LANGTON & Co., builders' merchants, Brentford and Twickenham. Liabilities £2,647; assets £819.

E. SUTTON, builder, Hinckley. Liabilities £761; assets £574.

T. E. THOMAS, builder, Maesteg. Gross liabilities £2,011; expected to rank £425; assets £95.

T. F. FENNEY, builder, Middleton-one-Row. Gross liabilities £305; expected to rank £292; deficiency £167.

H. JONES & SON, builders, Liverpool. First meeting, O.R.'s, Liverpool, May 23rd, at 12. P.E., Liverpool C.C., May 28th, at 11.

J. J. STACEY, painter and plumber, Clevedon. First meeting, O.R.'s, Bristol, May 23rd, at 12.15. P.E., Bristol Guildhall, May 25th, at 12.

J. SHAW, builder, Crawley. First meeting, George Hotel, Crawley, May 23rd, at 11.30. P.E., Brighton C.C., June 7th, at 11.

New Companies.

SPANISH MARBLE. Capital: £25,000.

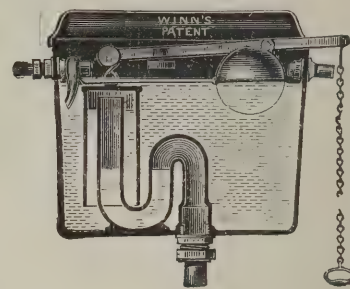
WILLIAM GRIFFITHS & Co. (BUILDERS), LTD. Capital: £3,000.

ABERNANT GLYNNEATH BUILDING Co. Capital: £5,000.

R. M. MIDDLETON & Co., builders and contractors, Gosport. Capital: £1,000.

MITCHELL & WELSH, to take over (1) the business of slaters and builders' merchants, &c., carried on by Simons & Welsh, Ltd.; (2) the business of a builders' merchant carried on by W. H. Welsh at Hull and elsewhere as Welsh & Co.; (3) the business of brickmaker carried on by F. W. Riggall at Killingholme, Lincolnshire, as the Lindsey Brickfields Co.; (4) the business of brick and tile makers carried on by the said F. W. Riggall and J. R. Mitchell at South Killingholme and Great Grimsby and elsewhere, as the Haven Brick and Tile Co.; (5) the business of brick and tile makers carried on by H. C. Scaping and C. Thompson at Goxhill, Lincolnshire, as Edward Thompson & Co.; and (6) the business of a carter and contractor carried on by R. Mitchell at Great Grimsby. Capital: £20,000.

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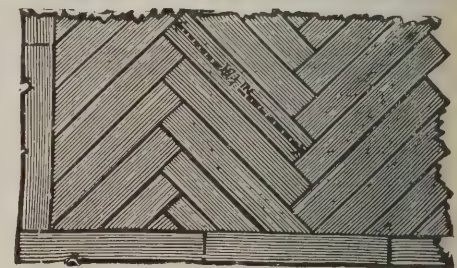
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17 1/2 x 3 x 2	8 3	7 9	
17 1/2 x 3 x 1 1/2	6 9	6 3	



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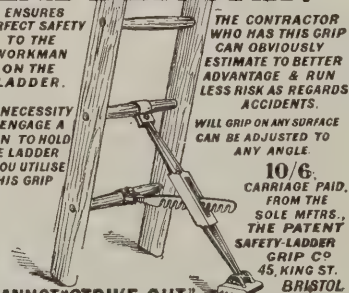
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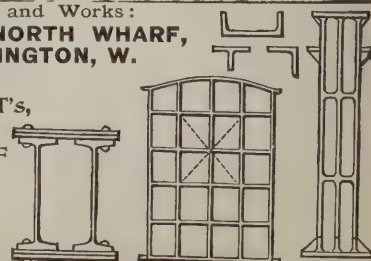
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THE BUILDERS' JOURNAL

AND ARCHITECTURAL ENGINEER.

May 23rd, 1906.

CONCRETE AND STEEL SUPPLEMENT (MONTHLY).

FOREWORD.

Changes in Construction.

ALTHOUGH the older generation of architects is reluctant to confess it, it cannot be disputed that with the advent of the twentieth century our whole ideas as to the building of commercial structures have been rapidly changing. All concerned in the erection of business premises, in buildings of the warehouse and factory class, and in structures where economy is a first essential, must realize that the constructional requirements of modern buildings are undergoing very marked changes.

Causes of Changes.

The causes of these changes are twofold, the first being the introduction of the steel-frame building, the second the invention of reinforced concrete.

Engineering & the Architect.

With the advent of these the architect is also gradually finding that a far greater amount of engineering knowledge is required of him than was previously the case. Some architects overcome this by employing engineering assistants or by having consultative advice on the engineering aspect of the problems put before them. But, no matter what assistance be obtained, he would indeed be a poor architect who did not carefully study and thoroughly inform himself of the primary principles of construction and calculation that are involved.

Engineering & the Builder.

Almost—though not entirely—in the same degree the builder is finding that a thorough knowledge of structural engineering problems is a most useful adjunct in the conduct of larger works, and he also is in many instances finding it advisable to engage engineers on his staff and to have regular consultative engineering advice. But here again, no matter what assistance may be obtained, he would indeed be a poor type of contractor who was not desirous of carefully informing himself as to the constructional and economic bearings of the movement towards the increased use of steel and concrete in buildings. Though work of this kind may be carried out by specialists, it is obvious that contractors who wish to keep up with the times may also have to undertake a considerable amount of this work themselves without the aid of sub-contractors.

Our new Supplement.

Having regard to this evolution in the requirements of the architect and of the contractor, and to the fact that many of our readers are specifically engaged in constructional engineering, we have decided to extend our series of supplements by yet another, to be known as the "Concrete and Steel" Supplement. This will deal in general with the multitudinous uses of concrete and steel in modern construction, and with the problems of the steel-frame building and reinforced concrete in particular.

To be issued Monthly.

No excuse is needed for this further development of our sphere of activity, for our regular readers will have noticed from month to month that we have had to devote more and more space to these two subjects to fulfil a growing demand for information. As with fire matters, and questions relating to the business side of contractors' work, we think our readers will find it more practical and convenient that we should collate such information as we have been giving, extend it and systematically present it in the form of a special monthly supplement, so that they may anticipate exactly when the particular information they require will be at hand, and also where data can be easily found when required for reference purposes.

Our Programme.

As to our programme for this supplement, we would rather not enter into details at this stage, having regard to the rapid development of this subject. Suffice it to say that we shall deal with every aspect of the subject as it concerns building construction, that we have secured the services of the best authorities as contributors, and that we shall copiously illustrate work by photographs and drawings, believing this to be an educational feature of the highest value in technical journalism.

Contributions.

We shall be glad to consider articles and illustrations on subjects within the province of this supplement. The articles we particularly desire are those which embody the results of personal experience and original research. Photographs should be sharp in detail and illustrative of the construction employed, while drawings are preferred in black line without wash of any sort. Communications should be marked "Concrete and Steel Supplement," and addressed to the Editor, "Builders' Journal," 6, Great New Street, London, E.C.

THE EARLY USE OF CONCRETE.

By Thomas Potter.

THERE can be no doubt that concrete has been in use for building purposes from time immemorial—not made and applied in the way that is usual now, it is true, but with similar results.

In Mexico and Peru fragments of concrete buildings belonging to prehistoric times have been discovered, in the Italian colonies of Magna Græcia there is much evidence that the ancient Greeks used it extensively, while the Romans employed it on a large scale both in this country and in Rome. Professor Middleton said—many years ago—that its use by the Romans could be traced as far back as 500 B.C., and that their method of using it for building walls was very similar to ours at the present time.

Earliest Use.

Probably the use of concrete is identical with the earliest period of employing quarried stone for building walls, where mortar was employed, which would arise almost as a necessity.

The practice in many stone districts in this country now is, and probably always has been, where the thickness of walls permits, to face the latter with roughly squared stone on both sides, to utilize the smaller stones not large enough for facing for the core by bedding them in mortar—filling the interstices between them with the still smaller chippings and waste, and pouring in liquid grout of lime and sand until every crevice is filled. The whole in this way becomes a solid mass.

This simple process must have inevitably occurred to the earliest stone wall builders, and the result was a concrete core, examples of which are to be found in many parts of the world.

A very old Lancashire proverb, which possibly dates from mediæval times, runs:—

"A castle wall to be stout
Must be full of mortar and grout."

Roman and Norman Remains.

Judging from the remains of Roman and Norman buildings in this country—Corfe, Rochester, Pevensey and Richmond Castles, for instance—the method described must have been usually adopted. If the smaller rough stones to form a core were not available, then chippings or other materials were used instead, but the concrete remains of old castle walls are so homogeneous in character and the aggregate generally so considerable in size that the modern method of mixing the materials together on a platform and depositing them *en masse* between the wall facings could not have been the general practice in those days. When circumstances rendered facing with stone unnecessary, boards were used to form encasing panels, just as we do now.

From wall building to the construction of roofs, floors, stairs, &c., with concrete there is a natural sequence. The concrete stairs at Colchester and Rochester Castles show the marks of the encasing boards, as do the fortification walls at Badajos.

The great dome of the Pantheon is mainly of concrete, and there is much evidence that

floors were also formed of concrete in very early times.

Roman and Norman Mortar.

Both Romans and Normans had a thorough knowledge of mortar, as the walls of many roofless castles and the remains of city walls in many parts of the country prove, although exposed to centuries of rain and frost, and apparently as strong now as when built. This is owing in a great measure to the interstices of the stonework being completely occupied by the grout used with the core filling, and to the custom of mixing pounded tiles or bricks with the lime to form mortar, which causes it to acquire increased hardness with time. Hydraulic—or water-resisting—lime was not always available where many ancient castles were built, and no doubt the builders were well aware that the addition of pounded tiles or bricks with a non-hydraulic or rich lime converted it into hydraulic mortar capable of resisting climatic changes.

Lost Knowledge Recovered.

It is singular that a knowledge of this peculiarity should apparently have been lost. Smeaton, when experimenting with a view to adopting suitable materials for building the Eddystone lighthouse, found that when the pure lime was extracted from certain lias limestones the residue was clay, and from this he actually made a brick which, when pounded and mixed with a non-hydraulic lime, entirely changed its character.

Palladio says:

"In ancient times coffer work was made by taking boards laid edgewise, according to the thickness of the walls, filling the space between them with cement and all sorts of small stones mingled together, and continued after this manner from course to course."

Alberti, another ancient architect, also wrote:—

"I have observed that in other places the ancients, who were wonderfully expert in making great works, followed different methods in filling up their foundations. In the sepulchre of Saint Antonini they filled them up with little pieces of very hard stones, each not bigger than a handful, over which they perfectly drowned the mortar. I have known other instances where the ancients have much the same sort of foundations and structures too—of coarse gravel and common stones that they have picked by chance, and which lasted many ages."

Philibert de L'Orme.

a French architect, writing in 1568, describes the usual custom at that period for making concrete as follows:—

"The excavations being made, whether for houses, harbours, bridges or buildings in a marshy soil, or even on land, and if being deep and wide, stones of a large size cannot be used for the foundations. The best and surest method is to prepare a mortar composed of quicklime recently burnt, mixed with river sand which contains a quantity of pebbles of all sizes, provided the largest be not bigger than the fist or the size of an egg, and that the whole be interspersed with smaller pebbles and gravel, such as are usually found in rivers. This material moistened with mortar and mingled with lime serves both for mortar and stone, and mixed with a sufficient quantity of sand must be thrown at once into the excavation, without any labour from the mason's trowel. It is only necessary to dress it with a spade. Having thrown in a layer about half a foot in thickness, large single stones may also be thrown in and mixed here and there with it as may be convenient, but without touching each other; after this you will again throw upon them the mortar of pebbles and gravel as before done, and this must be repeated till the excavation is full, throwing the whole from above with all sorts of small pebbles. The composition thus excited hardens and solidifies so firmly in the foundations that, being heaped up in a mass and bound together, it becomes a uniform body or rock, such as nature forms, of a single block and so strong and hard that when dry it cannot be broken either by piles or any other instrument, nor can the pebbles be separated from it without breaking them to pieces."

Smeaton's Use of Concrete in 1774.

In this country the use of concrete seems to have been almost forgotten or neglected for centuries, until about 1774, when Smeaton wrote about it and practised with it. Other engineers interested themselves in connection with foundations—Rennie, Smirke and Brunel among others—but in a general way its adoption was very slow.

Semple, an engineer, used it for the foundations of a bridge over the Liffey, however, in 1753, and writing about it at the time said:—

"There are three different ways of making use of lime in such a work as this; one is to mix the lime made liquid with its proportion of sand and small stones in

such a manner as may clothe every stone and particle of sand with it; the second to turn them up altogether like mortar; the third to lay each of the three, as it were, in thin layers, still observing the same proportion. Judiciously mix the lime, sand and stones, for if not equally mixed how can you expect them to petrify and unite into one solid mass?"

General Pasley.

in his treatise on limes and cements published in 1847, says:—

"Concrete is a recent improvement first adopted by Sir Robert Smirke (1) with success in the foundations of the Penitentiary at Millbank, where the soil chiefly of peat moss was soft, to a great extent. The origin of its use arose in this way; in excavating for one of the piers of Waterloo Bridge the workmen had a good deal of difficulty, owing to the very compact state of the gravel forming the bed of the river, which everywhere else had been found perfectly loose. The effect had been produced by the accidental sinking of a bargeload of lime over the spot some time before, which had cemented the gravel into a solid mass, resembling the calcareous conglomerates of nature which are gradually formed by a similar process. Mr. Rennie, the engineer, having mentioned the circumstance to Sir Robert Smirke, the latter with great judgment availed himself of the hint, and subsequently used concrete in all his foundations, none of which have ever been known to fail."

This statement is, however, scarcely correct, as a report by Messrs. Rennie, Lewis, Cockerell and Brown dated January, 1813, recommended concrete foundations for Millbank, while Sir Robert Smirke was not consulted in the matter until 1817. It seems somewhat remarkable that General Pasley was conducting a series of experiments with limes and cements at Chatham, within a mile of one of the finest specimens of a building comprising Roman concrete—Rochester Castle—without realizing what a valuable factor in building construction was practically waiting to be developed, and with a knowledge that the Castle had been given to a builder to clear away, but who, luckily, gave the job up in despair by reason of the strength of the concrete core.

The Paris Strike of 1840.

A strike of the carpenters in Paris in 1840 led to the extensive use there of concrete floors, and the *modus operandi* was identical with previous systems of making concrete, viz., a platform was formed at ceiling level, the aggregate was placed on it and levelled off to where required, and liquid grout was run in to fill the interstices. It was impracticable to mix the two materials—the aggregate and the matrix—on mixing boards, owing to the quick-setting nature of the matrix—plaster of Paris.

A system somewhat similar had been employed in Nottinghamshire and Derbyshire, where gypsum quarries were close at hand, and in Italy, for very many years.

In Paris, however, reinforcement (by means of flat bars on edge, rods with their ends turned down to get a grip of the concrete, and other devices, the iron being embedded in the concrete) was gradually introduced and soon became well-known and in common use. The rods and bars were usually fixed near the ceiling level to resist the tension strain, and vertical members were attached thereto, and to corresponding rods or bars near the floor level to resist the shearing stress, a principle similar to systems in use in this and other countries at the present time, and claimed as modern discoveries.

Modern Systems Antedated.

As a matter of fact all known systems of concrete construction for foundations, walls and floors, and generally, are identical with or grounded on similar methods practised—some—many centuries ago, but which the cycle of invention rejuvenates at intervals. The American form of hollow terra block, or burnt clay slab construction, and the many variations of the same are possibly taken from the ancient method of forming floors in Italy, or of quite a similar character adopted in Paris over sixty years ago. The latter form of floor is illustrated in Fairbairn's "Engineering" published in 1870, and possibly in earlier editions of the same work.

First Floor in Paris.

The first concrete floor in which the common form of rolled iron joist was used

as a support for the concrete was for a house No. 18, Boulevard Fillis du Calvaire, Paris, the span being 18ft. At that time rolled iron joists were scarcely known in this country.

In 1856 M. François Coignet, a French engineer, introduced a system of concrete construction which he called "Béton Aggloméré" and in which lime and suitable aggregates—as hitherto—were the component parts. The materials being mixed together dry and thoroughly amalgamated, a very moderate amount of water, just sufficient for adhesion, was sprinkled over the mass.

For wall building temporary wood encasements were used and small portions of the materials were cast therein at a time, workmen then gently tamping or ramming them until they were thoroughly consolidated. There does not appear to have been much novelty in the process; great care in dealing with the work being the principal factor.

M. Coignet stated at a public meeting in Paris that he had erected many buildings with Béton Aggloméré, one being a house three storeys in height, 60ft. by 40ft. on plan, in which every part, walls, floors, roof, string-courses, mouldings, &c., was composed of the material, and without bond iron or lintels of any kind. The component parts of the concrete were—

Sand, gravel and pebbles	-	8 parts.
Clay, burnt and powdered	-	1 "
Cinders, powdered	-	1 "
Unslaked hydraulic lime	-	1½ "

The cost was stated to be 4s. 6d. per cubic yard in some parts, up to 10s. 8d. for others. The description of the materials and the cost of the work read strangely at the present time. The house was said to be near St. Denis; it would be interesting to know if it is still in existence.

Dr. Fox and Mr. Barrett.

Dr. Fox, a doctor practising in Bristol, obtained a patent in 1844—in conjunction with Mr. Barrett, a builder—for floors formed with cast-iron joists and concrete. The joists were deeper in the middle than at the ends and were fixed about 18ins. apart. On the bottom flanges of the joists wood laths about ½ in. square were laid, and a small distance apart, to give a grip to a rough coat of plastering-mortar which was squeezed through from the top to form a key for the ceiling-plaster under. Upon this rough-plaster coat concrete was laid and the surface plastered over with lime-ash mortar and highly trowelled to form a smooth walking surface, a common method in the West of England at that time. This is probably the first kind of concrete and iron floor publicly used in this country. It was adopted for the Grosvenor Hotel, near Victoria Station, and many other buildings.

Early Reinforced Concrete in England.

Wilkinson, of Newcastle, introduced his concrete floors in 1854, and sometimes used iron ropes embedded in the concrete in place of rods or bars, for reinforcement.

Dennett's floor came into use about 1857, Cheynes' about 1863, Hornblower's in 1873, and Swarbrick's in 1875. The last-named was the prototype of the hollow terra-cotta lintel system of construction. The slabs were rebated at the ends to encase the bottom flanges of the joists, as a protection from fire, and had dovetailed projections on the top to key with the concrete filling over. Since the date of Swarbrick's patent the variety of systems of floor construction introduced in this country, on the Continent and in America are legion.

Monolithic Concrete Walls.

As a monolithic wall building material there is but little evidence of the use of concrete in olden times to any great extent, other than as a core between facings of some other materials. The construction of mud, clay and cob walls between planks or boards is a very ancient process in this country,

similar to the tapia walls of Spain, the pisé walls of France and others, and must have been practised in very early times, perhaps co-eval with wattle and daub. Cob walls were very common in this country where some kind of unctuous clay and chalk were procurable, up to within the last fifty years. They were very susceptible to rain and frost, necessitating stone or brick foundations and overhanging eaves to keep them dry. "Mud walling" and thatching were usually combined as one occupation in rural districts, but both have gone so nearly out of use that skilled workmen of that class are now rarely to be met with. It is not at all unlikely that owing to the objections to mud walls, lime-concrete must on occasions have been substituted for cob or mud to fill in between the boards, and it is quite possible that isolated buildings with walls of this kind exist in out-of-the-way districts where lime, gravel or stone chippings were available. Peter Nicholson's dictionary and Cresy's Cyclopædia of Engineering both contain illustrations of panel boards or encasements which would do equally as well for clay, cob or concrete walls.

It is remarkable how soon, comparatively, processes when they go out of use for a time are forgotten, and after an interval are hailed as new discoveries, and as a matter of course made the subject matter of patent rights. In no instance is this more apparent than in the use of concrete. A London architect, writing to a public journal in 1848, says he has used concrete for foundations of buildings in London, but in the provinces he is unable to, as he can find no one who knows anything concerning it. Sir C. W. Pasley writes in 1847 that a Mr. Thomas Cooper had used lime concrete for the formation of a sea-wall at the East cliff, Brighton, some years previous, and that to the best of his belief it was the first application of concrete other than for foundations.

An 1832 Patent.

Mr. Ranger, a Brighton builder, took out a patent in 1832 for making concrete blocks in moulds and using them as masonry. He slaked, or otherwise reduced to a powder, Dorking or Reigate lime, and mixed it with gravel, stone chippings or similar aggregates. The proportions were 1 part of lime to 10 parts of aggregate, mixed and cast in common wood boxes or frames. Apparently the only claim for a new invention was that hot water was used for mixing, to hasten the setting. The College of Surgeons in Lincoln's Inn Fields was built with Ranger's blocks. Sir C. W. Pasley minutely describes the process, in which there was nothing novel, but which shows how little there was known about concrete at that period.

Patents for Concrete Blocks.

Concrete blocks, since Portland cement was in common use, have been the subject matter of many patents, none of which appear to have been commercially successful until lately, when improved forms of metal moulds have facilitated their manufacture.

In the 'seventies Mr. Spencer Hayward, an architect, invented iron moulds in which to cast concrete bricks; Mr. Sidebotham, another architect, introduced concrete slabs for facing walls and filling between with concrete; Mr. Lish, of Newcastle, made moulds for an ingenious method of making hollow blocks, which he called the Z system; Mr. Cornish, a builder, adopted another way of slab-building; Mr. J. C. Sellars, of Birkenhead, made hollow concrete blocks and used presses, dies and other arrangements for their manufacture. These and numerous others for various reasons were in favour only for a time, and so far as I know have been almost forgotten.

The Invention of Portland Cement

Aspdin in 1824 was the primary cause of bringing concrete into more extended use, but it was a slow affair; Mr. James Wylson,

an architect, in his treatise on limes and cements written twenty years after that date, mentions it as having only just been introduced in London, and gives no particulars concerning it, although the first cement manufactory, Frost's, was erected on the Thames in 1825. It was for some reason, however, a failure until Messrs. White & Sons took it over in 1845 and made Portland cement a success.

Sir C. W. Pasley, who had been making many experiments with limes and cements, in a letter written to Dr. Garthe, of Cologne, in 1852, said that although living within ten miles of Robins and Aspdin's manufactory he had never heard of what they were doing until he accidentally met Mr. Aspdin at the Great Exhibition of 1851.

Portland Cement not trusted.

Mr. E. A. Bernays, M.I.C.E., said in a paper read before the Institute of Civil Engineers in 1880 that for the first contract let by the Admiralty for Chatham Dockyard extension works in 1867 so little reliance was placed on Portland cement, that it was not mentioned in the specifications, but that grey stone lime and lias lime from Warwickshire were to be used for brickwork above ground, and Roman cement and Puzzolana from Italy for all work below high-water mark, and for concrete. The last was specified to be made of 1 part of lime to 6 parts of ballast, but a difficulty arising as to the delivery of the lime it was decided to try cement. To avoid a "bill of extras" in the contract, the concrete was made of 1 part of cement to 12 parts of ballast, which balanced the cost. The result, Mr. Bernays said, showed that the cement-concrete was the superior of the two. One to 12, when cement was probably not more than 50 per cent. of its present strength, certainly did not err on the ground of extravagance.

Hydraulic Lime.

Hydraulic lime finely ground will, however, if properly used make substantial concrete walls. I used it largely when cement was a high price, in 1873-4, and built therewith the walls of buildings 18ft. in height and 2ins. in thickness. Those walls showed none of the cracks on the surface which is unfortunately so often the case with Portland cement-concrete walls. The lime was tipped out of the sacks on to a wood floor in a weather-tight shed, and kept a month before being used. The proportions were 1 part lime to 6 parts crushed bricks, both by measure.

Concrete Cottages.

In 1865 Mr. Tall, a bricklayer by trade, brought the use of monolithic cement-concrete walls into much prominence, by the introduction of wood frames or movable panels, very similar to those described by Peter Nicholson, and in Cresy's Cyclopædia, and to the fact that he received a commission from the Emperor of the French to build several concrete cottages at the Paris Exhibition. This created quite a widespread interest in this form of construction. Unfortunately Mr. Tall published such absurd statements as to the strength, cost and easy application of concrete by means of his frames, which turned out quite fallacious, that it almost entirely stopped its adoption, and even now it has not altogether retrieved the good name it should have as a wall building material. As an instance, the following is a copy of one misstatement he made and published as to the cost of building some cottages near Maidstone:—

	£	s.	d.
7 cub. yds. of gravel at 2s. 6d.	0	17	6
7 cub. yds. of Kentish rag stone for packing at 1s. 6d.	0	10	6
1 cub. yd. of Portland cement 16 bushels at 2s. 2d.	1	14	8
Labour per cub. yd., 15 at 2s.	1	10	0
Superintendence 15 cub. yds. at 6d.	0	7	6
Total cost of 15 cub. yds.	£5	0	2

Nothing is said about the cost of the apparatus, except that it was purchased for £100. The concrete was to be made with the gravel as the aggregate, and the Kentish rag bedded, or packed, into the soft concrete, not always advisable in thin walls, and certainly not to the extent of 50 per cent.

As will be noticed, the cement is supposed to form a portion of the measurement, whereas it is entirely disseminated in the interstices of the aggregate, and instead, the concrete itself, from shrinkage when wet, would measure 5 to 15 per cent. less than the aggregate alone.

It will be noticed that Mr. Tall calls a cubic yard of cement 16 bushels, whereas it is 21 bushels, and, strange to say, the formula as given was copied into Laxton at the time, as the basis on which to estimate the cost of concrete walls.

The strength of concrete Mr. Tall modestly put down at ten times the strength of brick walls of a similar thickness. Persons interested in economical buildings had walls, and floors too, constructed in concrete under the impression that so large a margin of strength would allow much liberty to be taken in the method and materials of construction, and, as a result, numerous accidents and several deaths occurred through walls and floors collapsing.

Other Systems of Walling.

Several other forms of appliances for wall building were brought before the public soon after Tall's, Drake's, Osborne's, Henley's and others, all of which appear to have gone out of use. Some really efficient means for building monolithic walls of any height, width, or thickness, and providing for irregular forms of construction and wall projections is wanted. I found no patented appliances—in my own experience—satisfactory, and at last adopted a plan of my own which answered somewhat better.

In 1865-1871, and again in 1880, Mr. John Grant, M.I.C.E., read papers before the Institution, on Portland cement and concrete. Mr. Grant was engineer to the Metropolitan Board of Works, and in that capacity made an extraordinary number of tests with cement and various kinds of aggregates, and there can be no doubt that these experiments had a great influence in inducing cement manufacturers to grind their cement much finer, to subject it to constant chemical analysis, and generally to produce it of a higher standard than had hitherto been the case.

At that time, 1880, the Germans had already been giving the subject much attention and were producing cement of a greater fineness and superior strength than any made in this country.

Hyatt's Researches.

In 1877 Mr. Thaddeus Hyatt published for private circulation the result of a large number of experiments made by Messrs. Kirkaldy for him in connection with concrete for various objects in 1860-70, the results being identical with similar experiments made within the last few years. He proved that concrete, cement and iron when exposed to great heat underwent a similar degree of expansion. A severe fire and water test showed that concrete stood both, without any serious deflection or loss of strength, and he also proved that concrete beams with iron embedded therein were capable of considerable elasticity without rupture, and that when loaded sufficient to effect considerable deflection they resumed their original shape when the load was removed.

Mr. Hyatt also made many experiments with reinforced beams, similar to some that are being adopted at the present time, using rods and bar iron as tension members and corresponding rods near the floor level, linking the two together by vertical bars; he made trials with reinforced beams up to 40 ft. in length and tabulated the results.

It has been said lately that the result of

trials with rods and bars having no arrangement to prevent sliding proved that the grip of the concrete was alone sufficient. Mr. Hyatt rivetted small plates of iron to the ends of his tension rods and bars, and in the published results a considerable number when loaded are stated to have slipped and broken away from the plates.

Major Seddon's Experiments.

In 1874 Major Seddon, R.E., made numerous experiments with unarmoured concrete at Chatham with the object of testing whether it could with safety be adopted for landings and floors for Government buildings. One was with a slab of concrete 14ft. 6ins. by 13ft. in the clear of supports, the sides not pinned into any walls, the materials being 12 parts of broken brick ballast, 4 of cement, and 3 of sand, and 6ins. thick. Eighty men marched on it at quick and double pace, then jumped simultaneously with no effect, but when weighted with 10½ tons of bricks it collapsed. The slab was only twenty-one days old, when it could not have attained more than 50 per cent. of its ultimate strength.

Since that date the use of concrete is modern history.

STRESSES IN REINFORCED CONCRETE BEAMS.—I.

[In future issues of the "Concrete and Steel" Supplement calculations for beams with double reinforcement, T-beams, shear and other points will be dealt with. This first article goes as far as rectangular beams with single reinforcement, and while introductory to succeeding articles refers particularly to floor slabs or beams supporting floors not monolithic therewith.]

WITH the object of demonstrating to ordinary students of building construction the method of designing reinforced concrete beams we have simplified the following discussion so as to bring it within the comprehension of those who have only a limited acquaintance with applied mechanics and mathematics. An explanation of the general beam theory so far as it relates to the particular subject has therefore been incorporated, as it is felt that the majority of the textbooks on applied mechanics do not readily afford an explanation in a form suitable for reference by those who take up the subject for the first time, or indeed for those who have forgotten certain points they once had learned. Indeed, few of the textbooks treat the beam theory adequately;

they mostly dodge points of difficulty, and merely serve for beams of homogeneous material where the moduluses of elasticity in tension and compression are the same.

In the following discussion simple formulæ have been derived by neglecting certain points that have little importance in practice, for the reason that (1) they will thus be more easily understood, (2) it is believed that with simple formulæ there is less risk of error, and (3) elaborate calculations waste time in practice, because the personal equation in the workmanship and the variability in the concrete render impossible anything like exactitude. We see no reason, however, in this last for increasing the factor of safety, because the increase in strength in concrete between the time of striking the centering and six months after, and the fact that the cement is generally of better quality than allowed for, more than make up for the discrepancies between calculation and practice. Therefore, we do not advocate any increase in the usual factor of safety of 4 on the assumed breaking strength of either material.

Steel.

The ordinary breaking strength of mild steel varies between 55,000 lbs. and 65,000 lbs. per sq. in.; the average may be taken as 60,000 lbs. per sq. in. Hard steel has an ultimate strength of about 100,000 lbs. per sq. in. The modulus of elasticity of both steels is about the same, namely, 30,000,000 lbs. per sq. in.

Concrete.

There is a much greater difference between the maximum and minimum values for the strength of concrete than in steel, and it seems unwise to adopt any settled value. It is preferable to determine the strength of any particular concrete by testing blocks prepared from the aggregate and cement to be used on any particular job, at about one month.

For the purpose of this article we shall take the strength of good 1 : 2 : 4 gravel or broken stone concrete as 2,600 lbs. per sq. in. at one month, 3,000 lbs. at three months and 4,000 lbs. at six months. We therefore see that if we adopted a factor of safety of 4 at one month we should have a factor of safety of 6 at six months. The modulus of elasticity of concrete has not yet been determined satisfactorily; it appears to bear a definite relation to the ultimate strength and to vary with the load applied. For 1 : 2 : 4 gravel or stone concrete, different experiments vary between about 2,000,000 and 5,000,000 lbs. per sq. in. Here, for the sake of simplicity, it will be taken as uniformly 3,000,000 lbs. per sq. in.

Symbols.

In the following discussion we shall use the following symbols:—

- b = breadth of beam.
- d = depth of tensile reinforcement from top of beam.
- y = distance from top of beam to neutral axis = zd .
- $d-y$ = distance from tensile reinforcement to neutral axis.
- a = area of steel in tension = wbd .
- E_s = modulus of elasticity of steel = 30,000,000.
- E_c = modulus of elasticity of concrete = 3,000,000.
- s_c = greatest stress in concrete.
- s_s = greatest stress in steel.

Rectangular Beams.

Stress is a force per unit of area, or so many lbs. per sq. in. When a body is stressed it is always accompanied by a change of form or dimensions, which is called the strain. By our definition of strain, when we apply a stress we shall find a strain; and, *vice versa*, when we find a strain, we know it is the result of stress. The modulus of elasticity is the measure of stress divided by strain, or

$$E = \frac{\text{stress}}{\text{strain}}, \text{ and stress} = E \cdot \text{strain}.$$

Fig. 1 shows the condition of a beam when loaded. The fibres at the top are compressed, and those below stretched. AB is the neutral surface where fibres are neither stretched nor compressed.

Fig. 2 shows an enlarged view of the cross-sections CD and EF in Fig. 1. These sections were originally parallel before being strained, but when the beam is loaded, assuming that they remain plane surfaces, they become inclined to one another. JK is the part of the neutral surface between these two cross-sections, which being unstrained remains its original length L . Now draw GH through K (the point where the neutral surface cuts EF) parallel to CD . Then considering any layer MN away from the neutral surface, we see this layer will have altered in length from $JK = MP = L$ to MN . We will call this alteration in length, *i.e.* NP , by the letter l .

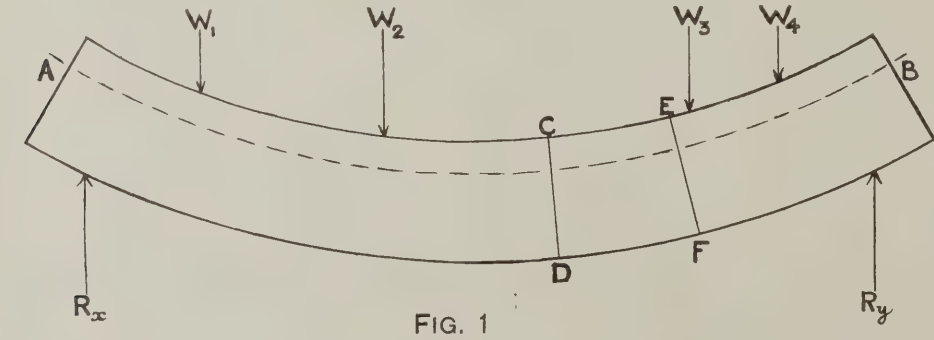


FIG. 1

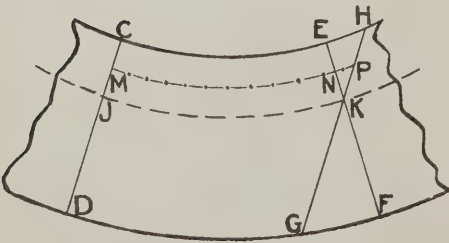


FIG. 2

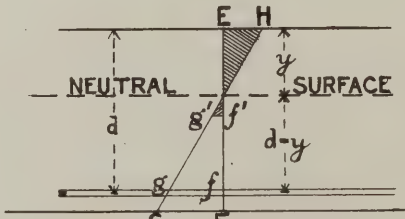


FIG. 3

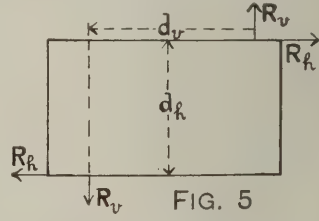


FIG. 5

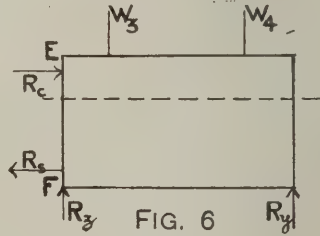


FIG. 6

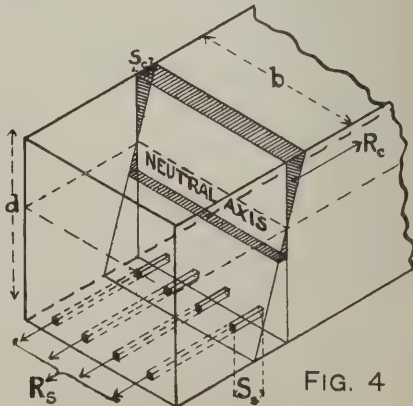


FIG. 4

The strain consequently will be $\frac{l}{L}$. If we make the assumption that plane sections remain plane after bending, the strain will be proportional to the distance from the neutral surface, because $EH:NP::EK:NK$. The stress, however, may not thus vary regularly according to the distance from the neutral surface, for stress = E · strain, and there is a possibility of the modulus of elasticity changing also. We shall, however, as above stated, for the sake of simplicity, assume the E to be constant, so that the stress will therefore vary only as the distance from the neutral axis and the sum of all the compressive stresses will be equal to the area of a wedge, as shown in perspective in Fig. 4 and in elevation in Fig. 3.

Let us consider the detail view of the section EF in Fig. 3, where EH is the deformation in the concrete on the top of the beam under any load and GF is the deformation at the bottom of the beam, gf being the deformation in the steel and $g'f'$ the deformation in the only portion of the concrete below the neutral axis which remains uncracked by reason of the tensile stress at this point not having exceeded the tensile resistance of concrete. Under the load in question the deformation is greatest in the concrete at EH and in the steel at gf . As stated above, the stress being assumed to be proportional to the strain, the greatest stresses on the two materials will be at these respective points. The greatest stress in the concrete we will call s_c and the greatest stress in the steel s_s . The stress on the outer fibres of the concrete, $s_c = E_c$ · strain, and the strain as explained before is proportional to the distance from the neutral surface. The same applies to the steel. Consequently, $s_c : s_s :: E_c \text{ strain} : E_s \text{ strain} :: E_c y : E_s (d-y)$

$$s_c = \frac{E_c \cdot y'}{E_c (d-y)} \text{ and } s_s = \frac{E_s \cdot d-y'}{E_s y} \dots (I)$$

Parallel Forces.

With beams we are dealing with a set of parallel forces. Thus in Fig. 1 we have a beam supporting four loads w_1, w_2, w_3 and w_4 . Elementary mechanics teach us that forces may be replaced by a resultant which will have the same effect as the various forces; also that when a system of parallel forces is in equilibrium their algebraic sum must be zero, in order that there may be no motion in a straight line (*i.e.*, translation), and further that the algebraic sum of their moments about any axis must also be zero, so that there may be no motion of rotation. These two facts are stated as $\Sigma W = 0$ and $\Sigma wl = 0$, where ΣW means $w_1 + w_2 + w_3$, &c., and Σwl means $w_1 l_1 + w_2 l_2 + w_3 l_3$, &c., where l_1, l_2, l_3 , &c., are the lever arms of the forces from the axis in question.

Now as the resultant of several forces is the algebraic sum of the forces and the moment of the resultant is the algebraic sum of the moments of the forces we derive the formulas $R = \Sigma W$ and $Rl_r = \Sigma wl$,

where l_r = the lever arm of the resultant.

Couples.

A couple is a system of equal and opposite parallel forces not acting in the same straight line. A couple has no resultant, for it will be seen that $R = W - W = 0$.

In a beam there is one couple formed by the resultants of the horizontal forces and another couple formed by the resultants of the vertical forces. Calling the former R_h and the latter R_v , we see that the algebraic sum of the horizontal forces is

$$R_h - R_h = 0 \dots (2)$$

and of the vertical forces

$$R_v - R_v = 0 \dots (3)$$

Hence two couples acting on a body have no resultant, and therefore there is no motion of translation. They may, however, have a tendency to rotation unless the algebraic

sum of the moments of the couples is zero $\dots (4)$

Fig. 5 shows two couples acting on a body. The algebraic sum of the moments about any axis is $R_h d_h - R_v h_v$. If these are in equilibrium—

$$R_h d_h - R_v h_v = 0. \therefore R_h d_h = R_v h_v.$$

These are the forces we obtain in a girder, $R_h d_h$ being called the moment of resistance, and $R_v h_v$ the bending moment.

Conditions of Equilibrium.

As stated above there are three conditions to be satisfied to secure equilibrium: firstly, as stated at (2), the sum of the horizontal forces must equal zero; secondly, as stated at (3), the sum of the vertical forces must equal zero; and thirdly, as stated at (4), the sum of the moments of all the forces, horizontal and vertical, must equal zero.

These three conditions may be used to determine whether a given system of forces is in equilibrium or not, or if the system is known to be in equilibrium (as it is in the case of a beam) these conditions may be used to find unknown forces, directions or lever arms provided the number of such unknown quantities does not exceed three.

We have in Fig. 6 the portion of the beam to the right of EF in Fig. 1. As the forces are known to be in equilibrium, we see that

(1) the resultant R_v of the forces w_3 and w_4 must equal the resultant R_v' of the forces R_z and R_v . $\therefore R_v = R_v'$, and we may call both R_v and signify their direction by + or -.

(2) the resultant R_c of the compressive forces above the neutral axis must equal the resultant R_s of the tensile forces below the neutral axis. Therefore we may call both R_h , using opposite signs for each.

(3) the sum of the moments of the forces + R_v , - R_v , + R_h , and - R_h , taken for convenience about the neutral axis, must equal zero. The moment of a couple equals one of the forces multiplied by the distance between the forces; referring to Fig. 5 we see that the distances are respectively d_h and d_v ;

$$\therefore R_h d_h - R_v d_v = 0 \text{ and } R_h d_h = R_v d_v.$$

i.e. the moment of resistance = the bending moment.

Stress on the Concrete.

As the compressive stresses on the concrete vary from zero at the neutral axis to the highest existing stress at the top of the beam in proportion to the distance from the neutral axis, the total stress on the concrete will be represented by the contents of the shaded portion of Fig. 4 multiplied by the highest stress, or $s_c \cdot \frac{by}{2}$.

The resultant R_c will pass through the centre of gravity of the triangle; this is situated $\frac{2}{3}y$ distant from the neutral axis.

As we neglect the tensile stress of the concrete, and as the diameter of the reinforcing rods is small compared with their distance from the neutral axis, it follows that the tensile stress will be $s_s a$, and that the distance of the resultant R_s from the neutral axis will be $d-y$.

Now we have just shown that by the second condition of equilibrium R_c must = R_s , or by substituting

$$s_c \cdot \frac{by}{2} = s_s \cdot a \dots (5)$$

The moment of resistance

$$M_r = R_c \cdot \frac{2}{3}y + R_s (d-y),$$

which, as $R_c = R_s$, becomes

$$M_r = R_s [\frac{2}{3}y + (d-y)] \dots (6)$$

$$\text{or } M_r = R_s [\frac{2}{3}y + (d-y)] \dots (7)$$

The moment of resistance as shown above by the third condition of equilibrium is

equal to the external bending moment, which is dependent upon the manner of loading.

Substituting equation (1) in equation (5) we have—

$$s_c \cdot \frac{by}{2} = s_s \cdot \frac{E_s}{E_c} \cdot \frac{d-y}{y} \cdot a;$$

$$\therefore \frac{b y^2}{2} = a \cdot \frac{E_s}{E_c} \cdot (d-y);$$

$$\therefore y^2 b = 2ad \cdot \frac{E_s}{E_c} - 2ay \cdot \frac{E_s}{E_c};$$

$$\therefore y^2 = \frac{2ad}{b} \cdot \frac{E_s}{E_c} - \frac{2ay}{b} \cdot \frac{E_s}{E_c};$$

$$\therefore y^2 + \frac{2ay}{b} \cdot \frac{E_s}{E_c} = \frac{2ad}{b} \cdot \frac{E_s}{E_c}.$$

This is a simple quadratic equation, and the solution for y is—

$$\begin{aligned} y^2 + \frac{2ay}{b} \cdot \frac{E_s}{E_c} + \left(\frac{a}{b} \cdot \frac{E_s}{E_c}\right)^2 \\ = \frac{2ad}{b} \cdot \frac{E_s}{E_c} + \left(\frac{a}{b} \cdot \frac{E_s}{E_c}\right)^2 \\ = \frac{2ad}{b} \cdot \frac{E_s}{E_c} + \frac{a^2 E_s^2}{b^2 E_c^2} \\ = \frac{a^2 E_s^2}{b^2 E_c^2} \left(\frac{2bd \cdot E_c}{a \cdot E_s} + 1 \right); \end{aligned}$$

$$\therefore y + \frac{a}{b} \cdot \frac{E_s}{E_c} = \frac{a}{b} \cdot \frac{E_s}{E_c} \sqrt{\frac{2bd \cdot E_c}{a \cdot E_s} + 1};$$

$$\therefore y = \frac{a}{b} \cdot \frac{E_s}{E_c} \left(\sqrt{\frac{2bd \cdot E_c}{a \cdot E_s} + 1} - 1 \right) \dots (8)$$

Position of Neutral Axis.

This equation gives the position of the neutral axis, and in specific examples it should be calculated from the ultimate strength of the two materials and not from the ultimate values divided by the factors of safety, because if the factors adopted are different for the two materials the position of the neutral axis then found is not in the same position as it would be at the ultimate strength, for which the beam is really being designed.

For economy we desire to give both steel and concrete the highest stresses they will bear, say, 3,000 lbs. per sq. in. on the concrete and 60,000 lbs. per sq. in. on the

steel. Taking $\frac{E_s}{E_c} = 10$, and putting $y = zd$

and $a = wbd$, we get from equation (1) by substituting values for concrete and steel

$$60,000 = 3,000 \cdot 10 \cdot \frac{d-zd}{zd};$$

$$\therefore \frac{60,000}{30,000} z = 1 - z; \therefore 2z + z = 1;$$

$$\therefore 3z = 1 \text{ and } z = \frac{1}{3} \dots (9)$$

We therefore see that with the assumed values

$$y = \frac{1}{3}d.$$

From equation (5) we get by the same method

$$\frac{3,000bd}{2} = 60,000wb.$$

$$\therefore w = \frac{3,000}{120,000} z = \frac{1}{40} z \dots (10)$$

Substituting equation (9) in equation (10) we get

$$w = \frac{1}{40} \cdot \frac{1}{3} = \frac{1}{120} \text{ or } .008\bar{3}.$$

That is to say, $a = .008\bar{3}bd$, or .83 per cent. of the sectional area of the beam, which is the most economical reinforcement with the above values.

(To be continued.)

SHEAR STRESSES

In Beams of Steel and of Reinforced Concrete.

By Prof. Robert H. Smith,
A.M.I.C.E., M.I.M.E., M.I.E.E., &c.

IT is no part of the object of this article to describe what reinforced concrete is or what it ought to be. It takes a hundred various forms. These, it is safe to say, differ very materially in the degree of efficiency with which they fulfil their main purpose. This purpose is to utilize fully, and in combination, the high tensile strength of steel in ratio to its cost and the high compressive strength of cement-concrete in ratio to its cost. An incidental very important object is to cover the steel so as to prevent its rusting, but with this object the present paper has no direct concern. It may be noted, however, that these two purposes are affected diversely by the amount of water used in mixing the concrete. There appears to be little doubt that wet mixing yields the more efficient protection of the metal from rusting. Close lime-washing, or cement-washing, of iron or steel is probably the most effective of all coatings in preservation from atmospheric corrosion, and if the concrete be dry-mixed there is little or no chance of the metal being well and closely washed with cement on every particle of its surface, unless it be specially brushed over with a thin cement grouting immediately before the filling in of the dry-mixed concrete. On the other hand, although there is some controversy as to the relative test strengths resulting from wet and dry mixtures, there seems no reasonable doubt as to the wet mixture yielding a very materially lower modulus of elasticity. As to the strengths it may be that the wet process yields less tensile strength, but does not affect adversely to any important extent the compressive strength; and, if this be true, it is an important conclusion because in reinforced concrete structures little use of the tensile strength of the concrete is made.

As to the Modulus of Elasticity,

this is a question bearing directly upon the special subject of this article, namely, the shear stresses, because the magnitude of these stresses at critical places in the beam structure depends largely upon the ratio of the two elasticities of concrete and of steel. If these two elastic moduli were equal, there would be zero difficulty in getting the two materials to work together harmoniously in combination. The greater the difference between the moduli, the greater the risk of intense local shear near the surfaces of contact between the two materials. The ratio of the modulus for steel to that for concrete varies, according to recorded tests, from about 20 to 10. The wet mixing reduces that of concrete and so makes this ratio greater than with dry mixing. This by no means proves the all round advantage of dry mixing, but it demonstrates its advantage in respect of the shear strength, considered separately, of beams of reinforced concrete.

In the safe estimation of the stresses, the main thing to remember is that the material is heterogeneous. The mortar itself is a heterogeneous mixture of sand and cement. In the concrete the mixture of the mortar or matrix, with the aggregate of stone, or slag, or cinder, we have heterogeneity in duplicate ratio and on a large granular scale. And when steel is embedded in the concrete we find the heterogeneity increased in a third-power geometrical ratio and the separation between the discordant elements mapped out on a still larger geometrical scale.

As most of the elementary propositions from which are derived all the stress-strain formulæ ordinarily used in text-books for the calculation of strength and stiffness in ties, struts, beams, columns, shafts, &c., &c., are based upon the assumption of homogeneous

material, it is absolutely necessary to examine in what respects these basic principles stand true for non-homogeneous material, and in what degree they require modification for application to such structures as those built in reinforced concrete.

Stresses on Various Sections.

There are certain relations, irrespective of strain, existing between the stresses on sections cutting in different directions through any one point. As these are independent of strain relations, they are unaffected by the elastic moduli, and are equally true for homogeneous and for heterogeneous substances. Calling the direction of trans-

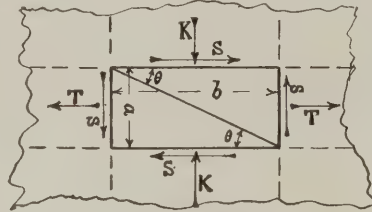


Fig. 1.

verse beam-loading vertical, we find vertical beam sections subjected to normal, either tensile or compressive, stress, and horizontal sections subjected to a normal compressive which may be zero, and is always small. Both vertical and horizontal sections transmit shear stress, and it is one of the above elementary laws independent of strain that the shear stresses on sections at right angles are of equal intensity. In Fig. 1, let τ and κ represent the tensile and compressive normal stresses, and s the shear stresses on the vertical and horizontal sections at any part of a beam, and let θ be the right-handed deviation from the horizontal of any section. Then if t , s , and r be the tensile, shear and resultant total stress per sq. in. on this section at the θ inclination, it is shown by direct resolution and addition of the component forces, when there is no mass acceleration involved, that

$$t = \tau \sin^2 \theta - \kappa \cos^2 \theta + s \sin 2\theta.$$

$$s = \frac{\tau + \kappa}{2} \sin 2\theta + s \cos 2\theta.$$

$$r^2 = t^2 + s^2 = \tau^2 \sin^2 \theta + \kappa^2 \cos^2 \theta + (\tau - \kappa)s \sin 2\theta + s^2.$$

The total stress r is simply the square root of the sum of the squares of the normal and shear stresses. Of course, these expressions appear considerably simpler if the compression κ on the horizontal section be so small that it may be, without material error, written in as 0.

The total stress comes to its maximum and minimum amounts on the same sections as do the normal stresses, and on these same sections the shear stress is found to be zero. The inclinations of these sections is given by—

$$\tan 2\theta = -\frac{2s}{\tau + \kappa}.$$

This corresponds to two values of 2θ diametrically opposite each other, and therefore to two values of θ at right angles. If τ be greater than κ , as is always the case in beams, the maximum stress on one of these sections is of the same sign as τ , and the minimum stress on the section at 90 degs. to this is of the opposite sign to τ . Their values are—

$$t_m = \frac{1}{2} \{ \tau - \kappa \pm \sqrt{(\tau + \kappa)^2 + 4s^2} \},$$

the + giving the maximum and the - the minimum. If κ be nearly 0, then these values are approximately—

$$t_m = \frac{1}{2} \{ \tau \pm \sqrt{\tau^2 + 4s^2} \},$$

Similar calculation shows that the shear stresses come to their maximum and minimum amounts on sections at 45 degs. or midway in angular position, to those of maximum and minimum normal stress.

This mid-position is defined by—

$$\tan 2\theta = \frac{\tau + \kappa}{2s}.$$

The maximum and minimum shears are of equal numerical magnitude and opposite in sign, the shear passing from + to - at the sections of principal normal stress on which the shear is zero. These maximum and minimum shears are—

$$s_m = \pm \frac{1}{2} \sqrt{(\tau + \kappa)^2 + 4s^2}.$$

These are the same as the square root parts of the main normal stresses, and these latter range from maximum to minimum through the same range as do the shear stresses. That is—

$$t_m = \frac{\tau - \kappa}{2} \pm s_m.$$

If κ be nearly zero, the principal shears are approximately

$$s_m = \pm \frac{1}{2} \sqrt{\tau^2 + 4s^2}.$$

All these results are everywhere true independently of strains and of elastic moduli, and therefore equally true of homogeneous and heterogeneous material. They are true of any section in any direction even at the points where it cuts out of the steel and into the concrete of a reinforced concrete beam.

Now in all beams of whatever character the shear stress on horizontal, and therefore also on vertical, sections becomes zero at top and bottom surfaces of the beam, where the normal stress on these sections becomes greatest; and at the neutral axis, where the normal stress is zero on the vertical section, the shear on this section is at its maximum. If t_m indicate the "extreme fibre-stress" at either surface, since $s = 0$ here, the equations give for these surfaces,

$$t_m = \frac{1}{2} \{ \tau_m - \kappa \pm \sqrt{(\tau_m + \kappa)^2} \} \\ = \tau_m \text{ as maximum,} \\ \text{and } -\kappa \text{ as minimum,}$$

the angle θ for these being 90 degs. and 0 degrees, or vertical and horizontal sections. Also on the surface sections at 45 degs. to horizontal the shears are—

$$s_m = \pm \frac{1}{2} (\tau_m + \kappa). \\ = \text{approximately } \pm \frac{1}{2} \tau_m, \text{ if } \kappa \text{ be nearly 0.}$$

It is too commonly imagined by "pocket-book" engineers that there is no shear stress near the upper and lower surfaces of beams, the idea being due to the fact that at these surfaces the shear on vertical and horizontal sections is zero. But we see that the shear on other sections is actually half the "extreme-fibre" tensile or compressive stress. A very serious difference!

At the neutral axis $\tau = 0$, and the formulæ give the stresses

$$t_m = \frac{1}{2} \{ -\kappa \pm \sqrt{\kappa^2 + 4s^2} \} \\ = s \left\{ -\frac{\kappa}{2s} \pm \sqrt{1 + \frac{\kappa^2}{4s^2}} \right\} \\ = \text{approximately } \pm s, \text{ if } \kappa \text{ be nearly 0;}$$

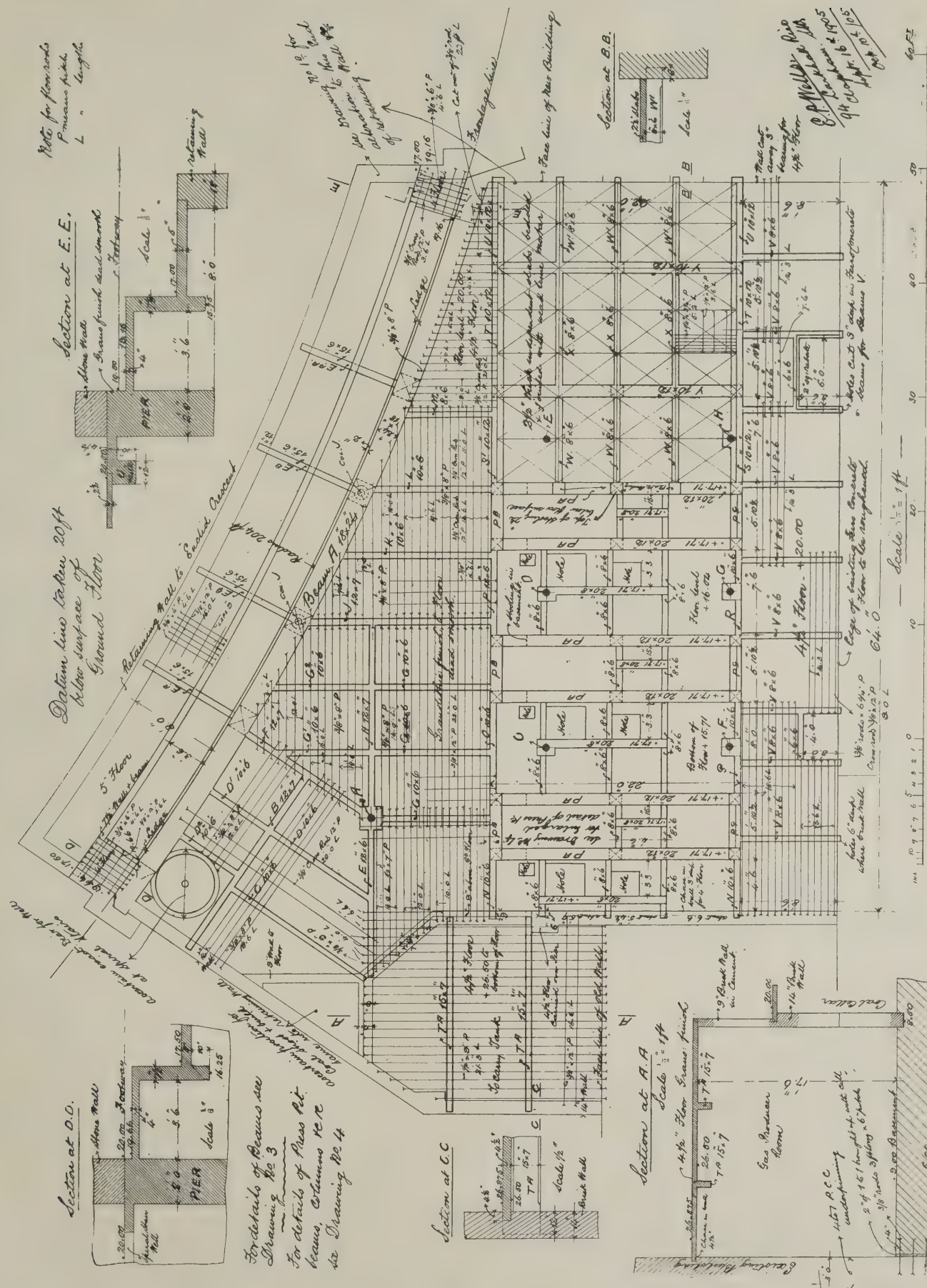
and

$$s_m = \pm \frac{1}{2} \sqrt{\kappa^2 + 4s^2} \\ = \text{approximately } \pm s, \text{ if } \kappa \text{ be nearly 0.}$$

Here again it is a mistaken idea that, because τ is zero on the vertical section, therefore there is no tension in the material. The principal tension equals half the shear stress on the vertical section and is found on a section at the angle θ given by $\tan 2\theta =$

$-\frac{2s}{\kappa}$. If κ be very small, 2θ is just over 90 degs. or just over 270 degs. and therefore θ degs. about 45 degs. or 125 degs. there being tension on one of these sections and compression on the other.

(To be continued.)

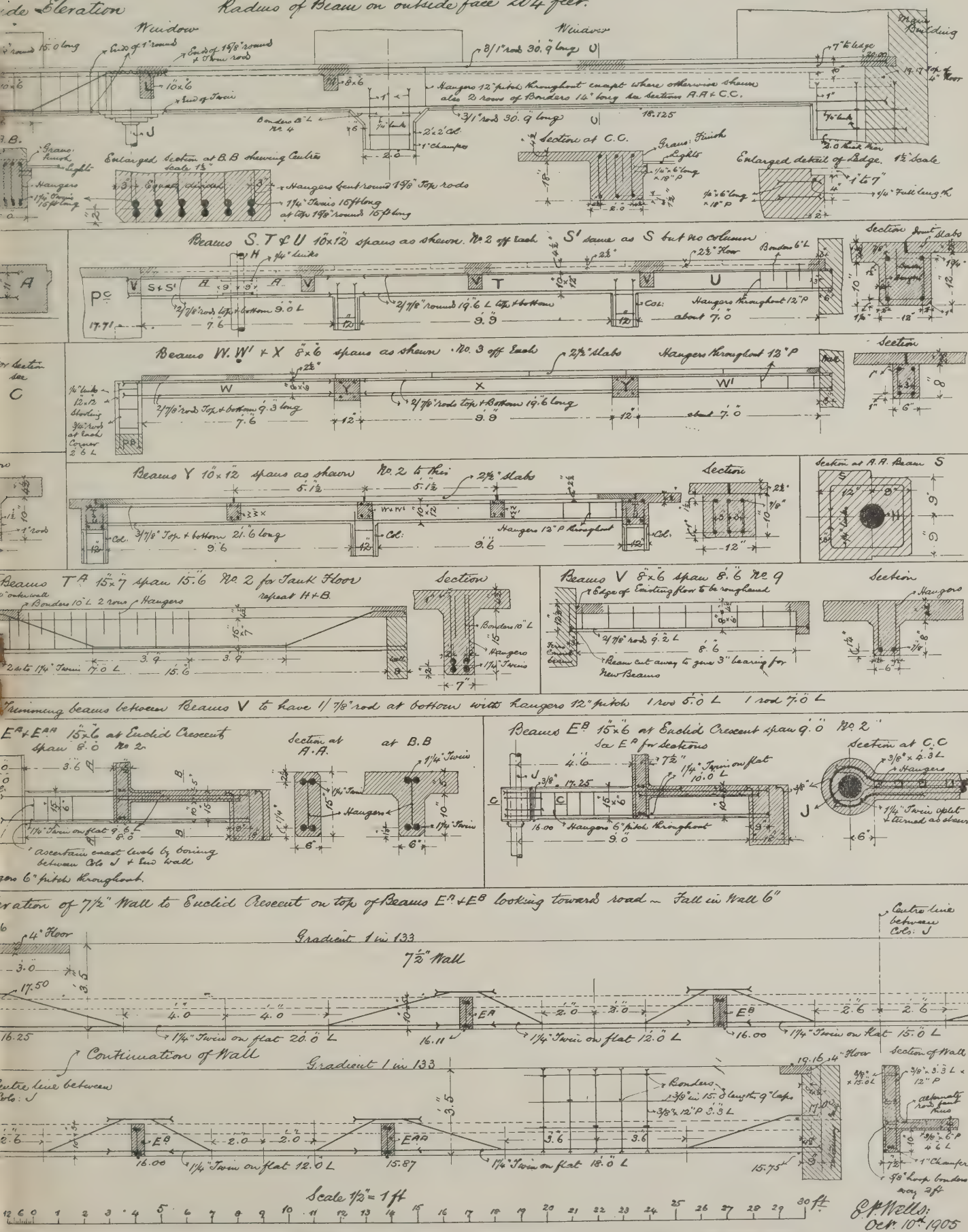


FRAMING PLAN, SHOWING BEAMS, &C., FOR THE GROUND FLOOR OF THE ANNEXE TO THE "DUNDEE COURIER" BUILDING, DUNDEE, CONSTRUCTED IN REINFORCED CONCRETE BY STUART'S GRANOLITHIC STONE CO., LTD.: WORKING DRAWING NO. 2. E. P. WELLS, ENGINEER. NIVEN AND WIGGLESWORTH, ARCHITECTS.

General Scale, $\frac{1}{10}'' = 1 \text{ ft.}$
Enlarged Sections, $\frac{2}{3}'' = 1 \text{ ft.}$

Drawing № 3.

Radius of Beam on outside face 204 feet.



E. P. Wells;
Oct. 10th 1905

Datum line is taken 20 ft
below Ground Floor.

Basement Reinforcement 84

The whole area of the Sacramento
outlets to outside of remaining walls
other than already shown to be
covered with 30" rods x 6" mesh.
All joints to overlap not less than
4 inches.

First layer of Concrete 4" thick over the whole area, the reinforcement to be laid on top of same.

Concrete for basement 601 & made with Ballast, also for retaining walls.

Concrete for Piers & Columns
4 to 1 Crushed Limestone
& sand.

Note. At all pier columns
is the concrete to be
stopped 12 inches from
surface of basement.
When the column or
pier will be built
see detail section.

The surface of the
basement to be
reinforced with $\frac{1}{4}$ "
rods x 12" mesh
laid 2 inches below
the finished
topping.

See Section at

Went cut track 3" for Bonding.

Details of Piers & Columns at Exelid Crescent

Pink

Play at Peers

11.14 long

11.14 long	11.14 long
------------	------------

Refraining
Wall

also

here

65700 3.0

1. New small built up together

See Drawing No. 3 for ground floor beams & where the same are connected up to retaining walls

Note. The exact signs & positions of Foundations for Gas Engines to be ascertained on site.
All templates for holding down bolts, throughout to be provided by Engine Contractors & Co.

[illegible]

Section at CC

* Columns 12 x 12" for Presses

Edge of Ferro Concrete

Face of existing building 64' " 64.0

(For further details and title, see next page.)

A REINFORCED CONCRETE
NEWSPAPER OFFICE.

Annexe to the "Dundee Courier"
Building.

WE are arranging to publish working drawings for reinforced concrete construction under different systems so as to show the methods by which such work is carried out. In this issue we give the first instalment of working drawings for the reinforced concrete construction of the "Dundee Courier" building now being erected in Dundee. We shall publish further drawings in future issues. These drawings will also serve to compare with the working drawings, which we have also arranged to publish, of the steelwork of the new "Morning Post" building, a steel-frame building being erected in London.

The "Dundee Courier" annexe is being constructed in reinforced concrete by Messrs. Stuart's Granolithic Stone Co., one of the earliest firms in this country to undertake reinforced concrete construction. Their system includes the use of Mr. E. P. Wells's patent system, which is to use twin rods consisting of two round rods united together by a diaphragm, split in order to allow the top rod to be cranked up at the ends at the points of contraflexure, and also punched with holes in the centre to allow indented hoop-iron hangers and borders to be inserted. This is clearly shown in the drawings published in this number. Mr. Wells is the engineer who has designed this work.

The building consists of basement, ground and first floors. The position of this annexe is shown on the ground plan of the whole block, published together with a perspective in our issue for May 24th, 1905.

The architects are Messrs. Niven & Wigglesworth, of 104, High Holborn, W.C. The general contractor is Mr. Stocks, of Dundee. The foundations consist of a raft covering the whole site 3ft. thick. The supporting power of the ground, which is clay, is taken at 1 ton per sq. ft. The whole of the raft is reinforced top and bottom, and carries the various loads placed upon it. The maximum load coming from any column is 57 tons.

In the basement there are three gas engines, two of 112 h.p. and one of 80 h.p., driving dynamos and three Goss printing presses. The retaining walls are also of concrete, sufficiently strong within themselves to resist earth pressure without reinforcement, but are reinforced to prevent any possible chance of cracking. The whole of the basement area is finished off with Stuart's granolithic paving. On the ground floor all the beams and floor are calculated for an inclusive load of $2\frac{1}{2}$ cwt. per sq. ft., the factor of safety being 4 to 1, excluding the concrete. The floors of the press pits and beams are of reinforced concrete and have to carry all the bearing blocks, pulleys, &c., for driving the printing presses which are here situated.

The first floor is also designed for an inclusive load of $2\frac{1}{2}$ cwt. per sq. ft. The whole of the roof, consisting of columns, beams, &c., is of reinforced concrete throughout, and calculated on the same basis as the rest of the work.

Reinforced Concrete and Earthquake Shock.—The "Engineering Record" of New York says, in reference to the earthquake and fire at San Francisco:—"A word about reinforced concrete construction. There was but one example in San Francisco at this time, this construction having been kept out by the existing laws. This building was in course of construction and its concrete portion is intact, while the brick walls are entirely ruined by cracks and will have to be replaced. This was built by the Kahn system. Another small example in Alameda escaped intact, while a brick building 50ft. away has crumbled down."

REINFORCED CONCRETE
CHIMNEYS.

By J. M. KENNEDY, A.M.I.C.E.

THE use of reinforced concrete in connection with constructional works of a most varied nature has deservedly come into general favour during the last few years. From the point of view of fire-resisting qualities, works constructed in this fashion have proved themselves to be superior to anything hitherto known, both on account of the protection afforded to surrounding objects by the non-conducting nature of the material and the absence of sensible damage to the structure itself when suitably designed. Portland cement mixed as described later appears not only capable of withstanding high temperatures, but of doing so as well as ordinary firebricks. It appears therefore that as far as fire-resisting qualities are concerned there is much to be said in favour of reinforced concrete for chimney construction. Several such chimneys have already been erected in America, and one, which will rank among the largest stacks in the United Kingdom, is now in course of erection in the vicinity of London. In America chimneys of this description have been in successful use for several years. Some of these dealing with gases at high temperatures and having an inner protective lining of reinforced concrete only, with air space between the lining and shell, show that so far the heat has had no deleterious effects on the material. In general, however, it would seem that for temperatures constantly above 800 to 1,000 degs. Fahr. a firebrick lining is advisable. This should be built, of course, as with an ordinary brick chimney, quite independently of the main shell and with a 2in. to 4in. air-space between.

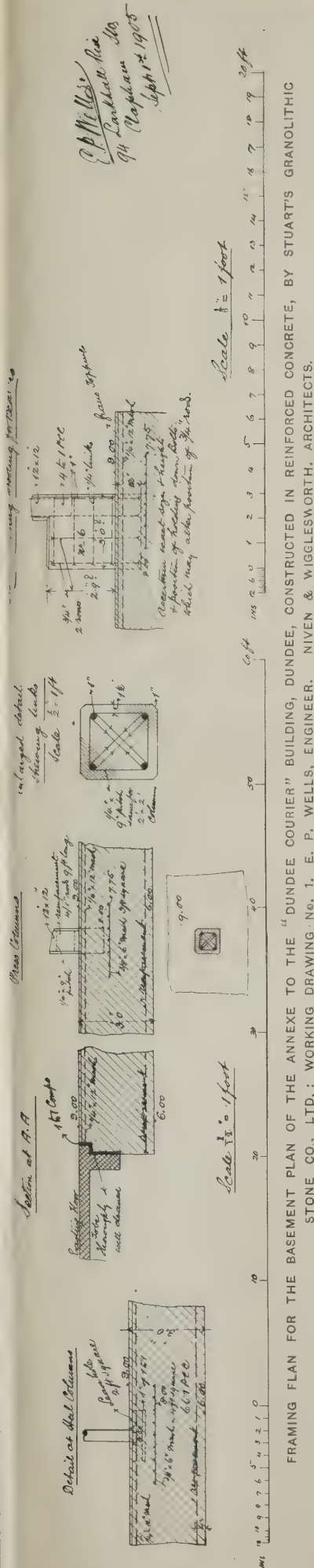
The material itself is heavier than brickwork and mortar bulk for bulk, the latter weighing 112 lbs. per cub. ft. to 150 lbs. scaled by reinforced concrete; but owing to the tensile strength given by the reinforcing steel the walls of the chimney can be made considerably thinner and the total weight greatly reduced. This is, of course, a specially important point where the foundations are of an unstable character and not suitable for carrying heavy weights.

By carrying down the reinforcements of the shaft into the foundation block, and bonding them with all layers of reinforcements therein, the chimney and its foundation become practically one homogeneous mass, and, as will be shown, the stability of the chimney is thereby greatly increased.

General Design.

In order to avoid the expense of special moulds, concrete chimneys must naturally be built with parallel sides and of uniform thickness. By the use of some special flexible form of mould and centering it should be possible to build these chimneys with taper sides without undue extra cost; but so far this has not been accomplished. There is, however, no difficulty in designing a perfectly stable chimney with parallel sides, and in the case of concrete no saving in material would be effected by making it taper.

The calculations of stability will show what is the minimum thickness required for any given height in order that the compressive stress may not under any conditions exceed a safe limit; and this thickness, except in the case of very tall chimneys, or where the thickness of the base for any other reason is necessarily great, should be maintained all through, as it will not generally exceed the minimum thickness which would be considered necessary from purely practical considerations. In the case of a tall chimney where the wind combined with the weight produce an intensity of compressive stress on the lower sections greater than safe limit, increased thickness or diameter of shell must be resorted to in order to obtain a greater area



FRAMING PLAN FOR THE BASEMENT PLAN OF THE ANNEXE TO THE "DUNDEE COURIER" BUILDING, DUNDEE, CONSTRUCTED IN REINFORCED CONCRETE, BY STUART'S GRANOLITHIC STONE CO., LTD.: WORKING DRAWING. No. 1. E. P. WELLS, ENGINEER. NIVEN & WIGGLESWORTH, ARCHITECTS.

over which the load can be distributed. Where a lining or inner shaft is only to be built up to a height of about 50 ft. it may be expedient to keep the inner effective diameter of the shaft constant, and increase the diameter of the outer shell for this bottom section, bevelling it off to the required extent above the top of the inner shell. This lining need not be more than $4\frac{1}{2}$ ins. thick, and a 3 in. to 4 in. air-space should be left between it and the outer shell, the two being entirely independent and suitable ventilation holes being provided. The top of the lining should be corbelled over outwards to butt against the outer shell, and so prevent soot from lodging in the cavity between them; but it must not be prevented from expanding and contracting independently of the shell. If the lining is carried up to any considerable height, space must be left round the top to allow the outer shell to oscillate freely.

A renewable reinforced concrete lining of the above description should be built inside every stack to a height of about 50 ft., even if the gases dealt with are only at a low temperature. For high temperatures a fire-brick lining is recommended.

A light cast-iron cap built up in sections and securely fixed to the top of the chimney will afford considerable protection. It should be put in good electrical connection with the lightning conductor and all reinforcements. If of hollow section it should be filled with coke-breeze concrete.

Experiments with steel rods show that the adhesion in concrete is approximately 500 lbs. per sq. in. of surface exposed. With steel having a tensile strength of 60,000 lbs. per sq. in. the adhesive strength is $\frac{1}{120}$ of the tensile strength, and the necessary superficial area of a rod in concrete to resist drawing out will be 120 times the sectional area of the rod. Consequently it is not necessary to join the longitudinal rods together in any way, but each rod should overlap the rod immediately beneath it by a length sufficient to give a superficial area in the concrete of 120 to 150 times the sectional area of the rod. This will ensure the adhesive strength being as great as the tensile strength, and the rods will break in tension rather than be drawn out of the concrete.

The number of rods to be used depends of course on the total area of reinforcement found necessary from consideration of stability and the size of the section of rod decided upon.

Calculations should be made for sections every 20 ft. or 25 ft. to find the necessary area of reinforcement, so that the number of rods may be reduced accordingly.

Every 18 ins. or 2 ft. horizontal rings must be built into the concrete, binding all the reinforcing rods together and so strengthening the structure against transverse shear.

At the base of the chimney about 2 ft. or at the most 3 ft. in height may be cast every day, though when nearing the top work may progress considerably faster, but should not exceed 5 ft. per day. The centering and moulds should not be struck for about six days, depending on the nature of the cement used.

As regards cost, concrete should hold an advantage over bricks at any rate as far as the cost of materials is concerned, and where men are employed who are used to this class of work a certain saving should be effected in the cost of labour, but this may not be great, because the daily progress is limited, as in the case of a brick stack, to 2 ft. or 3 ft. in height per day. In England so far estimates have shown the cost to be in excess of brick chimneys, but the Weber Steel Concrete Chimney Company claim that they can compete favourably with all other classes of chimney construction in America, and hope to do so in this country also.

Where the flue enters the shaft great care must be taken to avoid weakening the structure. All reinforcements should be diverted

and the concrete thickened up round the opening. The top of the opening should of course be arched and specially reinforced.

Should cracks develop in the chimney they can be grouted up with neat cement. If however a chimney gets out of plumb for any reason, the method of wedges applied to brick chimneys is not applicable and the whole shaft with its foundation will have to be dealt with. Owing to the comparatively light weight this is not such a difficult matter as it might seem.

As regards protection from lightning, a separate conductor appears superfluous owing to the comparatively large sectional area of steelwork available, but in the case of a tall stack an auxiliary copper conductor of not less than 0.7 sq. in. area is advisable. At the top of the chimney all the steel reinforcements should be suitably connected to a coronal ring fixed securely to the concrete and fitted with suitable air terminals. If an auxiliary conductor is employed it must also be efficiently connected to this ring. At the base of the chimney a connection should be made to one of the horizontal reinforcing rings, which should be in good metallic contact with all the vertical rods. This connection should be earthed in a suitable fashion, and the auxiliary conductor also connected to it by means of a removable testing link.

Materials.

Only the very best materials should be employed. The concrete should consist of a mixture of Portland cement and sand in the proportions of 1 of cement to 3 of sand. The use of any aggregate is not recommended except for the foundations.

The cement used should be the finest quality Portland cement and composed of well-burnt clinker finely ground. It should not leave residue of more than 3 per cent. when passed through a sieve with 5,776 meshes per sq. in. The tensile strength should not be less than 450 lbs. per sq. in. after seven days and 580 lbs. after twenty-eight days. The sand should be clean, sharp river sand, free from loam clay, salt or other impurities.

The steel reinforcements should consist of round rods, tee-bars, or any convenient section. They should be of the best quality steel, and should show an ultimate tensile strength of not less than 60,000 to 70,000 lbs. per sq. in., with an elongation of 20 per cent. on 8 ins.

The rods should be embedded in the concrete without any previous preparation or painting, as it has been found that the concrete entirely prevents any corrosion taking place if the materials used are perfectly free from salt or other impurities. The rods should never be less than 2 ins. from the surface of the concrete.

Stability.

The only forces which act on a chimney are those due to its own weight and to the pressure of the wind. As already stated, concrete shafts have for economic reasons been built up till now with parallel sides. The pressure at any section due to the weight alone is therefore directly proportional to the height of the shaft above that section. Allowing 150 lbs. per cub. ft. of reinforced concrete, this works out to approximately 1 lb. per sq. in. per foot of height, and if the maximum safe limit is 500 lbs. per sq. in. the theoretical maximum height with parallel sides will be 500 ft.

When the chimney is subjected to the force of the wind, however, the intensity of the pressure at the leeward side is increased and at the windward side diminished, but before any tensile stress is produced on this side the compressive stress at the other side will have reached twice its normal value.

Thus for a chimney h feet in height above the section under consideration the normal stress will be $1 \times h = h$ lbs. per sq. in. If

s = the effective area in square feet exposed to the wind, which in a round chimney is about 0.6 to 0.7 times the area of the diametrical section, and p = the intensity of the wind pressure in lbs. per square foot, then the total pressure = ps lbs. This pressure will cause a bending moment at the section of $ps \times \frac{h}{2}$ ft.-lbs., which will produce a

maximum stress at the furthest edges of the section from the neutral axis of $\frac{\frac{12ps h}{2} \times \frac{D}{2}}{I}$

lbs. per sq. in., where D is the outside diameter in inches and I the moment of inertia of the section. The wind, therefore, causes a maximum stress of compression at the leeward side and in tension at the windward side of $\frac{3ps h D}{I}$ lbs. per sq. in.,

and the nett stresses are therefore

$$\left(h + \frac{3ps h D}{I}\right) \text{ and } \left(h - \frac{3ps h D}{I}\right)$$

respectively, the latter being in tension only if the difference of the two quantities is negative.

In calculating the stresses to be resisted it is advisable to neglect any tensile strength in the concrete and to rely entirely upon the reinforcements for the tensile resistance. Similarly, in compression it is assumed that the concrete takes all the stress. This latter assumption is not correct, but errs on the safe side. The steel reinforcements, acting as struts and supported throughout their whole length, are capable of bearing a very considerable proportion of the total compressive stress. It is, however, beyond the scope of this article to deal with the somewhat intricate problem which this analysis of stresses involves, and it will be assumed that the concrete has to bear the whole of the stress.

The expression $h + \frac{9ps h D^2}{12I}$ gives the maximum stress to be borne by the concrete in compression. To obtain a value for I in this expression a definite thickness of concrete must be assumed. Taking this by way of trial as 6 ins., allowing for a wind-pressure of 56 lbs. per sq. ft. under normal conditions, and substituting $(0.6 \times \frac{D}{12})$ for s , the expression becomes

$$h + \frac{3 \times 56 \times 0.66 h^2 D^2}{12 I} = h + \frac{9.3 h^2 D^2}{I}$$

If this works out to more than 500 lbs. per sq. in.—the safe limit for concrete—the thickness, and consequently the value, of I must be increased. If less than the limit, the thickness can be diminished, but from practical considerations it should not be reduced to less than approximately 5 ins.

To calculate the necessary area of reinforcement which will resist the maximum nett tensile stress of $h - \frac{9.3 h^2 D^2}{I}$ the rein-

forcement must in the first case be considered to consist of a thin cylinder of steel embedded centrally in the concrete. It is again necessary to assume an area for the section, which may be from 2 per cent. to 3 per cent of the area of the concrete. The maximum stress can then be calculated, and should not exceed from 14,000 lbs. to 16,000 lbs. per sq. in., according to the quality of steel used. When the approximate total area has been calculated the number and size of the reinforcing rods can be determined. These should be spaced about 12 ins. apart at the base of the chimney.

Near the top of the chimney it will probably be found that no reinforcement is necessary. It is advisable, however, to carry a certain proportion of the rods right up to the top. In some cases, especially where any coping or ornamentation is desired,

expanded metal may also be used with advantage.

The above short statement shows roughly how the necessary areas of concrete and steel may be calculated. The stability of the structure as a whole is greatly increased by efficiently bonding the reinforcements in the shaft with those in the foundations. The resistance to rocking is thus increased, as not only would the chimney have to tilt on the furthest edge of its foundation but would also have to lift the mass of earth, &c., upon one side of the foundation block.

The Test of Time.

It remains to be seen of course whether concrete chimneys will stand the test of time, but there is every reason for supposing that they will outlast brick chimneys, as from our knowledge of cement, when properly used, it appears that the whole structure will become practically monolithic. The wonderful strength exhibited by reinforced concrete structures also leads to the supposition that if the chimney is properly designed and the known stresses are kept within safe limits, it should prove amply strong enough to stand any internal or external stresses which it may be called upon to bear.

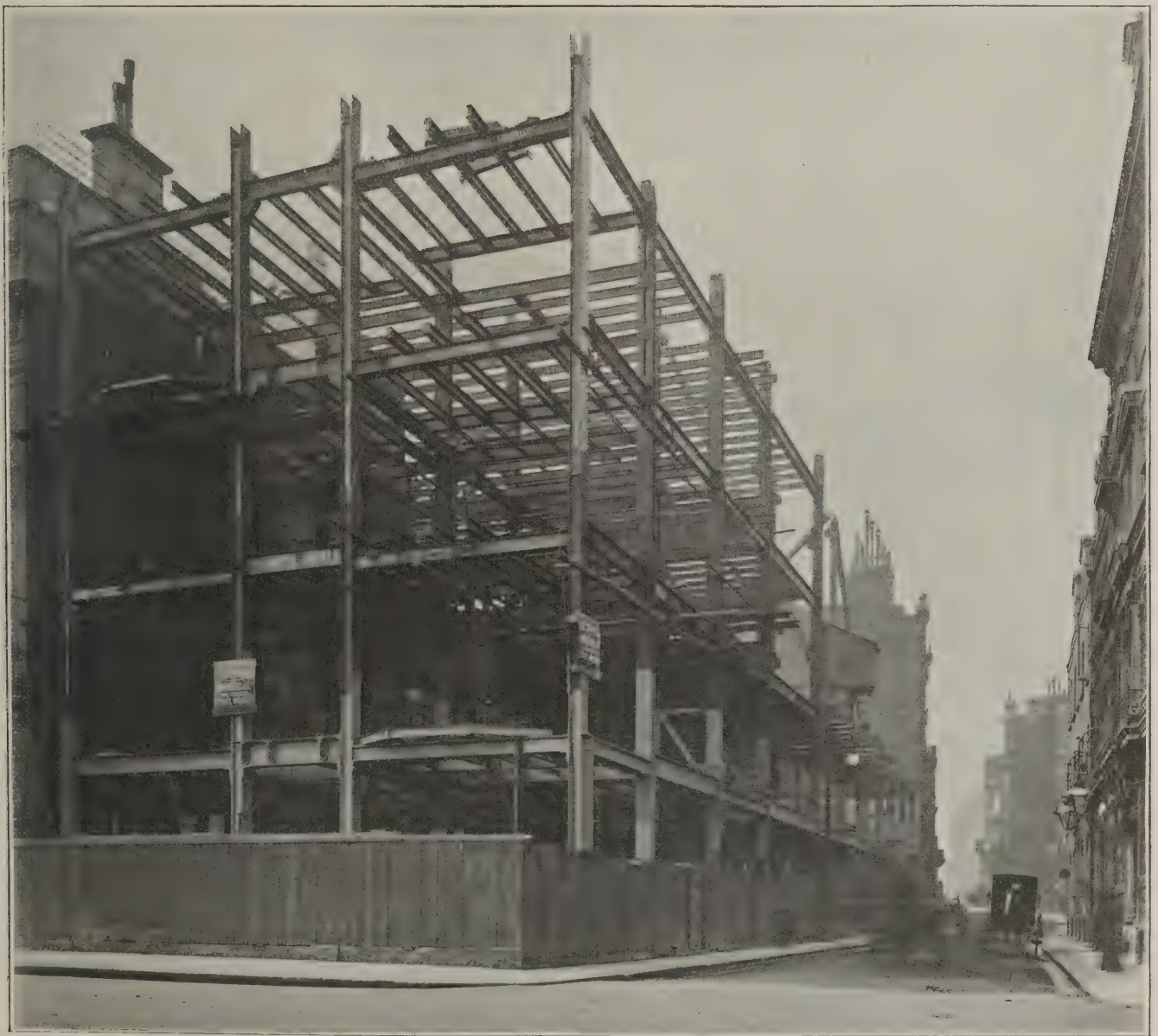
NOTES AND NEWS.

Reinforced Concrete in Mines.—A curious position of affairs has to be faced by property owners at Bo'ness. Owing to subsidences in the centre of the town through old coal workings sinking in, the town authorities are to erect reinforced concrete piers in the disused mines to prevent danger to North Street. Owners of property on both sides of the street are left to do as they choose—either to put similar piers under their premises or take the risk of subsidence.

An Interesting Catalogue, well illustrated and thoroughly explanatory of the Coignet system of reinforced concrete construction, has just been published from the London offices of M. Edmond Coignet, 4, Chancery Lane, London, W.C., which deserves to be studied by all interested in the subject. M. Coignet was one of the very first to scientifically study reinforced concrete construction, and has done much work.

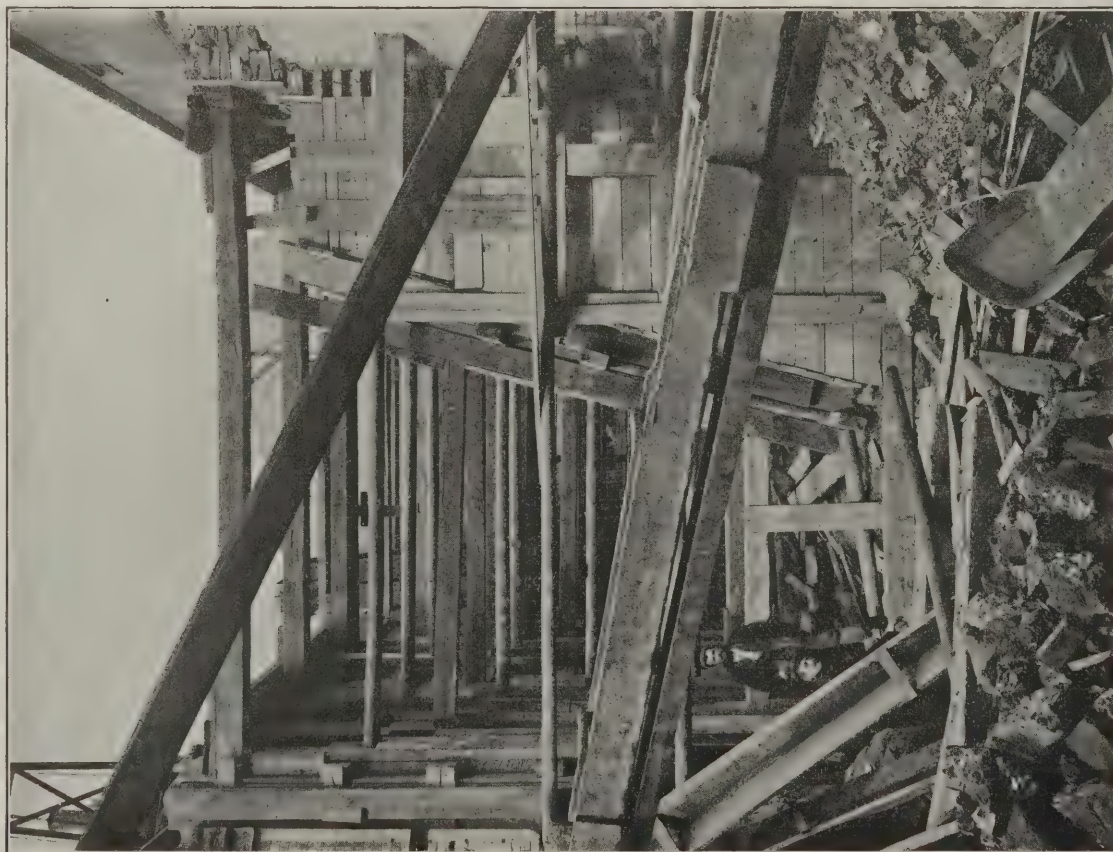
Hennebique Ferro-Concrete.—The following are some of the contracts which have been settled during the month ending April 15th last, in accordance with the well-known Hennebique system, for which Mr. L. G.

Mouchel, M.Soc.C.E. (France), is the agent-general in the United Kingdom:—*Bridges.*—Firgrove Bridge, Rochdale, span 26ft. (Mr. S. Sydney Platt, M.I.C.E., borough engineer); river covering at Bridge Mills, Middleton, Yorkshire. *Road Construction.*—Saltley Road widening, Birmingham (Mr. John Price, M.I.C.E., city engineer). *Quays and Jetties.*—River quay wall, Cullercoats, Newcastle-on-Tyne; Caledon Jetty, Dundee (Mr. J. Thompson, M.I.C.E., engineer); ferro-concrete piling, Woolmer Forest. *Reservoirs.*—500,000 gallon covered service reservoir at Nuneaton (Mr. F. Cook, engineer). *Building Construction.*—Complete chocolate factory buildings, York, for Messrs. Rowntree & Co. (Mr. W. H. Brown, architect, York); buildings for the Associated Portland Cement Manufacturers (Mr. H. O. Cresswell, F.R.I.B.A., architect); new factory at Harrow for Kodak, Ltd.; business premises, Dublin, for Messrs. Hely, Ltd. (Messrs. Batchelor & Hicks, architects, Dublin); new dyeing and cleaning works, Belfast, for the Monarch Laundry, Ltd. (Messrs. Batchelor & Hicks, architects); floors and roofs of new works for Messrs. Steiner & Co., Ltd., calico printers and dyers, Accrington; floors, Horsforth Sunday school, Horsforth, near Leeds.



GLOUCESTER HOUSE FLATS, IN COURSE OF ERECTION AT THE CORNER OF PARK LANE AND PICCADILLY, LONDON.
T. E. COLLCUTT F.R.I.B.A., AND STANLEY HAMP, A.R.I.B.A., ARCHITECTS.

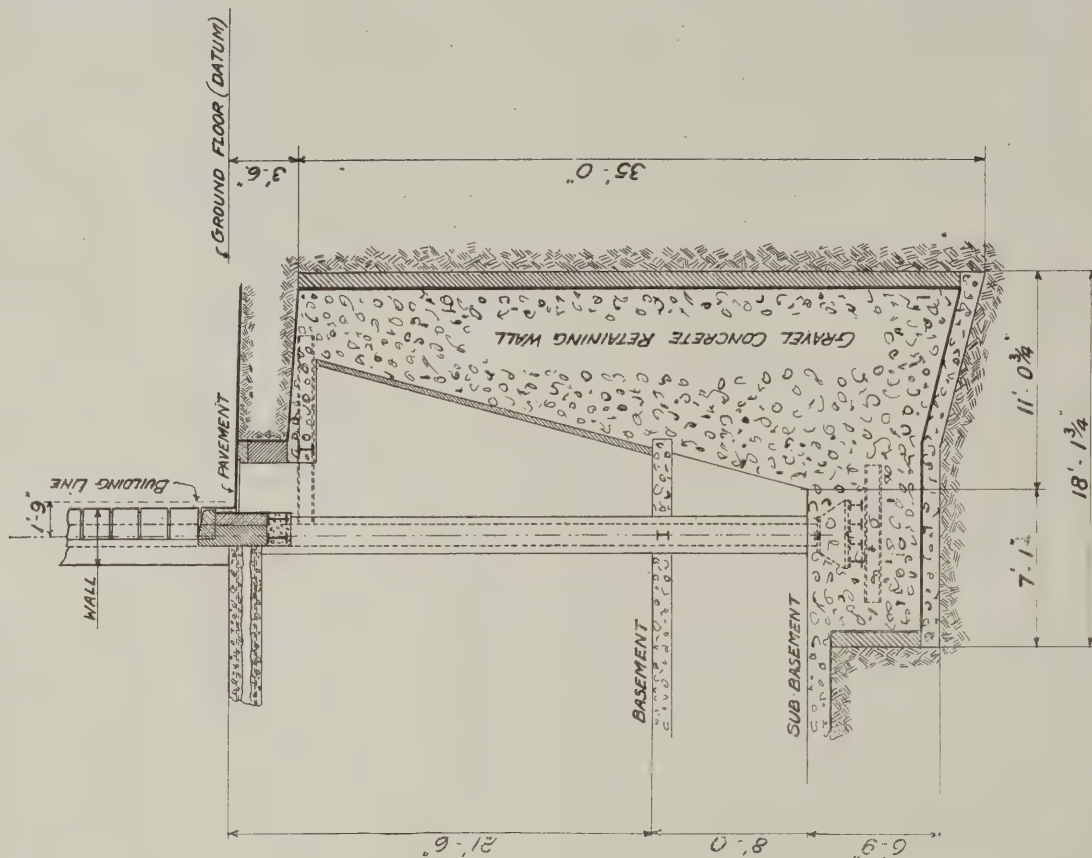
The photograph reproduced above of this steel-frame building now in course of erection was taken on May 16th. In our issue for March 28th last we published the grillage foundation plan and other photographs of the steelwork taken at earlier stages. The photograph above will, on comparison, show the progress made. The steelwork, as will be seen, has now reached the fourth-floor level on the Piccadilly front of the building. The contractors for the steelwork are Messrs. Drew-Bear, Perks & Co., Ltd., of the Battersea Steelworks, Wellington Road, London, S.W.



Portion of wall with shuttering in position.

CONCRETE RETAINING WALL AT THE NEW "MORNING POST" BUILDING, NOW IN COURSE OF CONSTRUCTION IN ALDWYCH, LONDON. MEWES AND DAVIS, ARCHITECTS.

The above illustrations show the construction of the retaining walls at the new "Morning Post" offices, a steel-frame building which is now being erected by the Waring-White Building Co. We published the basement, ground and first-floor plans with elevations of the building in our issue for February 7th last. These retaining walls embody some new features in design. The toe of the wall gives increased resistance to sliding, and the stairions being placed upon the foot of the walls give additional stability. The photograph shows how the ground in the middle of the site is left to support the strutting, and how a brick wall is first built against the soil, and is then waterproofed with mastic asphalt, and the concrete afterwards deposited in the shuttering. The danger of letting in the street, by reason of the proximity of the tunnel through which the L.C.C. trams run, and the Gaiety Theatre and Hotel, necessitated great care in the work, and only small portions at a time could be constructed. An efficient bond between the different lengths has, however, been obtained by leaving a V-shaped groove at each junction. The engineer for this work, and also for the steel skeleton, is Mr. S. Bylander, who designed the steelwork for the Ritz Hotel, London.



Detail of construction of wall.

REINFORCED CONCRETE SYSTEMS.**I.—The Columbian System.**

THE Columbian system of reinforced concrete construction was invented and patented in America by Mr. C. A. Balph, Pittsburg, Pa., U.S.A., and introduced into Great Britain by Mr. J. D. O'Brien. In its initial stage it was exclusively confined to the construction of fire-resisting floors and roofs, but as the possibilities of its adaptation were realized its employment was extended, and is now applied in the erection of almost all kind of constructional works, such as floors, roofs, vertical and sloping walls, retaining walls, reservoirs, tanks, culverts, sewers, high-pressure water-pipes, silos, stairs, bridges, girders, columns, &c.

The system was largely employed in America previous to its introduction into England. To enumerate all the large buildings in America in which the Columbian system of floor and roof construction has been adopted would be no light task, but among the most important the following may be mentioned:—Block of wool warehouses for the Boston Wharf Co., Boston, Mass. (one the largest fireproof warehouses in the world, containing 520,000 sq. ft. of fireproof floors); Massachusetts Fireproof Storage Warehouse, Boston, Mass.; Washington County Court House, Washington, Pa.; factory for American Soda Water Fountain Co., Boston, Mass.; residence of Mr. F. W. Vanderbilt, Hyde Park on Hudson; and Hudson Warehouse, New York, U.S.A.

Introduction into England.

The system was introduced into England about seven years ago, since when it has been extensively used in some of the largest and most up-to-date buildings in London and the provinces. Among the most important buildings in London in which the floors and roofs have been constructed on the Columbian system by the Columbian Fireproofing Co., Ltd., of 37, King William Street, London, E.C., are:—Ritz Hotel, Piccadilly; Messrs. Waring & Gillow's new premises, Oxford Street; The Shipping Combine Offices, Cockspur Street, S.W.; the generating and distributing stations of the Charing Cross and Strand Electricity Supply Corporation, Ltd.; Messrs. Macfarlane, Lang & Co.'s biscuit factory at Fulham; Messrs. Harrold's depository, Barnes; Chelsea generating station for the Underground Electric Railways Co. of London, Ltd. (in which the system was adopted in the construction of the coal bunkers, as well as the roofs, some of the floors, &c.).

The Standard Floor.

The standard Columbian floor consists of a flat slab of concrete reinforced with the Columbian steel ribbed bars laid parallel in and completely embedded by the concrete and extending from support to support. The bars are of structural steel and rolled to the following sections:—5 ins., 3½ ins., 2½ ins., 2 ins., 1½ in. The adoption of these sections of bars for floor reinforcement has been more than justified by the results obtained. A Columbian floor combines with resistance to fire great tensile as well as compressive strength; it has a comparative high degree of elasticity, so that it can be deflected considerably without fracture, a property of the utmost importance in a floor. Failures of Columbian floors under the loads they have been designed to carry have never occurred; in fact, instances have occurred where the floors have been subjected to loads seven or eight times as great as the load they were meant to carry, the only result of such abnormal loading being deformation of floor and tearing apart of the concrete on the tension side. Failure cannot occur until the steel bars are stressed beyond their elastic limit or the concrete crushed on its compressive side. The elongation which the concrete itself can stand

without cracking is increased by the reinforcement with the Columbian bars.

The heaviest section bar (that is, the 5 in. bar) is used for very long spans of from 16 ft. to 20 ft. in length, or where an extra strong floor is required. A floor reinforced with this bar is usually from 7 ins. to 8 ins. thick, and is suitable for very strong warehouse floors, when the floor is subjected to heavy loads rapidly applied. The lightest bar is the 1½ in. cruciform section. In very exceptional cases heavier sections can be employed if required.

Spans Possible.

Columbian floors can be constructed in spans up to 20 ft., the thickness of concrete and size and spacing of bars depending on the span of the floor—that is, the clear distance between the supports—also upon the weight per ft. super. the floor will have to carry.

Very exhaustive and elaborate tests have been made with Columbian floors of different spans reinforced with bars of the different sections embedded in different thicknesses of concrete, and from these tests have been drawn up tables of actual results obtained both for live loads and ordinary dead loads; from these tables the most economical section for any required floor can be accurately determined, the result being more satisfactory than any theoretical calculations.

The floors, when erected between wall bearings, consist of rectangular slabs of concrete reinforced with Columbian bars, the floor being supported at walls by a chase about 3 ins. deep in the walls. This is the simplest method of construction, and gives very satisfactory results.

The two other methods of floor construction most commonly employed are the panelled construction and the double construction.

Panelled Floors.

The panelled system of construction is employed when the floors are carried by rolled steel joists or girders. The method of construction is as follows:—The necessary centering is first erected between the girders carrying the span of floor, and the steel bars are then suspended between the girders by steel stirrups hung over the top flanges of the girders, the length of leg of stirrup being regulated so as to allow at least ¾ in. thickness of concrete under the bars. The concrete, which is composed of the best Portland cement, sand and crushed furnace clinkers or other aggregate, well mixed wet and dry, is then filled in to the requisite thickness and tamped in position. The floors are generally finished level with the top flange of girders, and may be battened to take ordinary wood finish or screeded for asphalt, &c. The girders are completely encased on sides with solid concrete, and the underside protected by slabs of concrete secured to bottom flanges of girders with concealed anchors. These slabs are made with air-spaces for ventilation. The panelled method of construction is largely employed, and is capable of being used with decorative effect.

Double Floors.

The double construction is used when the ceiling is required to be kept the same level throughout, or where a perfectly soundproof floor is required. The floor is formed the same as in panelled construction, but instead of the joists projecting between the ceiling-line a separate ceiling is constructed by laying 1½ in. bars on the lower flange of joist and embedding them in 2½ ins. thickness of concrete. An interior centering is erected on the concrete ceiling to carry the floor, and after the floor is in place the centering is removed through an opening purposely left in the ceiling, the opening afterwards being filled in with a slab of concrete moulded to a special shape to fit the opening. This method of double construction is only suitable for spans up to 7 ft.

Columbian bars were sometimes connected to the girders with angle connections, but

this method is now discarded, the steel bars being either suspended between the girders by the steel stirrups or laid on the top of the girders. The stirrups in which the bars are suspended are made in different sizes to suit the bars, and the legs of the stirrups are punched to suit the section of bar it is required to carry.

Fire-resistance.

Apart from the economical and simple construction of the Columbian floor, its chief advantage lies in its great strength combined with its fire-resisting qualities. A floor on the Columbian system was tested at the British Fire Prevention Committee's testing station at St. John's Wood. The ceiling and floor tested were subjected to great heat, the highest temperature recorded being 2,335 degs. Fahr. Water was applied through a ½ in. nozzle, the pressure ranging from 25 lbs. to 30 lbs. at the pump. After the test the floor and ceiling were examined, and the whole of the concrete of the floor and sides of the beams were found sound and good, not disintegrated at any point. The full report of the test can be had on application to the Columbian Fireproofing Co., Ltd., 37, King William Street, E.C.

Roof Construction.

The construction of roofs on the Columbian system may justly be said to illustrate the adaptability of the system, as there is really no form of roof which cannot be constructed on this system. In flat roofs the construction is identical with that of the floors, but in steep sloping roofs the Columbian bars take the place of rafters and the concrete is filled in between them. In domes and vaulted roofs the bars are bent to the required shape, and form the skeleton framework to take the concrete filling. In sloping roofs with purlins the method of construction is somewhat different, the roof being composed of moulded slabs of concrete 3 ins. to 4 ins. thick, reinforced with 1½ in. Columbian bars; these slabs are merely laid between the purlins and the surface of the slabs is then screeded and asphalted to render the roof weather-proof. Dormer windows, openings to skylights, lanterns, &c., can be constructed with great facility on the Columbian system, the trimming, &c., being done by employing Columbian bars bent to required shapes and cleated together.

In Walls.

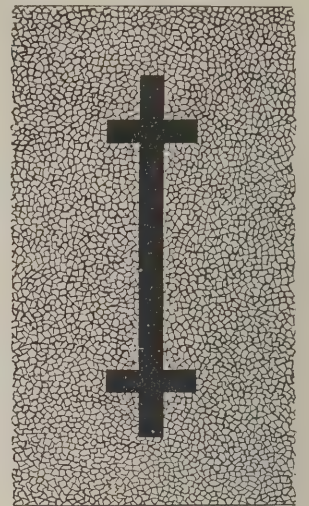
In vertical walls constructed on the Columbian reinforced concrete system the framework of Columbian bars is first constructed with all trimming for window-openings, &c.; vertical centering is then erected on both sides, and the concrete filled in between and well tamped. The surface of the walls is left ready to receive any desired finish.

In the construction of reservoirs, retaining walls and other similar structures on the Columbian system of reinforced concrete, the reinforcing is of Columbian steel bars, either of the sections described under floors or of any special requisite section. The method of calculation adopted is similar to that usually applied to such structures. A reinforced concrete reservoir for the Skegness Water Co. is now being erected, the whole structure being monolithic, with walls, roof, girders and columns all constructed in concrete reinforced with Columbian bars.

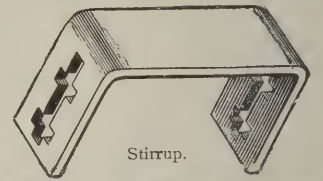
The Company also has acquired the rights of the Bonna system of constructing pipes in reinforced concrete, in which bars of a cross-section similar to the Columbian bars are wound spirally inside and out of a sheet of steel, the sand and cement-concrete or mortar embedding these bars inside and out. An 18 in. water main with a working pressure of 150 ft. head is now being constructed for the corporation of Swansea. Some of these pipes have been tested by Mr. R. H. Wyrill, engineer to the corporation, to over 450 ft. head, without showing the least sign of leakage. This contract was secured in competition with cast-iron pipes.



View of Pipe Construction, showing Internal Cores being withdrawn.



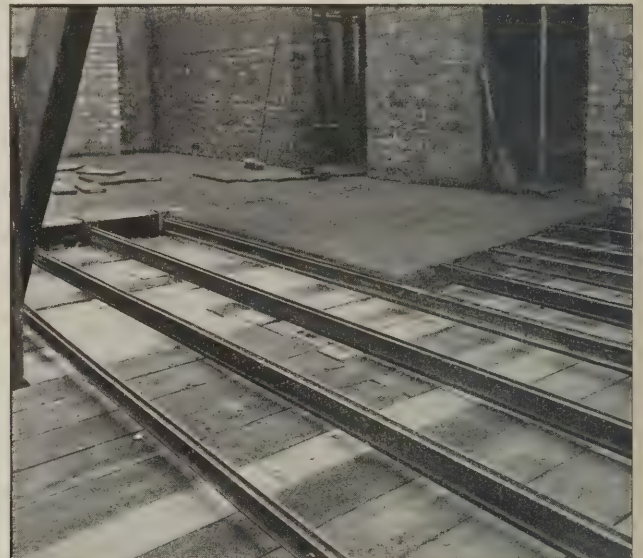
3 1/2 in. bar in 5 in. Floor (1/2 in. scale).



Stirrup.



Roof in course of construction at Electric Power Station, Grove Road, London.



Floor in course of construction.



Mansard Roof with Dormers.



18 in. pipe being laid at Swansea.

SOME APPLICATIONS OF COLUMBIAN REINFORCED CONCRETE CONSTRUCTION.

THE BUILDERS' JOURNAL

AND ARCHITECTURAL ENGINEER.

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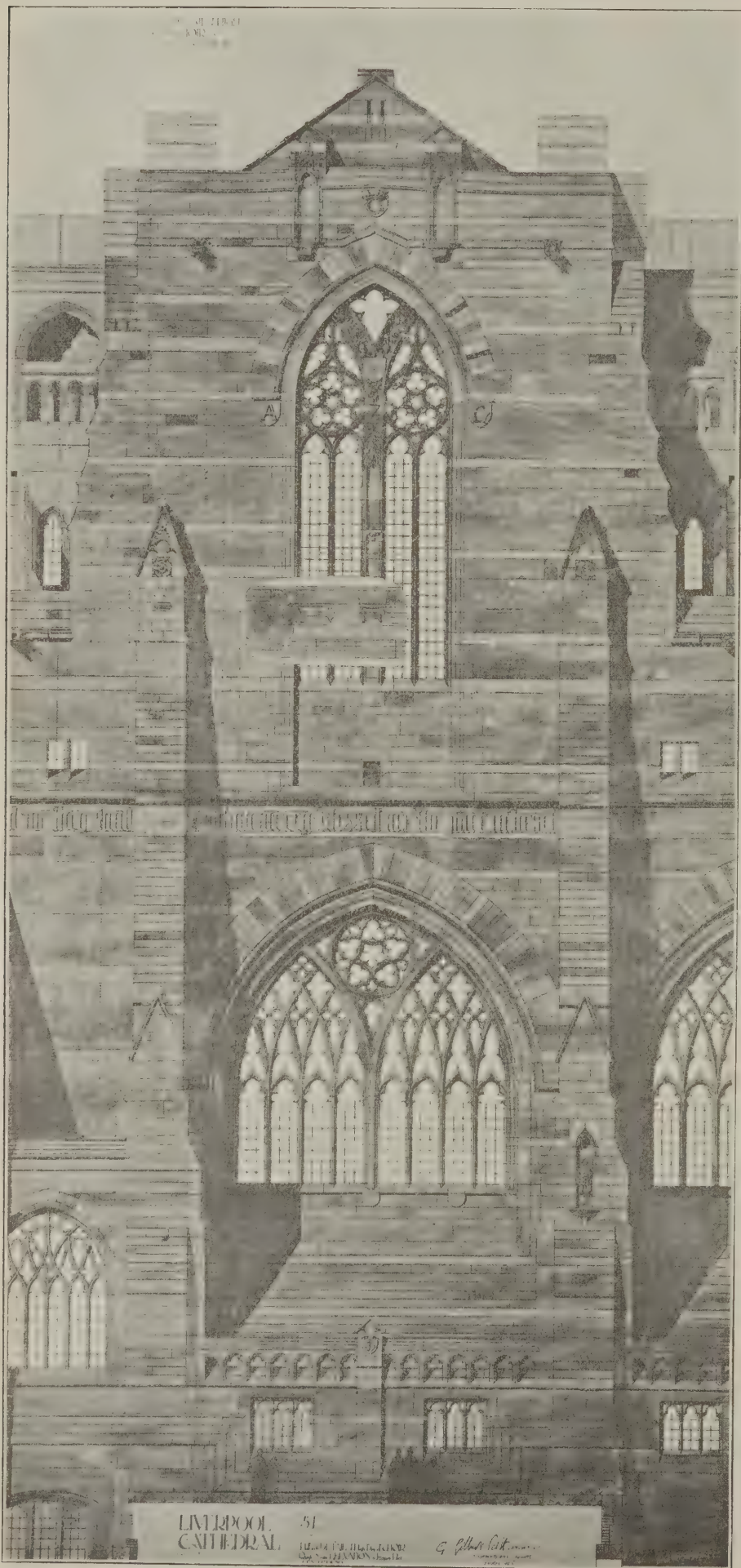
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The Cost of London Schools. An important report was submitted at yesterday's meeting of the London County Council dealing with the cost of erecting public schools in the London area. Discussion has recently taken place with respect to what has been thought to be the excessive cost of recently erected schools, and the Education Committee have reviewed the whole history of the present system. Their report shows that before the late

London School Board appointed its own architect various architects were engaged, and the first thirty schools were erected in this way. The code of the Education Department and the requirements of that day were only elementary, so that these schools were inefficient in many respects. The staircases were long, steep and narrow. Cloakrooms were insufficient or wanting. Teachers' rooms were practically unknown, whereas both head teachers' and assistant teachers' rooms are now provided. The classrooms were of unsuitable sizes, and scholars sat for the most part with their backs to the windows. Most of the rooms were passages one to another, sites were small, and playgrounds insufficient. In 1883, some time after the School Board had appointed its own architect, the importance of left-hand lighting began to be recognized, and changes were made in the plan. About 1888 it was decided, in view of the large maintenance account for repointing of exterior walls and in painting interior walls, that cement should be used in lieu of lime mortar, and that internal walls of staircases, corridors, dadoes, classrooms and halls should be faced with glazed bricks—points about which there has been some criticism of late. At this same time, with the increasing use made of halls for drill and public meetings, a heavier and more rigid type of floor construction than had hitherto obtained was adopted. In 1891 the Education Department so far acknowledged the utility of a hall in a school as to grant a special loan for the purpose to every school, and from this date we find the central hall being adopted generally. The form of plan thus originated is certainly a good one. Corridors are thus done away with. At this same time, namely 1891, the late School Board decided to provide drawing classrooms, and these were erected over the halls. At this same time, too, the Board began to add decorative detail with a desire to make the buildings more ornamental and less disfiguring to the neighbourhood. The present committee state that the difference of cost between buildings erected on utilitarian lines and those designed with some regard to materials, colour and style, was about 5 per cent. The committee naturally press the point that some consideration must be given to appearance. Ornament is not, however, necessary to architectural effect, and it should be of the simplest in school design. In recent years, too, the cost of the offices and drainage generally has considerably increased. Where the ground is of a treacherous nature, it is customary to use iron soil drains; glazed tile divisions are provided between each water-closet in the ranges in lieu of wood-work, which is always subject to damage, and requires periodical painting, &c. Further, single pans with separate water-waste preventers are provided in lieu of the trough and automatic flusher. The extra cost of these items alone on a school for 800 children represents about £3 5s. per

place. The cost is sometimes increased by the provision of a playground on the top of a school, in consequence of the restricted area of the site. The late School Board considered carefully the cost of erecting schools. A special committee was appointed in 1887 to investigate and report, and as a result a new specification, the joint production of Mr. Ewan Christian and Mr. T. M. Rickman, was adopted. In 1892 a competition was held. The object was the planning of a school for 1,200 children capable of being erected on any ordinary site. Sixty-one designs were submitted, but Mr. Macvicar Anderson, the assessor, reported that it had produced no novel treatment in respect of plan that had been deemed worthy of approval. A 1903 investigation seems to have established the fact that it is cheaper to build a school in two separate blocks consisting of a two-floor building for the graded school and a one-floor building for the infants' department, than in a single block of three or four floors. As a result, the new L.C.C. elementary schools are being erected on the two-block plan, where the site is of sufficient size. By reason of the Board of Education refusing to sanction the erection of a building slightly in advance of actual and immediate requirements, central halls are erected of full size with only a portion of the eventual accommodation for scholars; this forms a larger proportion of the total cost at first than it does when the whole of any particular scheme is completed. The cloak-rooms, teachers' rooms, lavatories, &c., have also similar effect. The cost of site also varies considerably. The Education Committee therefore think that the true test of the cost of a building is its cost per foot cube on the main building, and not on the total cost of the whole school. The cost on this basis seems to have been in the last three years about 6½d. to 7d. for one-storey buildings, and from 7½d. to 8½d. for two- and three-storey buildings. Although the general tenour of the committee's report is defensive and of a *non possumus* character, the criticisms that have been made seem to have been of some utility, for the conclusions the committee come to show that they have learnt how to effect some considerable economies. Thus the use of iron drains will be abandoned, except where drains pass through made-up ground or under buildings. Wood-block flooring will be confined to halls and corridors only, and floors be made by nailing boards on to fillets on the concrete. The playsheds will be simplified in construction and reduced in cost by the use of iron columns. The standard pattern of sashes and fittings, together with the substitution of cords, pulleys and quadrant stays for the present metal window gearing, will be provided for. The low-pressure hot-water apparatus is being cheapened. Art and drawing classrooms will be omitted, carving and needless embellishments reduced, special patented articles excluded from the specifications, &c.



HIGH BAY OF CHOIR, LIVERPOOL CATHEDRAL. G. GILBERT SCOTT, ARCHITECT. (R.A. Exhibition, 1905.)

[NOTE.—The portion of Liverpool Cathedral first to be erected comprises the Lady Chapel, chapter-house, the choir up to the crossing, and the eastern vestries; the contract for this work, amounting to £370,000, has been let to Messrs. Morrison & Sons, of Wavertree, Liverpool. The nave and great twin towers are to be completed later. The total cost of the cathedral will be £750,000, towards which £275,000 has been given or promised.]

KING'S NORTON SCHOOL COMPETITION.

IN the competition, just decided, for an elementary school to be erected at King's Norton, Selly Oak, Birmingham, fifty-two designs were submitted, and a selection of eleven plans was set aside by the assessor (Mr. H. T. Sandy, of Stafford) for the inspection of the committee and competitors. The difficult problem which the architects had to solve was the disposal of the buildings on the site so that they did not interfere with the lighting of the existing temporary premises facing Umberslade Road. At the same time adequate playground accommodation and the proper aspect of the classrooms added further interest to the planning of the scheme, which, taken as a whole, is best solved by the winning design.

Many designs altogether ignore the fact that classrooms arranged parallel to, or nearly so, and facing the north-west boundary, would never get any direct sunlight during the winter months, and in the summer only after four o'clock in the afternoon. As sunlight is so essential for the health of children, and as in this climate there are so few days when it is inconveniently powerful, this question of aspect has influenced the assessor to a great extent in making his award.

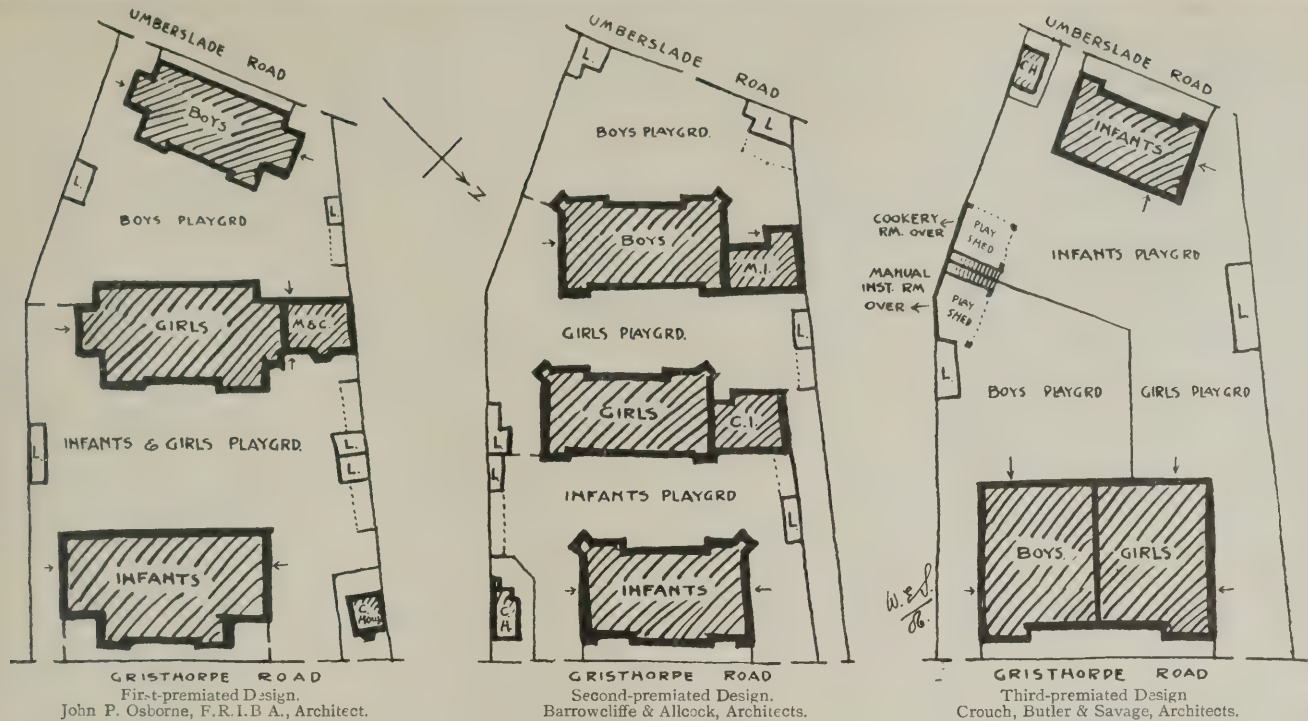
Another equally important point, which placed many competitors out of the final selection in this competition, was the disposal of the buildings on the site so as to allow the retention of the present temporary schools during the erection of the new infants' school. Some have apparently been oblivious of the fact that they were destroying the utility of the temporary buildings by blocking out the light, and thus, while fulfilling the letter of the instructions, ignoring their spirit.

A question in the replies to queries which misled many architects was the one relating to right of light over adjoining property. Some of the plans which required light along the whole or part of the side boundary were disqualified on this account.

The result of the competition is highly satisfactory to all concerned. The various difficulties connected with the site and buildings necessitated careful study on the part of the assessor, as many of the schemes display a good knowledge of school planning.

Design placed First.

The assessor has awarded the first premium to Mr. John P. Osborne, F.R.I.B.A., of Birmingham. This scheme permits of the erection of the infants' school without interfering in any way with the existing temporary buildings, and without depriving them of any light. It also similarly permits of the erection of the girls' school. The plan solves in a simple manner one of the most difficult problems submitted to competitors. It has one drawback, which some of the other designs are free from, caused by the three distinct school buildings cutting up the playgrounds. This creates a narrow space, comparatively speaking, between each school block, and the sunlight will be intercepted at times to a slight extent, and some of the blocks will also be shadowed because of this grouping on the site. The playgrounds are very well supervised. In detail the general arrangement of the plans is excellent, and although the whole of the classrooms do not lead directly from the central hall there are only two in each block which are not supervised therefrom. The entrance corridors, unless divided by a porch or screen, will be decidedly draughty—only one pair of doors is shown, and these open both ways instead of outwards only. The position of the lavatories does not add to the appearance of the corridors, and in practice would look



unsightly. As the corridors are only slightly over 7ft. wide they could easily be widened, with advantage, where the cloak-rooms are shown, because of the traffic when the school is breaking up. The elevations are quietly treated with stone quoins well placed to relieve the brickwork. The wood ventilating turret looks heavy and could be designed in a lighter and more graceful manner. There is no doubt about the building, as shown by the drawings, being erected for the sum stipulated in the conditions, namely, £14 per head.

Design placed Second.
This position has been awarded by the assessor to Messrs. Barrowcliffe & Allcock, of Loughborough. It is similar in many respects to the winning scheme, both in disposition on the site and in the working-out of the plans, and it has the same objections—namely, the narrowness of the playgrounds and the interception of the sunlight. In the infants' school supervision has been obtained for all classrooms from the central hall. The elevations show a fair amount of detail, but the design is not so satisfactory.

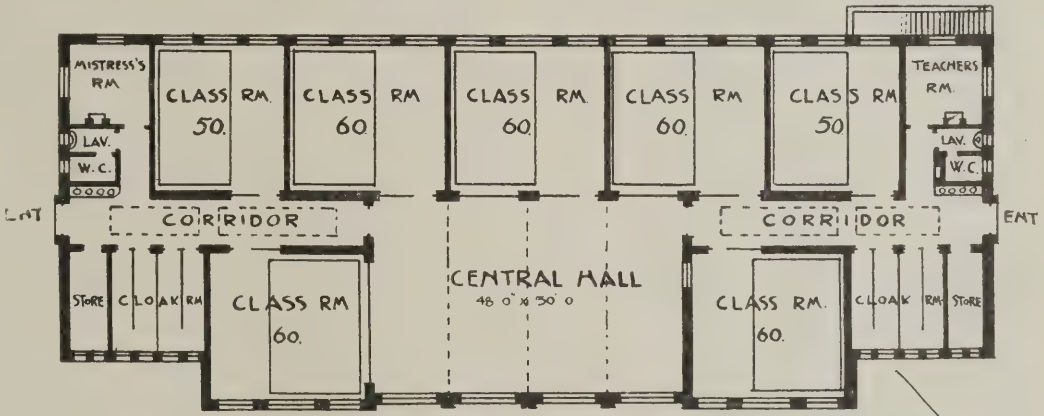
The design placed third, by Messrs. Crouch, Butler & R. Savage, of Birmingham, shows an admirable arrangement on

the site for sunlight and ventilation of the playgrounds, and the feeling of openness is a strong factor in its favour. The aspect of the classrooms and some points in the plans required more consideration than was accorded to them, but otherwise in many ways this runs the first design closely.

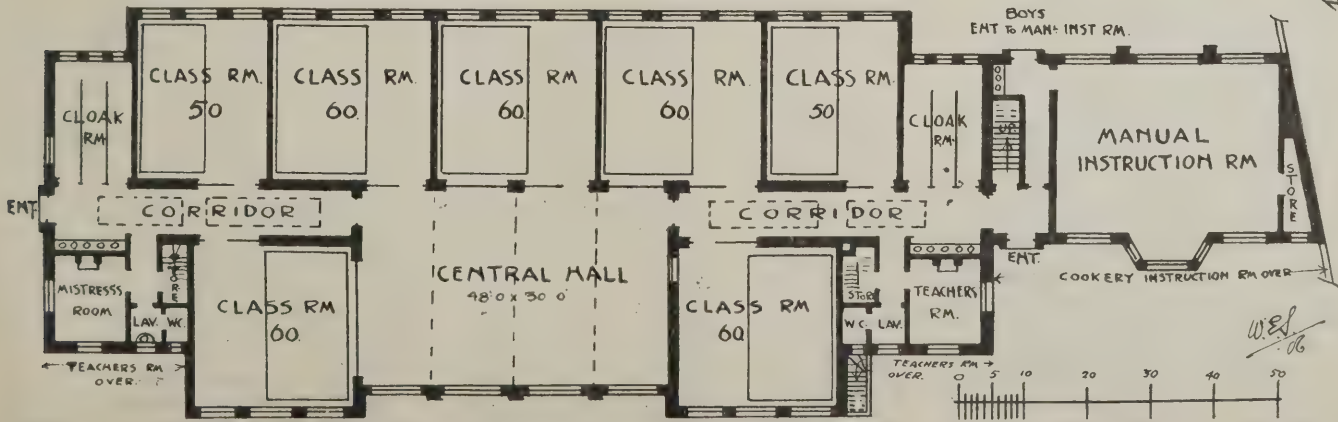
Messrs. Farmer & Beveridge, of Liverpool, submitted a very compact girls' and boys' school, with the infants' school arranged in the centre of the site; many competitors followed the same arrangement, but in the

working out this was one of the best designs exhibited.

Some sets of drawings were excellently coloured, and the standard of design and draughtsmanship was much better than in recent competitions. Mr. G. McMichael and Messrs. Cossins, Peacock & Bewley, of Birmingham, submitted well-got-up sets, especially in colour. Other well-known firms in the final selection and mentioned by the assessor were Messrs. Oliver & Dodgshun, of Leeds; Bower & Parsons, of Birmingham; and Salomons & Steinthal, of Manchester.



Plan of Infants' School.



Plan of Girls' School. (Boys' School similar.)

NOTES ON COMPETITIONS.

Nursing and Convalescent Home, Glossop.

In the town of Glossop, north of the Peak of Derbyshire, lives a benefactor who has presented the Corporation with £30,000 with which to build and endow a nursing and convalescent home. Judging by the set of conditions which accompanies the invitation for competitive designs, the Corporation appear to be somewhat embarrassed by the money thus placed at their disposal, and in order to obtain a happy issue out of their affliction they seek to place the onus upon the shoulders of long-suffering competitors. That at least is the conclusion arrived at by the writer of these remarks after a treble perusal of the requirements. These state that designs are to be "accompanied by particulars of a scheme as to the number of patients and nurses to be accommodated and the expense of maintenance," &c. ("particulars" and "scheme" are underlined in the original). "Particular regard must be had to the fact that the Corporation intend that the sum of £30,000 shall effectually provide for the erection and completion of the building, and also for the furnishing and decorating, and the laying out of the grounds, and leave a sum which, if invested in authorized trustees' securities, will provide a sufficient sum for the endowment of the institution, i.e., for the ground-rent, maintenance of the buildings and upkeep of the grounds and the carrying on of the institution so that no subsidy shall be requisite out of the rates." The cost of the building, with its decoration and furniture, as well as laying out the grounds, must not exceed £6,000. The ground-rent of the site is given as £42 per annum. This ground-rent is the only tangible sum which the harassed architect has to deal with, for the £6,000 will have to be carefully adjusted between furnishing, gardening and building. The process by which the desired result must be arrived at may be roughly stated as follows:—(a) The architect makes careful enquiries as to the cost of furnishing and laying-out of grounds, and adjusts the size of his building according to the result. (b) The architect then makes further careful enquiries as to the value of authorized trustees' securities, wages of nurses, matron, staff and gardener, cost of edible commodities in Derbyshire, fees of medical attendant, value of depreciation of stock, and the hundred and one items so difficult to estimate accurately even for a business man who desires to arrange in advance how a fixed income may be lived up to. Inevitable result—the annual outlay arrived at per b, when multiplied by the accommodation provided by the plan, proves either too great or too small, and another plan will have to be schemed. And what is the hope of reward for these herculean and unheard-of labours? The designs and schemes will be judged by a lay committee, who may call to their assistance such advice as they think proper; the two selected designs will become the property of the Corporation, who will pay a premium of £20 to the author of the design placed first by the committee, and £10 for the one placed second. The Corporation do not bind themselves to have the first or any of the designs executed. Comment is needless.

"The competition is open to all architects."

Proposed New School at Consett.

Particulars of this unsatisfactory competition were given in this column last week. In reply to a request that an assessor should be appointed, the secretary of the Durham Education Committee has replied that the Committee have upon their staff an architect who advises them upon all questions relating to plans and buildings. This reply was expected, for it has been made before by the same authorities. The Education Committee have been informed that the architect in

question cannot be regarded as an assessor, for his position is such that his opinion may be outweighed by members of the Committee who may have a predilection for a particular design. It is on record that this occurred in a former competition. It has been urged that a fully-qualified professional assessor, who shall be an expert in schools, is especially necessary in this instance by reason of the very scant information contained in the conditions, and that he should be appointed at once to be able to frame the answers to competitors' questions.

School at Newmains.

For a new school for 900 pupils at Newmains, near Wishaw, competitive plans have been sent in by four architects. The estimates varied from £8,839 to £9,545.

Kirkintilloch Conservative Club.

From information we have received, it appears that the competition for proposed new club rooms for the Kirkintilloch Conservative Association, has been decided in a very unsatisfactory manner. When giving notice of the competition some time ago, we referred to the conditions as being not at all what they should have been—no premium being offered, no site plan furnished, and the Association not binding themselves to accept any one of the designs submitted. We understand there were twenty-eight competitors, some with alternative plans, making a total of thirty-six sets. These were reduced to a short list of three, and were forwarded, together with a specification of the materials to be used, to a firm of measurers in Glasgow for a report on the cost. According to the schedule of conditions the cost of the building was not to exceed £1,800. The names of the architects in the short list were Mr. Frank Southern, Mr. William Baillie and Messrs. J. W. and J. Laird. The result of the measurers' estimating was that Messrs. Laird's plan was the only one which complied with the conditions in the matter of cost, being £60 below the sum stipulated. At the next meeting of the committee the list was reduced to two—Mr. Baillie and Messrs. Laird, but as Mr. Baillie's plans turned out about £200 in excess of the amount stipulated in the conditions, he was given back his drawings to alter and bring down his cost, though we understand that, even as amended, it is still over £1,800. In a good many competitions of course the cost is exceeded, but in this case, before the competition was decided on, plans were drawn out to order of the committee by an architect, and were thrown over for the reason that they cost £300 too much. The secretary of the building committee was most emphatic in stating that plans over £1,800 would on no account be considered. But with Mr. Baillie this seems to have been allowed. The following are some particulars of his design:—The building, which is to be of three storeys with basement, will occupy a prominent site at the corner of the High Street and the Backcausway. The front facing the High Street will be built of square rubble, with dressings of polished sandstone. On the ground floor are a well-lighted reading-room and two large committee-rooms—all three divided by folding partitions, so that the whole of the ground floor may be thrown into one large hall to accommodate about 300 persons, with ante-room and lavatories, an exit from the hall being arranged to the Backcausway. The first floor comprises a summer ice room for two tables and a large card-room, as well as caretaker's rooms and kitchen. On the top floor is a billiard-room having accommodation for four tables, with a bay window at each end, well lighted from the roof. Suitable lavatory accommodation has been provided on each floor. The total cost of the building including furnishings, &c., will amount to over £2,000. The work is to be proceeded with at once.

Competitions Open.

The following is a list of competitions open:—

DATE OF DELIVERY.	COMPETITION.
May 31	CHAPEL AND SCHOOLROOM AT MANSELTON, SWANSEA. Particulars from Mr. T. Roberts, 71, Brynhyfryd, Swansea.
June 26	NURSING AND CONVALESCENT HOME AT GLOSSOP, to cost £6,000. Premiums of £20 and £10. Particulars from Mr. T. W. Ellison, town clerk, Norfolk Chambers, Glossop.
" 30	ELEMENTARY SCHOOL AT EAST WEMYSS. Particulars from Mr. A. Watson Taylor, clerk to the School Board, East Wemyss, R.S.O., Fifeshire.
July 2	SECONDARY SCHOOL FOR GIRLS AT AIGBURTH VALE, for the City of Liverpool Education Committee. Limited to architects in Lancashire and Cheshire. Particulars from the Town Clerk, Municipal Offices, Liverpool.
" 4	SCHEME OF SEWERAGE AND SEWAGE-DISPOSAL WORKS AT WARBLINGTON. Premiums of £100 and £50. Particulars from Mr. J. W. Loader Cooper, clerk to the U.D.C., Queen Street, Emsworth.
Oct. 1	ALPHABET COMPETITION. Prizes of £20, £10 and £5. For particulars see "Architectural Review."
" 31	BOURSE AT CAIRO. — Premiums of £250 and £100. International competition. Designs to be submitted to the "Corporation des Agents de Change," Cairo, Egypt.
Date not yet decided upon.	NEW MUNICIPAL BUILDINGS AT STIRLING (to cost £12,000). Premiums of £100. Particulars from Town Clerk, Borough Buildings, King Street, Stirling.
No date	DETACHED AND SEMI-DETACHED HOUSES AT CLIFTONVILLE, BELFAST.—Premiums £700. Particulars from R. J. McConnell & Co., 51, Royal Avenue, Belfast.
"	SCHEME OF DECORATION for the interior of Cambridge Hall at Southport. Premium £5 5s. Particulars from Mr. J. Ernest Jarratt, town clerk, Town Hall, Southport.

THE FORTHCOMING CONGRESS OF ARCHITECTS.

Provisional Programme.

THE following is the provisional programme of the seventh international congress of architects to be held in London from July 16th to 23rd:—

Monday, July 16th.—Reception at Grafton Galleries at 10 a.m. and inaugural meeting at the Guildhall at 3 p.m. Soirée at the Royal Academy.

Tuesday, July 17th.—Congress meeting in the morning. Visits to Hatfield and Hampton Court in the afternoon. Conversazione at the Mansion House in the evening.

Wednesday, July 18th.—Congress meeting in the morning. Visits to Buckingham Palace Gardens, Westminster Abbey, Messrs. Holloway Brothers' works and Messrs. Doulton's potteries in the afternoon; also reception at Lyceum Club (ladies).

Thursday, July 19th.—Congress meeting in the morning. Visits to St. Paul's Cathedral, the Temple, the Institute of Chartered Accountants, St. Bartholomew's, Kensington Palace, Dorchester House and Windsor Castle in the afternoon. Evening fête at the Royal Botanic Society's Gardens in Regent's Park.

Friday, July 20th.—All-day visits to Oxford and Cambridge, and other visits to the Tower of London, South Kensington Museum and the Royal College of Science. Evening reception by Art Workers' Guild.

Saturday, July 21st.—Visits to Bridgewater House in the morning and to the Houses of Parliament, Westminster Cathedral and Greenwich Hospital in the afternoon. Farewell banquet at the Hôtel Cecil in the evening.

Exhibitions.

There will be the following exhibitions at the Grafton Galleries:—Photographs of buildings executed by living British archi-

fects; a chronological exhibition of British architecture from the Norman Conquest to the death of Sir Charley Barry (1860); oil paintings and water-colour drawings of English architecture; and a few choice specimens of British furniture and silver work: while at the premises of the Architectural Association in Tufton Street, Westminster, there will be exhibited a selection of Viennese students' drawings arranged by Prof. Otto Wagner, of Vienna.

Subjects for Discussion.

The Executive Committee have received the following communications (from this country where not otherwise stated):—

1. *The execution of important Government and municipal architectural work by salaried officials*.—M. F. Blondel (France), Society of Austrian Architects, Gaston Trélat (France), Oscar Simon (Société Centrale d'Architecture de Belgique).

2. *Architectural copyright and the ownership of drawings*.—George Harmand (France), H. H. Statham, Gaston Trélat (France).

3. *Steel and reinforced-concrete construction*.—The Joint Committee on Reinforced Concrete, Herr Wilemanns (Austria), Prof. Henry Adams, E. P. Goodrich (America), Louis Cloquet (Société Centrale d'Architecture de Belgique), Joaquim Bassegada (Spain), Gaston Trélat (France).

4. *The education of the public in architecture*.—John Belcher, T. G. Jackson, Arthur Hill, Othmar von Leixner (Vienna), Herr Muthesius (Berlin), Banister F. Fletcher, Francisco del Villars y Carmona, Manuel Vega y March, Eduardo Mercader y Saccamella (Spain), Society of Austrian Architects, Gaston Trélat (France), Gaston Anciaux (Société Centrale d'Architecture de Belgique).

5. *A statutory qualification for architects*.—Robert Walker, John S. Archibald (Canada), L. Bonnier (France), Society of Austrian Architects, Gaston Trélat (France).

6. *The architect craftsman: How far should the architect receive the theoretical and practical training of a craftsman?*—Reginald Blomfield, Prof. W. R. Lethaby, J. M. Poupinel (France), Fr. van Gobbelschroy (Société Centrale d'Architecture de Belgique), Society of Austrian Architects, Gaston Trélat (France).

7. *The planning and laying out of streets and open spaces in cities*.—Raymond Unwin, Herr Stübgen (Germany), E. Hénard (France), B. Polles y Pivo, J. Majó y Ribos, M. Bertran de Quintana (Spain), C. H. Buls (Société Centrale d'Architecture de Belgique), Gaston Trélat (France).

8. *To what extent and in what sense should the architect have control over other artists or craftsmen in the completion of a national or public building?* Sir W. B. Richmond, H. P. Nénot (France), C. B. Müller (Germany), Association of the Architects of Catalonia (Spain), Society of Austrian Architects, Gaston Trélat (France).

9. *The responsibilities of a Government in the conservation of national monuments*.—Prof. G. Baldwin Brown, A. Besnard (France), Gaston Trélat (France), Joseph Artigas y Ramoneda (Spain).

10. *The organisation of public international architectural competitions*.—J. Guadet, Society "Architectura et Amicitia" (Holland), Gaston Trélat (France).

The Executive Committee have also arranged for Professor Meydenbauer, of Berlin, to read a paper on "Messbildverfahren" or "Photometry." A communication on this subject has also been received from M. Marcel le Tourneau, of Paris.

M. Honoré Daumet (Paris) will read a communication on the Château de Saint-Germain.

Mr. Cecil Smith (Keeper of Greek and Roman Antiquities, British Museum) will read a paper on "The Tomb of Agamemnon."

THE NEW VAUXHALL BRIDGE.

THE new bridge across the Thames at Vauxhall, after being under construction for 7½ years, was opened on Saturday last. It replaces a structure opened in 1816 and finally dismantled in 1899.

The new bridge forms, on the Westminster side, a roadway over the river in continuation of Vauxhall Bridge Road, and on the Surrey side joins South Lambeth Road, facing Upper Kennington Lane. Its abutments and piers are faced with granite blocks, which have cores of concrete and stone. The steel and iron superstructure comprises five spans. Between abutments the length is 759ft 4ins. and the width between parapets 80ft., divided into a carriageway and two footpaths, the former 50ft. wide and the latter 15ft. each.

The Steel Spans.

The centre span is 149ft. 7ins. wide, with a headway of 20ft. above high-water; the two intermediate spans joining it on either side are each 144ft. 4½ins. wide, with headways of 19ft.; whilst the two shore spans, which at the land ends link on to the abutments, are each 139ft. 5½ins. wide, with headways of 14ft. 11ins. The five arches have thirteen ribs each, which bear on steel skewbacks built into the abutments or resting on the piers. These skewbacks, both the two single ones joining on the abutments and the four double ones linking the ribs to the piers, are particularly heavy members of the whole design, nearly 300 tons of steelwork having been put into them. In addition, other steelwork used in the superstructure—namely, for the arched ribs and bracings, the spandrels, framings of the arches, and hinge pins—amounts to over 3,433 tons, whilst there is cast-steelwork weighing 250 tons, 110½ tons of wrought-iron, and 166½ tons of cast-iron. Where the steel-plate decking is not laid directly on the ribs or on the steel framing of the piers, longitudinal rolled steel joists carry it, borne by stanchions, also of rolled steel, which stand on the ribs.

Piers.

The two central piers are each 15ft. 8ins. wide, and the two intermediate ones 14ft. 8ins. at the level of Trinity high-water. The four piers are all alike save for this difference in height, which was made to suit the gradients of the roadway. Three of the four were constructed with no more difficulties than those ordinarily incident to similar operations on a river with so great a range of tide as the Thames. The Westminster central pier, however, gave considerable trouble almost from the beginning, the various mishaps culminating in the complete collapse of the dam erected round it in the autumn of 1902, which seriously interfered with the work of erecting the superstructure until the dam was made tight again. The foundations, which are of 8 to 1 concrete, with a width of 37ft. and 38ft. in the side and centre piers respectively, and 140ft. 9ins. and 142ft. 6ins. in length overall, are cased in tongued and grooved sheet-piling, being the lower ends of the dam piles, which were cut off at the top of the concrete base and left in when the piers were built. The ends of the piers are finished with cutwaters, capped with carved granite blocks. A moulded cornice, similar to the cornices on the abutments, terminates the granite facings of the piers below the steel skewbacks of the arches, where the masonry ends.

The bridge has been constructed from the designs of Mr. Maurice Fitzmaurice, C.M.G., M.I.C.E., chief engineer to the London County Council, with whom has been associated Mr. W. E. Riley, F.R.I.B.A., superintending architect to the Council, in respect of the ornamental features of the superstructure. Messrs. Pethick Brothers, of Plymouth, were the contractors for the substructure, and Messrs. C. Wall, Ltd., for the steelwork. The total cost has been £437,000.



Photo: W. H. Watts.

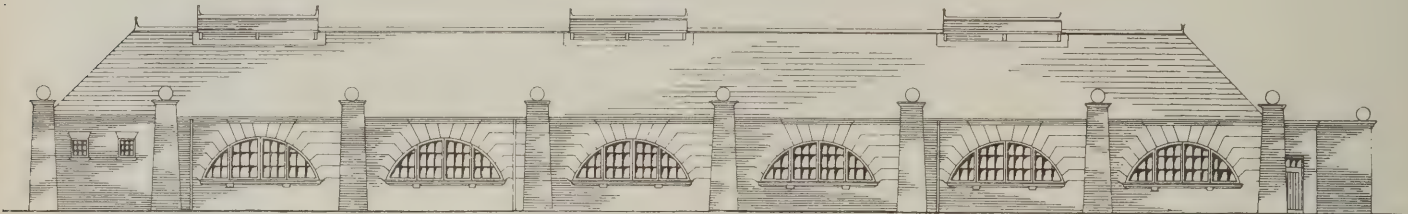
THE NEW BRIDGE ACROSS THE THAMES AT VAUXHALL.
MAURICE FITZMAURICE, C.M.G., M.I.C.E., AND W. E. RILEY, F.R.I.B.A., RESPECTIVELY CHIEF ENGINEER AND SUPERINTENDING ARCHITECT TO THE LONDON COUNTY COUNCIL.

A SCOTTISH ICE RINK.

THE building illustrated on this page is proposed to be erected at Crossmyloof, Glasgow, for skating and curling, and has been designed purely with the view of utility, the provision of a good and large ice surface being considered of greater importance than elaborate design and finish in the structure. The walls are to be built with good red clay bricks, neatly pointed, and the inside treated in Hall's distemper. The roof is to be constructed of light iron principals,

covered with boarding and open slating and having stretches of patent glazing. The roof will be in two spans supported on a lattice-girder running through the centre, carried on three steel stanchions, thus minimizing obstruction to the floor area. At one end of the rink is the main entrance, with pay-office and ladies' and gentlemen's cloak-rooms, while at the other end are the caretaker's house, with bar and tea-room adjoining, and the necessary stores. The engineering department for the manufacture of the ice is at the same end of the building, as

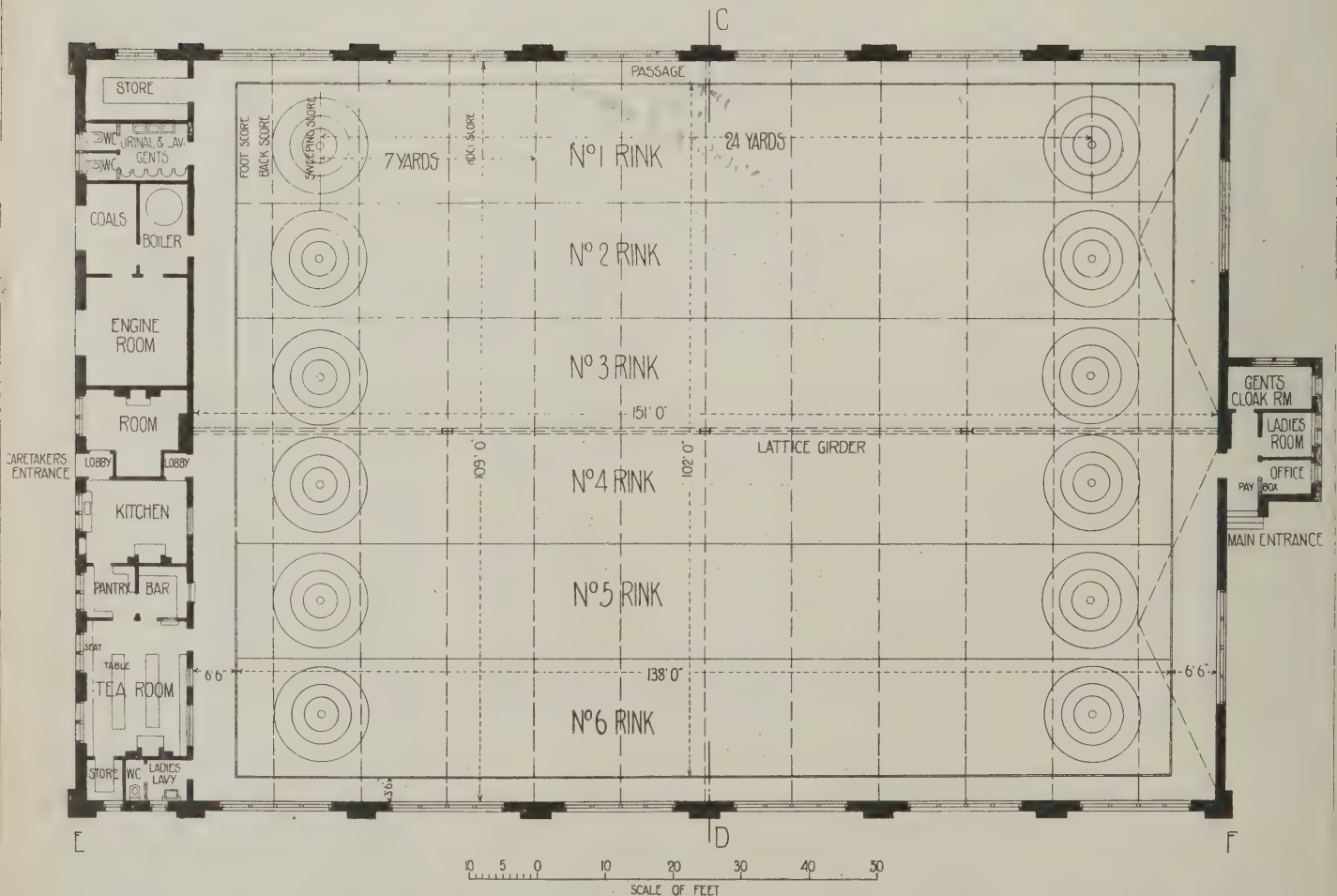
also the lavatories. All round the rink, seats will be formed for spectators and players, underneath which will be lockers for skates, curling stones, &c. The floor under the ice will consist of a concrete foundation covered with insulating material of cork, brick or other substance coated with asphalt, which, being turned up all round, will form a tank for the water. Through this water will be run the freezing pipes, which will be designed to keep the ice always in a uniform state. The architects of the building are Messrs. Fryers & Penman, of Largs.



Side Elevation E—F.



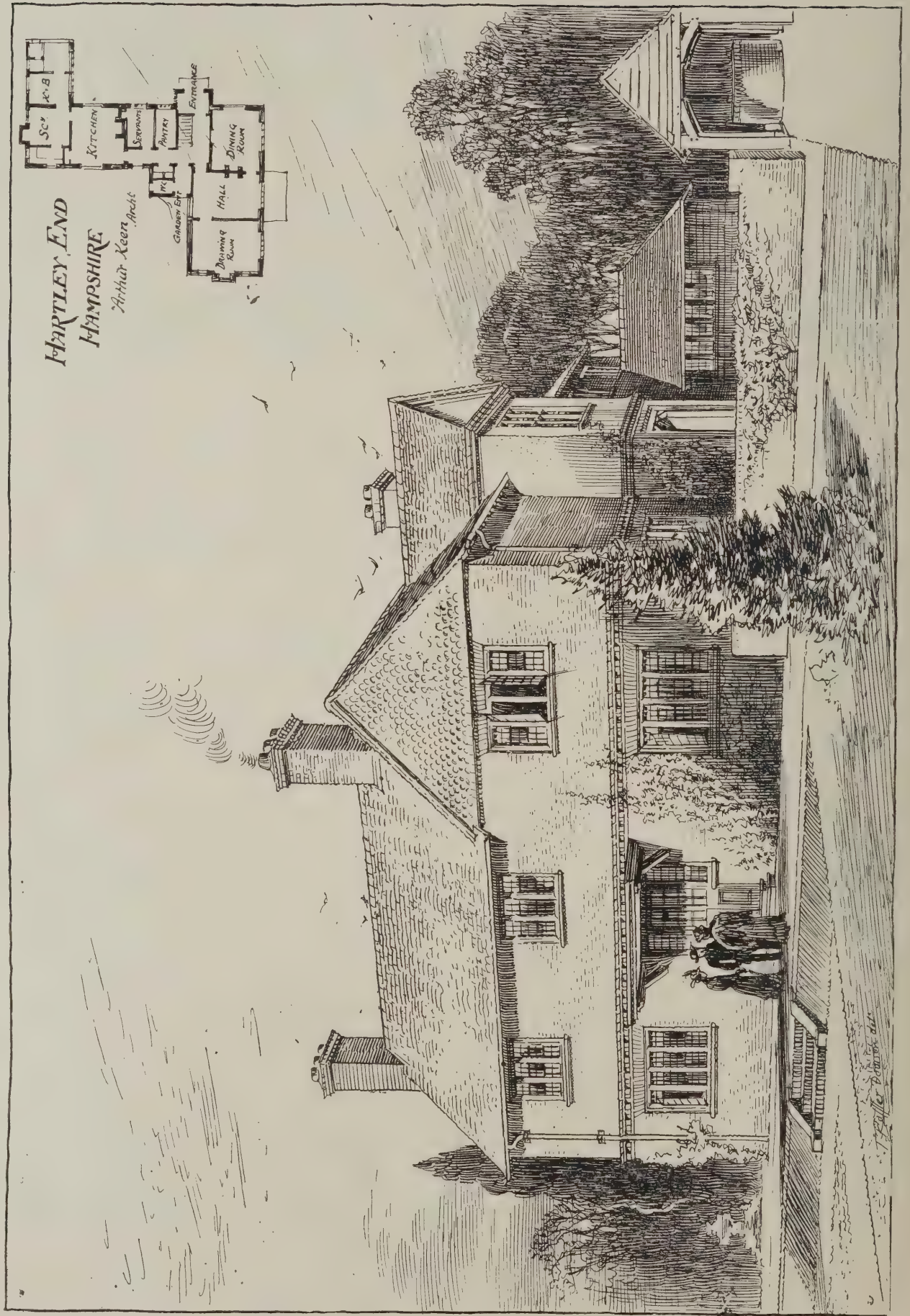
Cross-Section c—d.

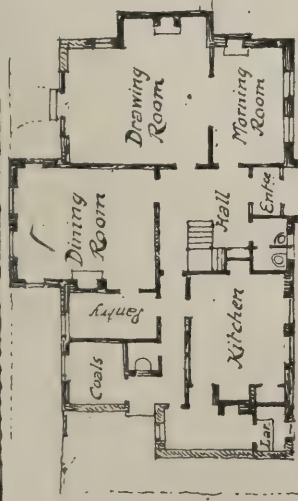


PROPOSED PAVILION FOR THE LILYBANK CURLING CLUB, GLASGOW.

FRYERS AND PENMAN, ARCHITECTS.

LIBRARY
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UNIVERSITY OF ILLINOIS





A HOUSE AT--
HIGHGATE.

Arthur Keen Archt.



LIBRARY
OF THE
UNIVERSITY OF ILLINOIS



WARING AND GILLOW'S NEW PREMISES IN OXFORD STREET, LONDON.
R. FRANK ATKINSON F.R.I.B.A., ARCHITECT.

THE WARING BUILDING.

A Notable Addition to London Street Architecture.

IT is somewhat remarkable that in the whole length of Oxford Street and Holborn the only public edifices are a free library and a post-office, and that these are quite inconspicuous in the perspective of the street. On this account the large building now being completed for Messrs. Waring & Gillow is doubly welcome, for not only does its façade give added interest to the thoroughfare, but its imposing scale is what one looks for in a large public building. Such features of the elevation as may seem most open to objection can be traced to the successful endeavour of the architect to meet the requirements of the case. What was the problem before the architect? Presumably to provide an enormous floor area, to provide as great a superficies of window as was compatible with dignity, and to challenge attention. The first condition dictated the number of storeys, and the great depth of the galleries or showrooms entailed considerable height to each. Hence the building is somewhat too high for its length, even though the architect has merged two storeys in the roof. The pediment or "fronton" in the centre might have been omitted and the cornice left unbroken. This would have diminished the height and emphasized the length; but then the building was to challenge attention, and it does this more by virtue of its height than by anything else. We must especially notice the blocks of stone used in the pediment and elsewhere; their enormous size compels our admiration.

Again we may regret the angle bay of the first floor. It detracts from the strength of the corner, emphasized as this has been too by the use of long stone quoins above. But

this bay is part of the endeavour to meet the second requirement as to light, and so it only remains for us to appreciate the skill with which it is carried and the way in which it merges once more into the wall above. The vigorous carving of the huge granite corbels is one of the most delightful details of the building.

The ground storey has been considerably modified from the architect's perspective and model, and not without detraction from the stateliness of the structure, but the broad rusticated piers of granite remain, although at wide intervals, and we feel grateful that the pilaster-like strips usual between shop fronts have been thus concentrated.

Above, on the principal storey, the centre is recessed between columns and pilasters, the whole bearing a balcony, while on either side is a series of lofty windows with circular lights above. The lower windows have wrought-iron balconies of pleasing design, consisting of scroll-like foliage stiffened with square bars, the whole taking a graceful bulging form.

In the upper portion of the façade are square-headed windows and a series of coupled semicircular arches, within which the plane of the glazing is much recessed. The details of both are excellent in their refinement and strength, but it is open to question whether the square-headed windows should not have been at the angles of the building and the semicircular windows grouped as an arcade above the circular lights of the second storey. This would have strengthened the corner and avoided the present change of vertical axis with relation to the end windows. But even here the critic must be cautious, for the thick walls which are carried up through the roof divide the building into vertical sections connected only by fireproof doors, and these walls

might have precluded a continuous arcade on the elevation.

The colour of the building is very attractive, and is mainly due to the use of bright red rubbers set with a fine white joint for the general walling. Portland stone is used for the dressings, and the sculptured blocks are so cut as to leave the white outlines to be silhouetted against the red walling, instead of the true bonding of the blocks coming to the front in the ordinary way. The bricks rise six courses to the foot, and this enhances the scale of the whole structure, as well as emphasizing the size of the blocks of stone.

The cast-lead rainwater pipes and heads are a feature of the elevations by reason of their unusual size and beauty. The great weight of the heads has probably entailed some special means of support.

OUR PLATES.

"HARTLEY END," Hampshire, has been built lately at Winchfield. The treatment of it is similar to many old houses in the neighbourhood, the materials being red bricks and hand-made tiles. The builder was Mr. J. Harris, of Basingstoke.

The house at Highgate is now being erected by Mr. Henry Brown, of Stoke Newington, at a contract price of about £1,600. The materials of this house also are red bricks and hand-made tiles.

Mr. Arthur Keen, F.R.I.B.A., of 4, Raymond Buildings, Gray's Inn, W.C., is the architect of both houses.

Enquiries Answered.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

Correspondents are particularly requested to be as brief as possible.

The querist's name and address must always be given, not necessarily for publication.

Concrete Domes.

REDHILL.—VETERAN writes: "(1) Please explain how rolled lead, sheet asphalt and Ruberoid should be attached to the exterior of a concrete dome, describing the procedure in each case. Also, which is the best material to use? How were the tiles fixed on some of the Byzantine domes? (2) Have the domes of the new Westminster Cathedral an asphalt covering as well as an external casing of artificial stone? (3) Is it possible to construct a concrete dome of, say, 40ft. diameter strengthened with steel rods, so as to be entirely without thrust and to admit of its being supported on thin walls (or piers) without buttressing? Have any special precautions to be taken in forming an 'eye' in same?"

If the dome is of coke-breeze concrete the materials named can probably be cut in gores and nailed to it, but the joints and nail holes would require special protection, and the writer has no experience of covering domes. A ferro-concrete dome can be constructed 40ft. in diameter in such a way as to produce dead load only without thrust. There would be nothing special about the eye for a dome of this material, beyond encircling it with embedded steel rods.

HENRY ADAMS.

San Francisco for Architects.

BIRMINGHAM.—R.I.B.A. writes: "Is there any opening in San Francisco for two young architects who are Associates of the Royal Institute? Would the fact of not being American citizens at all handicap them? As an alternative, would they have a better chance in the Eastern States or Canada?"

Ifso, which towns offer the best opportunities?"

OSWALDTWISTLE. — T. Y. writes: "To whom should I make application for a situation in an architect's and surveyor's office at San Francisco? I think no place offers better prospects."

There will no doubt be plenty of openings for architects' assistants in San Francisco in a few weeks' time, but matters can hardly have been cleared up yet. There seems to be an impression abroad that English architects could easily start private practice and secure clients, but we think this is erroneous. There are plenty of architects in California, and well-known American architects in other cities will probably secure clients and open

branch offices, so that strangers will be rather out of the running, except as draughtsmen and material agents. As regards our first correspondent, the Eastern States offer no better chances. Canada is a good field undoubtedly, especially out West. In reply to our second correspondent, appointments can only be secured by first going out and advertising in local papers and calling on local architects.

Learning the Building Trade.

LONDON. — J. G. writes: "Where could I learn the building trade from the beginning? I am just starting in the office of my father, who is in a small way of business, as builder and decorator, mostly repairs and

dilapidations being his line, which requires a little knowledge of the building trade. I am anxious therefore to attend some classes and lectures where I can obtain sufficient knowledge to be able to measure work and manage a business."

We should advise you to go to the London County Council School of Building at Brixton.

Ballroom Floor.

BOURNEMOUTH. — E. D. writes: "Please give me a few hints on the construction of a spring or hanging floor for a large ballroom."

See an article in our issue for January 26th, 1898.

Complete List of Contracts Open.

WITH a few exceptions, news of Contracts Open are not repeated after they have been published once in these columns, so that readers will find particulars in our previous issues of other contracts that still remain open.

Unless expressly stated to the contrary all deposits required for bills of quantities, &c., are returned on receipt of bona-fide tenders.

The words "Fair Wages Clause" inserted in certain paragraphs signify that persons tendering must conform to a fair-wages clause in the contract, which requires them to pay the rates of wages current in the district.

BUILDING.

May 31. Thornhill. — Mason, joiner, slater and plaster work of addition, &c., to shepherd's house and offices at Achaneich, Spean Bridge. Also for mason, joiner and slater work in connection with shepherd's house and offices at Blarour, and offices at Tirndrish. Plans and specifications to be seen at the places mentioned. Offers must be lodged with James Brown, Jarbruck Lodge, Thornhill, Dumfriesshire, not later than May 31.

May 31. Carmarthen. — Conversion of Bank House into county offices and the erection of new roof thereon. Plans may be seen and specifications and quantities obtained from Charles H. Mounsey, county surveyor, Carmarthen, and W. D. Jenkins, county education architect, Carmarthen. Sealed tenders, endorsed "County Offices," must be in the hands of J. W. Nicholas, clerk of the County Council, Shire Hall, Carmarthen, on or before 4 p.m. on May 31.

May 31. St. Clears. — Erection of a new dwelling-house for Zion Baptist Church, St. Clears. Plans and specifications may be seen at 1, Station Road, St. Clears, and tenders are to be sent to John Williams, at the above address, on or before May 31, endorsed.

May 31. Ecclesfield. — Erection of the Stacey Memorial Parsonage House at Grenoside, in the parish of Ecclesfield. Plans and specifications may be seen and quantities obtained on application to R. & W. Dixon, architects, 5, Eastgate, Barnsley, to whom sealed tenders must be delivered, endorsed "Tender for Parsonage House," not later than 10 a.m. on May 31.

May 31. Truro. — Erection of new stores, &c., on the site of the old smelting works, Trafalgar Square, Truro, for W. G. Goodfellow, according to plans and specifications, which may be seen at the office of A. J. Cornelius, M.S.A., architect, Truro. Sealed endorsed tenders to be sent to W. G. Goodfellow, The Parade, Truro, on or before May 31.

May 31. Mountain Ash. — Erection of buildings to be used in connection with the Workmen's Institute, Mountain Ash, for the Committee. Plans, &c., may be seen at our Offices, 1, Jeffrey Street, Mountain Ash, or 42, Canon Street, Aberdeen. Endorsed tenders to be sent to Morgan & Elford, not later than May 31.

May 31. Sudbury. — Erection of additional accommodation, consisting of nurses' bedrooms, isolation ward, &c., at St. Leonard's Hospital. Drawings, specification and conditions may be seen at the office of the architect, Alfred Howard, Cornard Road, Sudbury, from whom further information can be obtained. Tenders, which are to be sent in by May 31, should be sealed and endorsed "Tender for Additional Accommodation at St. Leonard's Hospital," and addressed to Joseph Alexander, Esq., secretary of the St. Leonard's Hospital, Sudbury.

May 31. Bristol. — Erection of Wesley Memorial church, Bryant's Hill, Bristol. Plans, &c., may be seen any weekday from 9.30 a.m. to 4.30 p.m., on application to G. Peters, Kingscote House, Bryant's Hill, St. George, Bristol. Quantities obtained of W. Hugill Dinsley, architect, Chorley, Lancs., on deposit of 10s. 6d. Tenders to be delivered to the Rev. W. J. Clarke, Elmlyra Villa, Hanham, near Bristol, not later than noon on May 31.

May 31. Warrington. — Erection of the New Winwick Hall imbecile wards for the Lancashire County Asylum. Plans may be seen and bills of quantities obtained from the architects, Chadwick & Booth, 16, Princess Street, Manchester. Applications from contractors desirous of tendering for the general building contract, engineering, heating and ventilating must be forwarded to the architects not later than May 31.

May 31. Swindon. — Alterations and additions at Nos. 10 and 11, East Street, for the Industrial Co-operative Society. Plans and specifications may be seen at the office of R. J. Beswick, architect and surveyor, 10, Victoria Road, Swindon. Sealed and endorsed tenders to be delivered to J. L. Braud, Secty., not later than 5 p.m. on May 31.

June 1. Brighton. — Supply of Portland cement for the year ending June 30, 1907, the same to be delivered at

any of the Brighton Railway stations as ordered in quantities of from 6 to 20 tons at one time. The specification and form of tender may be obtained on application to the Borough Surveyor at the Town Hall, Brighton. Sealed tenders, endorsed "Tender for Portland Cement," must be left at the Town Clerk's Office, at the Town Hall, before 10 a.m. on June 1.

June 1. Ballymena. — Proposed extensions and alterations at Ballymena Cottage Hospital. Plans and specifications can be obtained from — Boyd, C.E. Tenders to be sent to R. R. Porter, hon. secty., on or before June 1.

June 1. Cardiff. — Erection of a new Greek Church on a site situated between the West Junction Canal and North Church Street, Cardiff. Plans and specification may be seen and bills of quantities obtained on payment of a deposit of £1 1s. Sealed and endorsed tenders, "Greek Church," to be sent to Milnside Raphael, Greek Consul, Bute Docks, Cardiff, on or before June 1.

June 1. Worcester. — Rebuilding of a retaining and parapet wall in connection with Shipston County Bridge at Shipston-on-Stour. Copies of drawings and specification and form of tender may be obtained on application to J. H. Garrett, county road surveyor, Shirehall, Worcester, to whom sealed tenders, endorsed "Retaining Wall, Shipston Bridge," are to be sent not later than June 1.

June 1. Port Patrick. — Erection of a dwelling-house at Port Patrick, in the county of Wigtown. Copies of the bill of quantities will be supplied on application to the Superintendent Engineer, H.M. Naval Establishment, Rosyth, Inverkeithing, N.B. The drawings, specifications and conditions of contract may also be seen there, and at Port Patrick Coastguard Station and the Office of the Director of Works Department, Admiralty, at which latter place tenders are to be deposited before noon on June 1.

June 1. Leeds. — Erection of a woollen mill adjoining Dewsbury Road, Beeston, Leeds, for W. Douglas. Persons desirous of tendering for the various works required should send in their names to T. A. Buttery & S. B. Birds, 1, Basinghall Square, Leeds. Plans and specifications may be seen and quantities obtained on and after May 25. Sealed and endorsed tenders to be sent to T. A. Buttery and S. B. Birds, 1, Basinghall Square, Leeds, before 4 p.m. on June 1.

June 2. Arnside. — Erection of a residence at Arnside, for W. F. Bolton. Plans and specifications may be seen and particulars obtained at the office of G. L. Hoggarth, architect, Kendal and Arnside, to whom tenders are to be sent by June 2. Preference will be given to the contractors who can commence and complete the work in the shortest time.

June 2. Priddy. — Alterations and additions to the Council school, Priddy, during the summer holidays. Drawings and specifications are at the offices of Price & Jane, Weston-super-Mare. Sealed tenders must reach the County Education Office, Weston-super-Mare, before noon on June 2.

June 2. Leigh. — School. The Corporation of Leigh invite builders desirous of tendering for the erection of a new school in Windermere Road to send in their names to the architects, J. C. Prestwich & Son, Bradshaw Gate Chambers, Leigh. The drawings, general conditions and specification may be inspected, and the bill of quantities with the form of tender annexed, obtained at the offices of the Architects on deposit of £1. Tenders on the form provided, addressed to the Chairman, School Buildings Committee, Town Hall, Leigh, and endorsed "Tender for Council School," must be sent to Stanley Wilson, town clerk, Town Hall, Leigh, before noon on June 2.

June 2. Pickering. — Erection of a villa residence at Pickering. Plans and specifications may be seen on application to the Rev. J. W. Brown, 28, Burgate, Pickering, or at the office of Samuel Dyer, architect, Bridlington, where sealed and endorsed tenders are to be delivered on or before June 2.

June 2. Antrim. — Erection of a villa on the Holywell Estate, near Antrim, for the Committee of Management of the County Asylum. The plans and specification may be inspected at the office of the Clerk of the Institution, and at the office of S. C. Hunter, 2, Wellington

Place, Belfast, from which latter copy of the bill of quantities may be obtained on payment of a deposit of £1 1s. Sealed tenders, to be endorsed "Tender for Villa," and addressed to the Chairman of Asylum Committee, Holywell, Antrim, to be sent in or before noon on June 2. Copies of the plans and specification may be obtained on application to A. Basil Wilson, M.I.C.E., Maryville, Malone, Belfast, on payment of the sum of £1, which will not be returned.

June 4. Kinloss and Findhorn. — Mason, carpenter, slater, plumber, plasterer and painter works of alterations and additions at the schools of Kinloss and Findhorn. Plans and specifications may be seen with Peter Fulton, architect and surveyor, North of Scotland Bank Buildings, Forbes, who will receive tenders up to 10 a.m. on June 4.

June 4. Ludlow. — Extension of the Infirmary at the Union Workhouse, and for the execution of works of drainage at the same workhouse. For plans and specifications apply to B. Weale, architect, East Hamlet, Ludlow. Separate tenders for each of the works must be sent in to Arthur W. Weyman, clerk to the Guardians, Ludlow, on or before June 4.

June 4. Durham. — Improvements to Middleton Moor School. Plans, specification and conditions of contract may be seen and forms of tender obtained at the School or the Architect's Office. Sealed endorsed tenders to be delivered to W. Rushworth, F.R.I.B.A., architect, County Education Offices, Shire Hall, Durham, on or before June 4.

June 4. Taunton. — For the following works in accordance with the specifications, &c., prepared by the borough surveyor: — Erection and putting up of a mortuary and post-mortem room at the Coal Orchard Yard; paving (with bricks), curbing and channelling of one side of Leslie Street, Rowbarton; painting, &c. of the outside woodwork and ironwork at Lambrook Farm. Plans, specifications and other particulars can be obtained at the Borough Surveyor's Office during the usual office hours, on depositing £1 1s. Tenders, on the prescribed form only, must be addressed, in sealed envelopes, to the Town Clerk on or before June 4, and endorsed on the outside "Tender for —."

June 4. Croydon. — Erection of small first-floor additions to the workshops at the workhouse, Queen's Road, Croydon. The plans, specification and conditions of contract may be seen, and bills of quantities with form of tender obtained at the office of Henry Berney, architect, 104, George Street, Croydon, surveyor to the Guardians, upon depositing the sum of £3 3s. Tenders, sealed and marked "Tender for Additions to Workshops," to be addressed to Harry List, clerk to the Guardians, Union Offices, Mayday Road, Thornton Heath, Surrey, and delivered by June 4.

June 4. Stratford-upon-Avon. — Erection of a cloakroom, &c., at the rear of the Town Hall. Plans and specification of the work may be seen upon application at the Borough Surveyor's office. Tenders, sealed and endorsed "New Cloak Room," to be delivered to Roden Dixon, borough surveyor, Municipal Offices, Stratford-upon-Avon, by June 4.

June 5. Darwen. — Iron and steelwork in the construction of the new free library. Quantities and particulars can be obtained from the architects, Haywood & Harrison, Post-office Chambers, Accrington, at whose office plans of the proposed work can be seen. Sealed tenders, endorsed "New Library Iron and Steelwork," must be forwarded to William P. Halliwell, town clerk, Town Clerk's Office, Darwen, on or before June 5.

June 6. Wallsend. — Erection of a building in connection with the Cookery Centre of the Education Department of the borough of Wallsend, and the Richardson Dees School. Amended plans and specifications may be seen on application to the Borough Surveyor, George Hollings, Corporation Offices, Hugh Street, Wallsend. Tenders to be delivered to W. V. Mulcaster, town clerk, Wallsend, marked "Tenders for Cookery Centre," on or before June 6.

June 6. Naburn. — Erection of two cottages and office, at Naburn Locks. Specification and bill of quantities may be obtained from A. Creer, architect, Guildhall,

York, on deposit of £1 is., to whom tenders, endorsed "Cottages, Naburn," must be delivered not later than June 6.

June 6. Carlisle.—*Extension of buildings at the Central Electric Lighting Station, situate in James Street.* Persons desirous of tendering for the above works may inspect the drawings, specification, stipulations and conditions of contract, and obtain a copy of the bill of quantities and form of tender, at the office of Henry C. Marks, M.I.C.E., city engineer and surveyor, 36, Fisher Street, Carlisle, on deposit of 10s. 6d. Sealed tenders, endorsed "Tender for Electric Lighting Station," to be delivered at the City Engineer's Office, not later than 10 a.m. on June 6.

June 7. Stockport.—*Erection of the first portion of an observation block at Dialstone Lane Hospital.* The plans, drawings and general conditions may be inspected at the office of the architect, G. H. Brady, Borough Chambers, St. Petersgate, Stockport, and specifications and quantities will be supplied by him on payment of a deposit of £1 is. Sealed tenders, endorsed "Hospital Building Contract," addressed to the Chairman of the Health Committee, must be delivered to Robert Hyde, town clerk, Town Clerk's Office, Stockport, not later than noon on June 7. Fair wages clause.

June 7. Huddersfield.—*Supplying and fixing of skylights at the Artizans' Dwellings, for the Corporation.* Plans, specifications and general conditions may be seen, and bills of quantities and forms of tender obtained on application at the offices of the Borough Engineer, 1, Peel Street. Sealed tenders, endorsed "Tender for Skylights," signed in the handwriting of the tenderer or his agent, and addressed "Town Clerk, Town Hall, Huddersfield," must reach him not later than 10 a.m. on June 7.

June 8. Salcombe.—*Erecting two houses and three shops at Salcombe.* Drawings and specification can be seen on application to the "Times" Office, Salcombe, and tenders to be delivered to J. Wills, Bar Lodge, Salcombe, before noon on June 8.

June 8. Carlisle.—*Erection of a caretaker's cottage at the Meeting of the Old and New Waters, Gelsdale, for the Corporation.* Persons desirous of tendering for the above works may inspect the drawings, specification, stipulations and conditions of contract, and obtain a copy of the bill of quantities and form of tender at the office of Henry C. Marks, M.I.C.E., city engineer and surveyor, 36, Fisher Street, Carlisle, on deposit of 10s. 6d. Sealed tenders, endorsed "Tender for Cottage," to be delivered at the City Engineer's Office, not later than 10 a.m. on June 8.

June 9. St. Austell.—*Erection of a new gallery and certain other alterations at the Bible Christian Chapel, Bugle.* Plans and specifications may be seen and full particulars obtained at the office of the architect, F. C. Jury, No. 1, Alma Villas, Tregonissey Road, St. Austell. Tenders, sealed and endorsed "Bugle Chapel Tenders," must be sent to the Rev. W. H. Webber, Fernleigh, Bodmin, on or before June 9.

June 9. Leith.—*Terazzo work in connection with the erection of the new porch at Leith, for the Parish Council.* Contractors desirous to tender for the work will, on application to James Miles, clerk, 45, Charlotte Street, Leith, be supplied with specification and schedule of quantities, on payment of a deposit of £1 is., not later than June 2. No offer will be considered unless accompanied by the priced schedule, which must be delivered by June 9.

June 9. Morriston.—*"Libanus" new schoolroom.* Persons desirous of tendering for the above can inspect plans and specifications and obtain all particulars at the offices of Charles S. Thomas, architect and surveyor, Wind Street, Swansea. Tenders to be sent to George Rowe, Llanllienwen, Morriston, on or before June 9, endorsed "Tender for Libanus Schoolroom."

June 11. Swindon.—*Erection of laundry buildings and disinfecting house, for the Guardians.* Plans and specifications can be seen and particulars obtained on application at the office of the architect, R. J. Beswick, M.S.A., 10, Victoria Road, Swindon. Sealed and endorsed tenders to be delivered to John P. Kirby, clerk to the Guardians, Union Offices, Victoria Road, Swindon, on or before 5 p.m. on June 11.

June 11. Burley.—*Additions to the council school.* Persons desirous of tendering may see plans, specification and conditions of contract, and obtain bills of quantities, at the office of W. J. Taylor, county surveyor, The Castle, Winchester, between 9 a.m. and 5 p.m. (Saturdays 9 a.m. to 1 p.m.) on payment of £2 2s. Deposits must be made by cheque payable to Hants County Council and crossed Bank of England, or particulars will not be sent. Tenders, endorsed "Proposed Additions, Burley Council School," are to be delivered to H. Barber, clerk of the County Council, The Castle, Winchester, on or before 10 a.m. on June 11.

June 12. Bristol.—*Additions and alterations to the Club-house, Failand, for the Bristol and Clifton Golf Club.* Persons desirous of tendering can see the plans and specifications, and obtain bills of quantities, at the offices of Bernard & Son, 41, St. Stephen's Chambers, Baldwin Street, Bristol, on and after May 31. Tenders to be delivered by June 12.

June 12. Rugby.—*Proposed new wing to the hospital of St. Cross.* Bills of quantities and forms of tender may be obtained at the offices of the architect, J. D. Hoper, Albert Street, Rugby, on payment of £1 is. Fair wages clause. Sealed tenders, on forms supplied, must be delivered before noon on June 12, addressed to the Chairman of Children's Wards' Committee, and endorsed "Tender for New Wing."

June 13. Portland.—*Erection of the Wesleyan Methodist Church, Easton Square.* Bills of quantities may be obtained from the architects, La Trobe & Weston, F.R.I.B.A., 44, Corn Street, Bristol, or from R. Pearce, 3, Easton Square, Portland, on payment of a deposit of a £2 2s. Tenders to be sent in before June 13.

June 13. London, S.W.—*Erection of two additional ward blocks, recreation hall, and staff quarters at Tooting Bee Asylum, Tooting, S.W., for the Metropolitan*

Asylums Board, in accordance with drawings and specification prepared by W. T. Hatch, M.I.C.E., M.I.M.E., engineer-in-chief. Drawings, specification, bills of quantities, conditions of contract and form of tender may be inspected at the Office of the Board, Embankment, E.C., and bills of quantities and form of tender obtained upon payment of a deposit of £5. Tenders, addressed as noted on the form, must be delivered at the Office of the Board not later than 10 a.m. on June 13.

June 14. Penrith.—*Heightening the Presbyterian Church of England, Penrith, lengthening nave and erecting chancel, organ-chamber, minister's and deacons' vestries, class-rooms, &c.* Plans can be inspected and all information obtained at the office of Stephen Shaw, F.R.I.B.A., architect, Kendal, where quantities and specifications can be had till June 14, upon which day endorsed tenders are to be sent in. A duplicate set of plans can be seen in the Church Hall from 10 till 4.

June 15. Grimsby.—*Erection of proposed new hall, Garibaldi Street, for the Ancient Order of Foresters.* Plans, specifications, form of tender, and all particulars may be obtained at the office of the architect, Herbert Heap, A.M.I.C.E., architect and surveyor, Osborne Chambers, between 9 a.m. and 6 p.m. Sealed tenders, which must be endorsed "Tender for Proposed New Hall," and addressed to T. Steel, secty., must be delivered at No. 164, Oxford Street, Grimsby, not later than June 15.

June 15. London, N.—*Erection of a bandstand, composed of brick, wood and tiles, at Finsbury Park, N., for the London County Council.* Persons desirous to submit tenders may inspect the drawings and obtain the specifications, bills of quantities, form of tender and other particulars at the Architect's Department, 15, Pall Mall East, S.W., upon payment to the cashier of the Council, at the County Hall, Spring Gardens, S.W., of the sum of 10s. Tenders must be upon the official forms, and the printed instructions contained therein must be strictly complied with. Fair wages clause. Each tender is to be delivered at the County Hall, in a sealed cover, addressed to the Clerk of the London County Council, Spring Gardens, S.W., and marked "Tender for Bandstand at Finsbury Park." No tender will be received after 10 a.m. on June 15.

June 16. Knock.—*Erection of one detached and two semi-detached villas at Kensington Road, Knock.* Plans and specifications may be had at the office of Thomas Houston, architect and civil engineer, Kingscourt, Wellington Place, Belfast, with whom sealed and endorsed tenders are to be lodged by June 16.

June 16. Manchester.—*Extension of the existing laboratory at the Davey Hulme Sewage Works, near Urmston.* Drawings may be inspected and bills of quantities and tender forms may be obtained on application to the Secretary of the Rivers Department, Town Hall, Manchester. Tenders must be enclosed in the official envelope provided expressly for the purpose (otherwise the tender will not be considered), and delivered at the above office not later than 10 a.m. on June 16.

June 18. Talgarth.—*Repair of Llandefalle Church, Talgarth.* Plans and specifications can be seen at Llandefalle Rectory on and after June 4. Tenders to be sent to Ernest V. Collier, M.S.A., architect, 4, Quay Street, Carmarthen, not later than June 18.

June 20. Cheltenham.—*Erection of new school buildings, to accommodate 1,100 children for the Gloucester Road district of Cheltenham, in accordance with plans, specifications and conditions of contract to be seen at the offices of Chatters & Smithson, architects, 17, Regent Street, Cheltenham.* Early application is requested for bills of quantities, which will be supplied by the architects upon receipt of a deposit of £2 2s. Tenders, sealed and endorsed, must be delivered to William Preston, secty., Education Offices, Rodney Road, Cheltenham, by noon on June 20.

June 21. Fishguard.—*Building a new chapel.* Plans and specification may be seen on application to the architects, George Morgan & Sons, F.R.I.B.A., A.R.I.B.A., 24, King Street, Carmarthen, or to D. B. Phillips, surveyor, High Street, Fishguard, to whom sealed tenders are to be sent on or before June 21.

June 23. Brentwood.—*Remodelling one of the blocks of buildings at the Essex County Asylum so as to form attendants' quarters.* Drawings and specifications and form of contract may be inspected at the office of the county architect, Frank Whitmore, Duke Street, Chelmsford, between 10 a.m. and 4 p.m. on any working day except Saturdays. Persons desirous of tendering must send in their names and addresses to the County Architect not later than noon on June 4. Sealed tenders, on the form supplied, endorsed "Tender for Female Attendants' Block," should be delivered to W. P. Gepp, clerk to the Committee of Visitors, Chelmsford, not later than 10 a.m. on June 23.

No date. Basford.—*Erection of new stores in Egypt Road, for the Cinderhill Co-operative Society, Ltd.* Bill of quantities may be obtained from the architect, W. V. Betts, 630, Radford Road, Old Basford, on payment of £2 2s. Fair wages clause.

No date. Bispham.—*Stabling, fencing, &c., to residence, Bispham.* For quantities apply F. T. Waddington, architect, 10, Birley Street, Blackpool.

No date. Brandon.—*Erection of a dwelling-house and business premises in High Street, Brandon.* For particulars, plans and specification apply Thomas A. Green, Brandon Printing Works.

No date. Maidstone.—*Construction of the Empire Theatre.* Address, in the first instance, for plans, specifications, &c., The United States Commercial Agency, 199, Piccadilly, W.

No date. Haslingden.—*Erection of a new weaving shed, for the Grane Manufacturing Co., Ltd.* Firms desirous of tendering for any portion of this work must communicate with P. Pickup, mill architect, Mercantile Chambers, St. James Street, Burnley, from whom full particulars can be obtained.

No date. Beccles.—*Erection of a new hotel, with stabling, coach-house and cartshed, at Ingate Street, Beccles, for the Colchester Brewing Co.* Contractors desirous to tender are requested to send at once their names and addresses to Arthur Fells, F.S.I., architect, Beccles. Bills of quantities and form of tender will then be forwarded in due course.

No date. Omagh.—*Building a new clubhouse in Omagh, according to the plans prepared by Godfrey W. Ferguson, architect, of Avenue Chambers, Belfast, at whose office the plans can be seen.* Copies of quantities may be had from S. C. Hunter, quantity surveyor, Scottish Provident Buildings, Belfast. Further particulars can be obtained from Colonel H. Irvine, Estate Office, Omagh.

No date. Foyers.—*Mason, carpenter, plumber, slater, plasterer and painter and glazier works, &c., of Nursing Home, proposed to be erected at Foyers, for the British Aluminium Co., Ltd.* Contractors desirous of tendering are requested to lodge their names with Cameron & Burnett, architects and ordained surveyors, Academy Buildings, Inverness, from whom schedules of quantities and all other information are to be obtained.

ENGINEERING.

May 31. Halifax.—*Erection of No. 2 Cornish boilers and fittings thereto; also sundry works in connection with same, at the Workhouse, Gibbet Lane, Halifax.* Plans may be seen and specifications obtained at the office of W. Clement Williams, architect, 29, Southgate, Halifax, until May 31, on which last-named date sealed tenders are to be delivered at the offices of the clerk to the Guardians, Arthur T. Longbotham, solicitor, Carlton Street, Halifax, not later than 10 a.m., endorsed "Tender for Boilers, Halifax Workhouse."

June 1. Southport.—*Making, delivering, and erecting a wood and iron pumping engine-shed required for the proposed Bickerstaffe pumping-station, situate at or near Royal Oak, in the parish of Bickerstaffe, about 2½ miles by road from the Town Green and Aughton Station of the Lancashire and Yorkshire Railway for the Southport, Birkdale and West Lancashire Water Board.* A copy of the specification and form of tender may be obtained on payment of £1 is., at the office of the Board or at the offices of H. Rofe & Son, civil engineers, 8, Victoria Street, Westminster, and Oxford Chambers, Victoria Square, Leeds. Photo prints of the plan can also be obtained by application to 8, Victoria Street, Westminster, on payment of 1s. 6d. Tenders, endorsed "Tender for Pumping Engine-shed," to be sent in to Alleyne Browne, clerk to the Board, 11, St. George's Place, Lord Street, Southport, on or before June 1.

June 1. Colwyn.—*Supply, delivery and erection of the following for the U.D.C.:—Section 1, water-tube boiler, &c.; section 2, steam dynamo; section 3, condensing plant.* Copies of general conditions, specifications and forms of tender, can be obtained from the electrical engineer, A. R. Tudman, on payment of £1 is. per section. Sealed tenders to be sent to the clerk, James Amphlett, Council Offices, Colwyn Bay, not later than noon on June 1.

June 4. Pontypridd.—*Supply, delivery and putting to work of about 2,640 yds. of 3 triple concentric feeder and pilot cables, paper insulation.* Specification, general conditions and form of tender may be obtained on application to J. E. Teasdale, A.M.I.E.E., electrical and tramways engineer, upon payment of a deposit of £2 2s. Tenders on the prescribed form, sealed and endorsed "Tender for Cables," must be received by J. Colenso Jones, clerk to the Council, District Council Offices, Pontypridd, on or before June 4.

June 5. Portsmouth.—*Supply of sixteen double decked tramway electric motor cars.* The specification, with general conditions and form of tender, can be obtained on application to the Town Clerk, Town Hall, Portsmouth, but a deposit of £5 5s. must accompany the application. Drawings may be seen at the office of V. G. Lironi, M.I.M.E., A.M.I.E.E., tramways engineer, Vivash Road, Fratton, Portsmouth. Fair wages clause. Tenders must be delivered to the Town Clerk, Town Hall, Portsmouth, not later than 10 a.m. on June 5.

June 7. Handsworth.—*Construction of a storage tank in Hennebique's patent ferro-concrete at the Public Baths, Grove Lane, Handsworth.* Plan, specification and conditions of contract and form of tender may be obtained at the offices of the architect, J. P. Osborne, F.R.I.B.A., of 95, Colmore Row, Birmingham, on depositing with him the sum of £2 2s. Fair wages clause. Tenders, on the prescribed form, enclosed in sealed envelopes, endorsed "Tender for Storage Tank," must be delivered to H. Ward, clerk, the Council House, Handsworth, near Birmingham, not later than noon on June 7.

June 8. Melrose.—*Repair of two bridges on the main road, near Buckholm, the work consisting of stripping arches and haunches, covering them with coat of concrete 2 ins. thick, building tie walls, &c., for the Roxburghshire County Council.* Plans and specifications may be seen and schedules obtained at the office of C. Monteath, C.E., Newton St. Boswells. Sealed tenders, marked "Tender for Buckholm Bridges Repairs," to be lodged with A. Murison Small, W.S., district clerk, Melrose, not later June 8.

June 9. Paignton.—*Supply, delivery and laying of a 7 in. cast-iron water-main, together with the requisite meter, sluice valves, air valves, washouts and other fittings, meter-house and store, and other works in connection with Paignton water supply in the parishes of Marldon and Paignton, from Churchcombe Cross to the Paignton and Churston Ferrers parish boundary.* Drawings may be seen and copies of specification, bills of quantities, and forms of tender obtained at the office of the engineer, Frederick W. Vanstone, Palace Chambers, Paignton, on payment of £5. Sealed tenders, upon the form provided, endorsed "Paignton Waterworks," are to be addressed to James R. Mill, clerk to the Council, Town Hall, Paignton, on or before June 9.

(Continued on p. 296.)

Notes and News.

The Hearts of Oak Benefit Society's new offices in the Euston Road were opened by the King on Saturday last. The building, which has cost £100,000, was designed by Messrs. Essex, Nicol & Goodman, the contractor being Mr. C. Gray Hill, of Coventry.

Mr. Max Clarke, F.R.I.B.A., of 4, Queen Square, Bloomsbury, W.C., has taken into partnership Mr. Matt Garbutt, F.R.I.B.A., A.M.I.C.E., at present the architect to the Metropolitan Railway Co. The name of the firm will be Max Clarke & Garbutt, to whom all professional communications should be addressed after June 1st.

Subsidence at Bilston.—The opening-up of the streets at Bilston, Staffs, in connection with a sewage-disposal system, has led to the discovery that only a short distance below the roadways the ground is honey-combed with mines dug long ago. The excavations pass the town hall, and subsidences have occurred causing cracks in the building, which has had to be propped up with timber while some scheme is devised whereby to prevent a disaster.

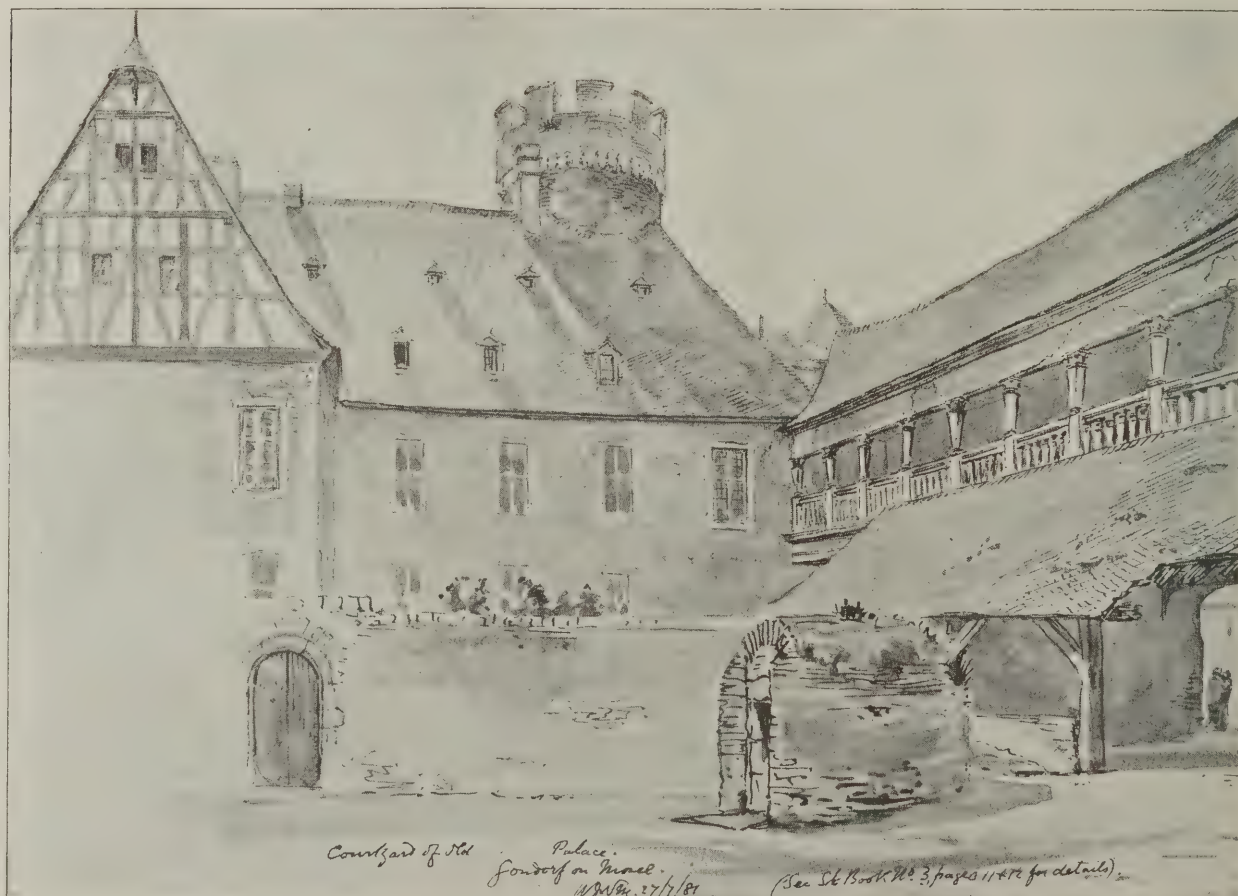
A new High-Level Bridge at Newcastle-on-Tyne is being erected for the North-Eastern Railway Co. by the Cleveland Bridge & Engineering Co., of Darlington. With its approaches the bridge will have cost about £500,000. It is built of steel, of lattice girder type, and carries four sets of lines. Caissons were sunk to a depth about 70ft. below high-water spring-tides, and on these the piers were built. There are five latticed steel girders in each span, each weighing 300 tons. They are 27ft. in depth, with a width of 4ft. 6ins. The width of the bridge is 48ft. 6ins. from parapet to parapet.

A new Edinburgh Theatre.—The King's Theatre, Edinburgh, is approaching completion. The building, which is Free Classic in character, was designed by Messrs. Swanston & Davidson, of Kirkcaldy and Coatbridge. The material used is from the Closeburn quarries, Dumfriesshire, and the builders are Messrs. W. S. Cruikshank & Sons, Edinburgh. The length of the building is 200ft., and the general width 92ft., the auditorium being 72ft. from side to side. The building has been designed to accommodate 3,000 persons. The house is divided into the usual sections, but the boxes provide an entirely new feature. They are fitted with swing partitions, capable of being divided up into one or three, and providing in this way eighteen in all.

New Stands at Newmarket have been erected of brick and iron, with a thatched roof 130ft. long and 39ft. wide. They will accommodate 1,500 people on seventeen flights of steps, the highest of which is 15ft. 3ins. above ground-level. Underneath the stand are a refreshment bar 44ft. by 23ft., press-room, telegraph-room and receiving office, and ladies' cloak-room. In the rear of the building are a public luncheon-room 44ft. by 21ft., kitchens, stores, doctors' room, cloakroom, lavatories, &c. The stand in "silver ring" will accommodate 1,000 people. It is 82ft. 6ins. long and 37ft. 6ins. wide. Under the stand is a refreshment bar 80ft. by 22ft. 6ins. The stands are built at an angle of 19½ degs. to the course. They have been jointly designed by Mr. C. W. Marriott and Messrs. Barber & Sons, surveyors, of London, the builder being Mr. H. Holland, of Newmarket. The ironwork was done by Messrs. Homan & Rogers; the concrete steps by Messrs. Royal, of Cambridge; and the thatching by Mr. W. Oldfield, of Whittlesea.

AN OPEN-AIR SWIMMING BATH.

AN open-air swimming-bath has been provided at Chelmsford by the municipality. It is in the Greyhound Mead, and is said to be the largest of its kind in the kingdom. The bath is 150ft. by 100ft., with a water area of 15,000 sq. ft. It has a depth of water varying from 3ft. to 6ft. and holds 400,000 gallons. It is constructed partly above and partly below ground, and is surrounded by two paved footpaths in the form of terraces, which were formed with the excavation material from the centre of the bath. The bottom of the bath is lined with 1,490 sq. yds. of concrete flags, grouted together, and the sides formed with cement-concrete. A sand filter 50ft. by 20ft. is provided at the end through which the water passes before entering the bath. On the top terrace, which extends the full length of the site, 2ft. 6ins. above the water level, thirty-six dressing-boxes are provided. There is also an open dressing shed, about 80ft. long, for free bathers, with caretaker's shed and cycle store adjoining. The terrace is planted with shrubs and flowers. The site is surrounded by a corrugated iron fence 7ft. 6ins. high. An island built of timber is fixed in the centre, and arranged in the form of step platforms for diving purposes. In addition there are two spring diving boards. The water is supplied from the River Chelmer, and is conveyed from the dam at Springfield Mill by a 12in. pipe main to the sand filter. After being filtered it runs direct into the bath at the deep end, but it can, if required, be diverted before reaching the filter, and made to enter the bath at the shallow end. The work has been carried out under the entire supervision of the borough engineer and surveyor, Mr. Cuthbert Brown. The total cost has been under £700.



DRAWN BY: WALTER MILLARD.

TESTING VARNISHES.**Old and New Methods.**

THE subject of testing oil varnishes has hitherto been dealt with to only a very limited extent; therefore any information which will help to determine their intrinsic value, either as decorative agents or as protective materials, must necessarily be of great value to the user or purchaser of large quantities of varnish.

There are many persons who regard chemical analysis with feelings of greater veneration than the occasion always warrants, but, says Mr. J. Cruickshank Smith, B.Sc., F.C.S., M.S.C.I., writing in the "Decorator," there is an objection to chemical tests as the sole means of determining the value of oil varnishes which may be pointed out. It is that varnish manufacturing practice is not nowadays the simple guileless process that it was in the "good old days." Unhappily science holds out helping hands both to the just and to the unjust, and it sometimes happens that the latter class is less disinclined to refuse the proffered aid than the former. Processes are in existence for hardening resin and for enabling compounds of lime and other metallic bases with resin to be incorporated in oil varnishes. Such methods may be bad or they may not, but they increase enormously the difficulty of the consultant who is compelled with only chemical data at his disposal to form an opinion on the suitability or durability of a particular varnish for a particular piece of work.

Therefore it is that the tendency appears to work along the lines of physical tests. These tests may be roughly divided into two groups. The first group includes those tests of a strictly scientific nature, such as the determination of specific gravity, viscosity, optical activity, solubility, constants and the like.

The second group of physical tests includes those which are based on the theory that the capacity of varnish films to resist the influences they may be expected to undergo in actual use over a considerable period of time can be estimated with fair accuracy by exposing the films to severe but rigidly controlled conditions for a short period of time and then examining their physical condition.

Natural Drying Test.

This test is undertaken in order to determine the rate of drying of the varnish under normal conditions, and the condition of the varnish film after drying. Drying under normal conditions with free access of air is by no means easy to ensure, as a very little consideration will show.

Numerous experiments have proved conclusively that the question of humidity of the atmosphere is at the root of many of the abnormalities met with in the drying of varnish. The presence of moisture in the air at once interferes both with the evaporation of the turpentine and the oxidation of the oil. All free-drying tests should therefore be conducted in a dry airy chamber which can be maintained at a temperature of 55 degs. to 60 degs. Fahr.

The varnish is poured on a clean dry glass slip 2 ins. by 6 ins. in sufficient quantity to cover three-quarters of the slip. The various slips are then stood vertically upright for five minutes in order that excess of varnish may drain off. Any drops that adhere to the edges of the glass are carefully removed with blotting paper, and the slips are then placed on racks inclined at an angle of 10 degs. The temperature is maintained at as near 60 degs. Fahr. as possible, not more than 2 degs. variation either way being permissible, for twenty-four hours. No ordinary oak, copal or carriage varnish of good quality will be sensibly tacky to the touch after twelve to fourteen hours. Twelve hours may be regarded as a satisfactory limit for

house-painters' varnishes and eighteen hours for coach-painters' and extra pale varnishes. After drying, the film should be transparent, free from specks, lustrous, and hard yet elastic.

Forced Drying Test.

The question has been discussed whether in the case of oil varnishes the results of a short exposure under extreme conditions can be utilized in order to give information as to the probable results of prolonged exposure under ordinary conditions. The results of many experiments appear to indicate that in a general way they can.

The test samples are poured on glass slips, as in the natural drying test, and the slips are drained vertically for five minutes. They are then heated for twenty-four hours in a hot-air chamber through which circulates a steady stream of pure dry air maintained at 100 degs. C. In applying the test it is well to always employ two or three control samples. Thus one ought to conduct four similar experiments with the same varnish. If three concordant results are obtained they may be taken as correct, but if less than 75 per cent. of the samples emerge successfully from the ordeal, either they must be condemned or the test must be repeated. The result that one looks for in a varnish film after exposure to this test is a hard dry transparent tough film, free from cracks, and coming off in ribbon-like scales when scraped with a steel point. Powdering under the tool is a fault, so is too soft a result. Fissures and cracks should be carefully looked for not only with the naked eye but under a hand lens or low-power microscope.

Air-drying Test with Pigment.

When the surface of a varnish that is exposed to the air is increased relatively to the total bulk of varnish there is a considerable increase in the rate of drying. This fact may be made use of in testing varnishes. Equal parts by weight of varnish and oxide of zinc are rapidly incorporated by means of a palette knife on a glass slab, and the mixture is painted on a glass slip and exposed to the air under fair drying conditions. Exterior and "elastic" varnishes ought not under these conditions to take more than nine hours to dry. Interior and "hard drying" varnishes may take rather less, but not less than six hours.

The foregoing test may also be made use of to determine the intrinsic colouring power of the varnish. The exterior characteristics of varnish which should be carefully examined in comparing different samples are brightness and colour. Brightness practically means freedom from suspended matter, and special attention should be directed to this point, as it has been found that the durability of varnish films is greatly interfered with if suspended matter is present even in small traces.

Colour should be compared against some definite standard. Varnishes may be conveniently divided into four groups as regards colour, viz., extra pale, pale, medium and dark. The palest white copals and French oil varnishes would fall under the first heading. Pale varnishes would include the pale copals, pale carriage varnishes, maple and pale oil paper varnishes. "Medium" would include most of the standard copal oaks, darker carriage varnishes, &c. "Dark" would be reserved for a still darker group.

Colour Comparison.

In comparing the colour of varnishes use may again be made of dried films on glass slips, the actual determination of the colour in comparison with a standard taking place at least forty-eight hours after the varnish ceases to be tacky. It will be found that many varnishes which are pale in themselves, and when first spread out in a thin film, darken materially in drying.

There is still a whole series of combined chemical and physical tests which cannot be neglected if a really reliable opinion is to be

formed as to the composition of the varnish. Thus the presence of rosin, unsaponifiable matter, metallic compounds and other foreign substances have sometimes to be looked for, particularly if the varnish is bought to specification.

Correspondence.**The Architectural Draughtsman.**

To the Editor of THE BUILDERS' JOURNAL.

SIR,—I think the Chard draughtsman might see something to be admired in the action of the pupil who, after having placed trees in the wrong field, seriously drew an arrow from the middle of them into the right field, as set forth in your columns. The plan is a means to an end, and no doubt the method here adopted served the desired end! Why do more? The position of draughtsmen is now very precarious, and the dearth of employment is due to the fact that plans are rather overdrawn. The time spent upon a sheet of paper is too great, with the result that many architects—younger men more especially—are mere paper architects or paper draughtsmen. A man who spends so much energy on paper is useless as a practical building man.—Yours truly, PRACTICE.

Law Cases.

Builders and the Water Board.—On May 21st at the North London Police Court Mr. Fordham delivered a considered judgment in the case of *Paine v. The Metropolitan Water Board*. The summons was taken out under section 43 of the Water Works Clauses Act, 1847, for neglecting to supply water by measure to the complainant at his request. The facts, as stated in the "Times," were these:—The complainant, a builder, is the owner and occupier of a piece of land adjoining Moresby Road, Upper Clapton, where a water main had been laid by the East London Water Co. The land until recently was appurtenant to a house, and was used as a garden, upon part of which the complainant had built about ten houses, but further building operations were in progress. The complainant, being desirous of having a supply of water by measure for use in his building operations, requested the defendants, as successors to the water company, to supply him with water by measure, and he tendered with that request the sum of £2 2s. in payment for 25,000 gallons of water at the rate of 9d. per 1,000 gallons—the maximum price—and for what he considered would cover the cost of laying the supply from the street in which the main was laid to his land. The defendants neglected to supply water by measure to the complainant, who asserted that they were in consequence liable to penalties for such neglect. The defence put forward by counsel for the Board was that they were not bound to supply water by measure because the complainant was not the owner or occupier of any "premises" situate in or adjoining any street in which any main or service pipe of the defendants was laid, and so could not claim a supply of water under section 79 of the East London Water Works Act, 1853, and it was argued that the spot at which the supply was to be used could not be described as "premises" within the meaning of the section, and therefore that the complainant was not entitled to a supply of water by measure, but must take water for his building operations by agreement with the defendants under section 78 of the Act. The magistrate held that the complainant was entitled to the supply he claimed under section 79, since he was the owner and occupier of "premises" in the commonest use of the word. He fined the Water Board 40s., and ordered them to pay 10 guineas costs.

(Continued on p. 293.)

June 9. Hull.—Construction of a covered concrete service reservoir at Keldgate, to hold about ten million gallons. Drawings may be seen and copy of specification and form of tender may be obtained at the City Water and Gas Engineer's Office on payment of £2. Cheques and postal orders to be made payable to T. G. Milner, city treasurer, Hull. Tenders, endorsed "Tender for Covered Service Reservoir," are to be addressed to the Chairman of the Water and Gas Committee, and delivered at the Town Clerk's Office not later than June 9.

June 11. Portsmouth.—Supply of tramway feeder cables. The specification, with general conditions and form of tender, can be obtained on application to the Town Clerk, Town Hall, Portsmouth, but a deposit of £5 5s. must accompany the application. Drawings may be seen at the office of V. G. Lironi, M.I.M.E., A.M.I.E.E., tramways engineer, Vivash Road, Fratton, Portsmouth. Fair wages clause. Tenders must be delivered to the Town Clerk, Town Hall, Portsmouth, not later than 10 a.m. on June 5.

June 11. London, N.—Supply and erection of one cold water-softening plant, capacity about 2,000 gallons per hour continuous working. Plans may be seen, and conditions, specification and form of tender obtained at the office of the electrical engineer to the Council, E. Calvert, Electricity Works, Squires Lane, Finchley, N. A Winchester quart sample of the water will be sent to firms desiring to tender on receipt of 5s. (not returnable) to cover expenses of sending same. Sealed tenders, marked on the outside "Electricity Works, Section XXVII," to reach E. H. Lister, clerk to the Council, Council Offices, Finchley, before 5 p.m. on June 11.

June 12. Nuneaton.—Supply, delivery and erection of one 200-hp. steam dynamo, for the U.D.C. Copies of the general conditions, specification and form of tender may be obtained on payment of £2 2s. Additional copies of the specification may be had on payment of 10s. per copy, which amount will not be returned. Sealed tenders, endorsed "Tender for Steam Dynamo," and addressed to the Chairman of the Electric Light Committee, Electricity Works, Nuneaton, will be received up to noon on June 12.

June 12. Kempton.—Water supply. A.—The provision, delivery, laying, and jointing in the rural district of Bedford of about 550 tons of cast-iron pipes (principally 7 in. and 8 in.) and for the construction of certain ancillary works; and B.—The supply, delivery, laying and jointing of about 5 miles 325 yds. of 7 in., 6 in., 4 in. and 3 in. cast-iron socket pipes, with appendages, including all necessary sluice and air valves, hydrants, and other works, for the water-supply of the urban district of Kempston. Plans, specifications and conditions may be seen as regards contract A at the offices of the engineer, George F. Deacon, 16, Great George Street, Westminster, S.W., and as regards contract B at the offices of the engineers, Beesley, Son & Nichols, 11, Victoria Street, Westminster, from whom respectively specifications, bills of quantities and forms of tender can be obtained on payment of £5 for each contract. Sealed tenders, endorsed "Tender for Waterworks Contract A" (or B), to be addressed to William Payne, clerk of the Council, and sent to the U.D.C. Offices, Bedford Road, New Town, Kempston, at or before noon on June 12.

June 14. Battle.—Supply, delivery and laying of about 1,620 yds. of 4 in. water main, and the necessary valves in connection with the same, from the town of Battle to the Battle Union Workhouse. Sealed tenders, endorsed "Tender for Mains, &c.," and addressed to Charles Sheppard, clerk to the U.D.C., Battle, to be sent in not later than noon on June 14. Plan, specification, and general conditions may be inspected at the offices of the Clerk, at Battle.

June 18. Middlezoy.—Supplying and fixing a steel flooring bridge at Greylake's Fosse, Middlezoy, Somerset, in part substitution for the existing bridge and for other alterations of the approach thereto, for the Kings Sedgemoor and Cary Valley District Drainage Board. Specifications and plans may be seen and blue prints of the plans and tender forms may be obtained on application to Walter J. R. Poole, clerk, 9, Dampier Street, Bridgwater, to whom sealed tenders must be sent not later than noon on June 18, marked "Tenders for Greylake's Fosse Bridge."

June 18. Banbridge.—Construction and erection of a steel umbrella roof, 35 ft. by 22 ft., at Banbridge, for the Great Northern Railway Co. (Ireland). Parties wishing to tender may see the drawing and specification at the office of W. H. Mills, engineer-in-chief, Amiens Street, Dublin; or copies of them at the Offices of the District Engineer, Belfast; and can obtain at the said offices lithographed copies of the drawing, specification and form of tender on payment of 10s. (not returnable) per set. Tenders, made out on the forms supplied by the Company, and endorsed "Tender for Umbrella Roof," should be delivered to T. Morrison, secy., Secretary's Office, Amiens Street Terminus, Dublin, not later than 10 a.m. on June 18.

June 30. Leicester.—Construction and erection of a steel bridge over the River Trent, together with the cast-iron cylinders and all dredging, excavating, bricklaying, and masons' work in the abutments and hauling path belonging thereto, in connection with Section No. 2 of the main for bringing the Derwent supply to Leicester. The bridge will be in one span of the bowstring type, supported on four cast-iron cylinders, and having a clear opening of about 220 ft. between the cylinders and a width between the centres of the main arches of 10 ft., and is estimated to weigh about 393 tons, including the cast-iron and steel work in the cylinders and hauling path. The drawings may be inspected at the offices of the engineers, Everard, Son & Pick, 6, Millstone Lane, Leicester, and conditions of contract, specification, quantities and form of tender obtained from them upon payment of £5. Sealed tenders, upon the form supplied, addressed to the Chairman of the Water Committee, Town Hall, Leicester, are to be delivered not later than 10 a.m. on June 30, endorsed "Tender for Trent Bridge—Derwent Main."

June 30. Mansfield.—Sinking a well near Waterfield Farm, in the parish of Clipstone, 5½ miles from Mansfield. The well is to be 150 ft. deep and 12 ft. in

diameter in the new red sandstone, and is to be lined in part with cast-iron tubing. The contractor is to provide temporary pumping plant, capable of raising 70,000 gallons of water per hour 150 ft. high, or 1,680,000 gallons in 24 hours. In addition to the well-sinking, the contract will also include driving certain headings and putting down boreholes. The drawings and specification may be seen at the office of the engineers, G. & F. W. Hodson, Bank Chambers, Loughborough, and copy of the schedule of quantities and form of tender obtained on deposit of a cheque for £3 5s. Sealed tenders, endorsed "Tender for Clipstone Well," to be sent to J. Harrop White, town clerk, Mansfield, not later than June 30.

June 30. Cairo.—Supplies and works in connection with the water supply of Menouf, including engine-houses, pumping machinery, motors, conduits, and steel water tower and reservoir. Specifications, plans, &c., may be seen at the Ministry of the Interior, Cairo. Tenders will be received by the European Secretary of the Ministry of the Interior, Cairo, up to June 30.

Oct. 1. Bangkok (Siam).—Construction of a bridge, 260 metres long, over the Meram River. For particulars apply to the Siamese State Railways, Bangkok. Tenders to be in by Oct. 1.

IRON AND STEEL.

May 31. Carlaway.—Supply and erection of an iron wire fence round the New Cemetery at Dalmore Carlaway, parish of Uig. Specifications may be seen with A. Macdonald, C.E., Municipal Buildings, Stornoway, or with Rev. D. Macleod, The Manse, Carlaway, with whom sealed tenders are to be lodged not later than May 31.

June 6. London, E.C.—Supply and delivery of cast-iron chairs, for the East Indian Railway Co., as per specifications to be seen at the Company's offices. Tenders are to be sent to C. W. Young, secy., Nicholas Lane, E.C., not later than noon on June 6, marked "Tender for Cast-iron Chairs." For each specification a fee of £1 1s. is charged, which cannot under any circumstances be returned.

June 9. Guildford.—Supplying and erecting about 700 ft. lineal of barbed wire fencing with iron standards on the Poyle Charity estate. All particulars can be obtained from William G. Lower, surveyor to the Estate Trustees, 12A, High Street, Guildford, to whom tenders are to be sent on or before June 9.

PAINTING AND PLUMBING.

May 31. Leeds and Stourton.—Painting, &c., the locomotive buildings at Leeds and Stourton, for the Midland Railway. Specification may be seen, quantities and particulars obtained on application at the Engineer's Office, Derby. Sealed tenders to be forwarded by post to the Secretary of the Way and Works Committee, Midland Railway, Derby, not later than 9 a.m. on May 31.

May 31. Poole.—Painting and repairs to lodge and chapels at the Poole Cemetery. The specifications can be seen at the Borough Offices, and also at the Cemetery Lodge. Tenders to be delivered at the Borough Surveyor's Office by 10 a.m. on May 31.

May 31. London.—Cleaning and painting station buildings, &c., at Highgate Road, Junction Road, Upper Holloway, Hornsey Road, Crouch Hill, Blackhorse Road, Walthamstow, Leyton, Leytonstone and Wanstead Park, for the Midland Railway. Specifications may be seen, quantities and particulars obtained, on application at the Engineer's Office, Derby. Sealed tenders to be forwarded by post to the Secretary of the Way and Works Committee, Midland Railway, Derby, not later than 9 a.m. on May 31.

June 1. London, E.—Whitewashing and repainting of the outside walls and ceilings of Nurses' Home, Raine Street, Old Gravel Lane, for the Guardians. Specification and form of tender may be obtained from R. Murray Lochner, clerk, Clerk's Office, Raine Street Old Gravel Lane, E., to whom sealed tenders must be delivered not later than 2 p.m. on June 1.

June 6. Cranbrook.—Repairing and painting the outside wood and ironwork of the workhouse. Specification of the work may be seen on application to H. Fincham, the master. Tenders must be sent to T. H. Crampton, clerk, Cranbrook, on or before June 6.

June 6. Mold.—Painting Bethesda C.M. Chapel, Mold. Specification to be obtained from Jesse Roberts, Bryn Hilyn, Mold, to whom tenders are to be sent not later than 6 p.m. on June 6.

June 6. Hunslet.—Painting and colour-washing required at the Children's Homes at Rothwell Haigh. Forms of tender, with a specification of the work, may be obtained on application to Fred W. Mee, clerk to the Guardians, Union Offices, Hunslet, Leeds, to whom sealed tenders, endorsed "Painting," must be delivered by 10 a.m. on June 6.

June 7. Carmarthen.—Painting, colouring, &c., at the following Council schools:—Llwynhendy, Philadelphia, St. Clears, Trelech Village, Bettws, Capel Isaac, Velinwm, Five Roads. Specifications may be seen and full particulars obtained on application at the above-mentioned schools, or at the office of W. D. Jenkins, M.S.A., M.R.S.I., county education architect, Shire Hall, Carmarthen. Tenders, sealed and endorsed, to be delivered to J. W. Nicholas, County Education Offices, Carmarthen, on or before June 7.

June 8. London.—General repairs and painting to the artisans' dwellings, Stoney Lane, for the Corporation, according to specification and other particulars to be seen at the office of the Engineer to the Corporation, Guildhall, where forms of tender may be obtained. Tenders, on the before-mentioned forms, must be addressed, Town Clerk, Public Health Department, Guildhall, E.C., endorsed "Artisans' Dwellings," and delivered at the office of the Hallkeeper, Guildhall, between 1 and 2 p.m. on June 8.

June 9. Aberdeen.—Lime-washing of courts and closes, of which a specification and list lie at the Sanitary Inspector's Office, 41½, Union Street, and which will be given out for perusal of intending offerors on application any day at 10 a.m. Tenders addressed to the Council, and endorsed "Tender for Lime-washing," to be lodged

with the Sanitary Inspector on or before June 9. The work to be commenced on June 18, and finished by July 21.

June 9. Nottingham.—Outside painting proposed to be done to the gates and the lodges at the Waverley Street and Sherwood Street entrances to the Arboretum. Specifications, forms of tender, and bills of quantities may be obtained on application at the City Architect's Office on payment of a deposit of 10s. Tenders, endorsed "Tender for Painting Lodges, &c., Arboretum," to be addressed to Samuel G. Johnson, town clerk, and delivered at his office, the Guildhall, before noon on June 9. Fair wages clause.

June 12. London, W.—Cleaning, painting and distemping, &c., the interior of the infirmary buildings at Isleworth, for the Guardians of Brentford Union, in accordance with specification, which can be seen at the Union Offices, Isleworth, W. Tenders, endorsed "Painting Infirmary," must be delivered to William Stephens, clerk to the Guardians, not later than 4 p.m. on June 12.

June 12. London, W.C.—Preparing and painting the whole of the external ironwork, and for cleaning out and repairing all the gutters and stack pipes at the Receiving House for Children and Nurses' Home in Broad Street, W.C., for the Guardians of St. Giles-in-the-Fields, and St. George, Bloomsbury, in accordance with a specification to be obtained at the Guardians' Offices, 57, Broad Street, Bloomsbury, W.C., where tenders must be delivered on or before 10 a.m. on June 12.

June 23. Dunham.—Painting Dunham Bridge above and below the roadway, together with the gate-house and outbuildings, gates, fences, &c. The specification may be seen and a form of tender obtained upon application to Scorer and Gamble, Bank Street Chambers, Lincoln, to whom tenders are to be delivered not later than 10 a.m. on June 23.

Note. Tockholes.—Painting outside woodwork of Tockholes Congregational chapel, school, and cottages. Apply to the Pastor, Silk Hall, Tockholes.

ROADS AND CARTAGE.

May 31. Aberdeen.—Macadamizing Canal Place, and laying cement-concrete foot-pavements at Great Western Road, Burnett Place, Belgrave Terrace and Grampian Road. Plans may be seen and specifications, schedules of quantities, and forms of tender obtained on application to W. Dyack, burgh surveyor, Burgh Surveyor's Office, 41½, Union Street, Aberdeen, with whom sealed tenders, properly endorsed, must be lodged before noon on May 31.

June 4. East Stonehouse.—Supply of broken and other stone to be delivered at the yard in Stonehouse Pool, for the U.D.C. Specification and form of tender may be obtained at the Surveyor's Office. Sealed tenders, endorsed "Road Materials," together with samples, must be delivered free of charge at the Surveyor's Office, Town Hall, East Stonehouse, Devon, on or before June 4.

June 4. Winteringham Haven.—Supply of 600 tons of granite, broken to 1½ in. or 1½ in. gauge, delivered at Winteringham Haven, either into carts or shored as may be required, for the U.D.C.; also for the supply of 200 tons of well-broken slag and 50 tons of screenings; and for carting the granite and slag and screenings, either by carts or traction, and deposited in such quantities and where as the Surveyor shall direct. Tenders and samples to be sent to A. Spencer, clerk of the Council, Council Offices, Queen Street, not later than June 4.

June 5. Tynemouth.—Excavating, laying a rubble foundation and paving with Whinstone chips in Huddleston Street, Simpson Street and Back Lane, Cullercoats. Plans and specification may be seen at the office of John F. Smillie, borough surveyor, to whom sealed and endorsed tenders are to be sent not later than noon on June 5.

June 5. Woodford Green.—Providing and laying concrete slabs in footway in Snakes Lane, Woodford Green, for the U.D.C. Estimated quantity, 1,100 yds. super. Plan and specification may be seen and bills of quantities and form of tender obtained from the Surveyor upon deposit of £1 1s. Fair wages clause. Sealed tenders, endorsed "Tender for Footway Paving, Snakes Lane," to be sent in on the official forms to the Council Offices, Woodford Green, not later than June 5.

June 5. London, N.—Supply and delivery of about 8,365 sup. yds. of zin. artificial slab paving, and for supplying and laying about 2,359 sup. yds. of similar paving, for the U.D.C. of Finchley. The Council also invite tenders for supplying and laying such paving of a similar description as may be required by them during the period ending Mar. 31, 1907. Specification and conditions of contract, together with form of tender, may be obtained on application to the Engineer and Surveyor. Sealed tenders, endorsed "Paving," must be addressed and delivered to E. H. Lister, clerk, Council Offices, Church End, Finchley, N., not later than June 5.

June 7. Edinburgh.—Work on the carriageways of Chalmers Street and Saxe Coburg Place (paving with concrete); Torphichen Street (paving with hard whin setts). Schedules of quantities may be obtained on application to the City Road Surveyor, City Chambers. Tenders, sealed within the official envelopes supplied, must be lodged with Thomas Hunter, W.S., town clerk, City Chambers, by 10 a.m. on June 7.

June 8. Hebburn.—Excavating and laying tar macadam roadways, whinstone chip paving, cement foot-paths, channels, &c., in Hedgely Road, Whickham Road, Aln Street, Alwin Street, Station Road, Back Station and Aln Street, Back Alwin and Aln Street, North Back Whickham Road, South Back Hedgely Road, Hebburn, for the U.D.C. Plans, specifications and quantities may be seen at the office of H. Paterson, surveyor, Council Offices, Argyle Street, Hebburn. Tenders, endorsed "Roadmaking," to be addressed to the Chairman of the Building and Sanitary Committee, Hebburn, and forwarded not later than June 8.

June 11. Ilford.—Levelling, metalling, channelling, kerbing, paving and making good Durban, Colenso, Wellesley, Lockwood and Dunedin Roads, Kimberley Avenue, and right-of-way leading from Lockwood Road to

Sunnyside Road, for the U.D.C. Plans and specifications may be seen and form of tender obtained on application to H. Shaw, A.M.I.C.E., surveyor to the Council, at the Town Hall, Ilford, during the usual office hours, on payment of a deposit of £2 2s. Sealed tenders, endorsed "Tender for Private Street Works," are to be delivered to John W. Benton, clerk to the Council, Town Hall, Ilford, on or before June 11.

June 12. Beckenham.—*Tar macadamising of Bromley Road (part of) and Minor Road, for the U.D.C.* The tar macadam is to be 4½ in. thick in two layers, the approximate areas of the two roads being as follows:—Bromley Road, 4,000 sq. yds.; Minor Road, 2,800 sq. yds. Plans may be seen, and bills of quantities, specifications and forms of tender obtained on application to John A. Angell, surveyor, on the production of a receipt from the collector (who attends his office daily from 9 to 10 a.m. only, except on Tuesdays, when his hours are from 9 a.m. to 1 p.m.) for a deposit of £1. Fair wages clause. Tenders, duly sealed and endorsed "Tenders for Tar Macadam," to reach F. Stevens, clerk of the Council, not later than 4 p.m. on June 11.

June 13. Enfield.—*Making-up of the following private streets, for the U.D.C.:—Forest Road, Freezywater, Holmwood Road (part of), Freezywater.* Plans and specifications can be seen, and forms of tender and all information obtained, on application to Richard Collins, surveyor to the Council. Separate tenders for each road (on the forms supplied only) to be endorsed "Tender for —," and sent in to T. W. Scott, clerk, Public Offices, Enfield, not later than noon on June 13.

June 20. Watford.—*3,000 tons of granite (or such less quantity as the Council may require), machine broken, so as to pass in any direction through a 2 in. ring, also an alternative tender for similar granite broken so as to pass in any direction through a 1½ in. ring, delivered in quantities as required, at Watford or Bushey Stations, for the U.D.C.* A sample of granite is to accompany each tender, and the tender is to state the rate per ton of the material. No official tender form will be issued. Sealed tenders, addressed to the Clerk to the Council, and endorsed "Tenders for Granite," to be delivered at the offices of the Council not later than noon on June 20.

No date. Carden.—*Widening Hand Lane, Carden, for the Tarvin R.D.C.* Particulars can be obtained on application to H. Grant Bailey, clerk to the Council Crypt Chambers, Chester.

SANITARY.

June 4. Newport (Fife).—*Construction of a gin, fireclay and iron pipe outfall sewer at Scroggieside, Wormit, with manways and fittings, &c.* Plans may be seen and specifications, schedules of quantities, and forms of tender obtained from the Surveyor on depositing the sum of £1 1s. Tenders, endorsed "Sewers, Scroggieside," are to be lodged with D. A. Donald, C.E., burgh surveyor, Burgh Chambers, Blyth Hall Buildings, Newport, Fife, not later than 10 a.m. on June 4.

June 5. Yeovil.—*Construction of about 500 lin. yds. of 12 in. and 557 lin. yds. of gin, stoneware pipe sewers.* Specification and plans may be seen and forms of tender obtained at the office of A. Odly, borough surveyor, Municipal Offices, Yeovil, to whom sealed tenders must be delivered by noon on June 5, endorsed "Sewers," and addressed to the Chairman of the Sanitary Committee.

June 6. London, N.—*Construction of a 12 in. sewer of about 700 yds. in length, together with manholes and other incidental works, for the drainage of the White Hall Estate, for the Finchley U.D.C.* The proposed works are to be constructed in accordance with plans and drawings, which may be inspected at the offices of the engineer and surveyor to the Council. Copies of specification, schedule and form of tender may be obtained from the engineer on application, accompanied by a deposit of £2. Sealed tenders, endorsed "Works of Sewerage," and addressed to B. H. Lister, clerk to the Council, Council Offices, Church End, Finchley, N., to be sent in not later than June 6.

June 6. Watford.—*Construction of 400 lineal yds. of gin, stoneware pipe sewers and storm-water chain, with the necessary manholes, &c.* Persons desirous of contracting may see the drawings, form of contract, specifications, &c., at the Offices of the Council, 14, High Street, Watford. Sealed tenders, addressed to H. Moreton Turner, clerk, council offices, Watford, and endorsed "Tender for Sewerage," must be delivered under cover by June 6.

June 6. London, W.—*New relief effluent water sewer from southern works to River Thames, and manholes &c., in connection therewith, as under:—about 3,700 ft. of 24 in. pipe.* The drawings and specifications may be seen, and forms of tender, together with schedule of quantities and other particulars, obtained from C. Jones, M.I.C.E., borough engineer, Town Hall, Ealing, W., any day during office hours, upon payment of a deposit of £3 3s. Sealed tenders, in the envelope provided, endorsed "Tender for New Relief Effluent Water Sewer," must be delivered to George E. Brydges, town clerk, Town Clerk's Offices, Town Hall, Ealing, W., not later than the first post on June 6.

June 6. Watford.—*Erection of a three-stall urinal at the "Queen's Arms," Calton Lane, for the U.D.C.* Plans and specification and general conditions can be seen on application to D. Waterhouse, surveyor to the Council, 14, High Street, Watford. Sealed tenders, endorsed "Tender for Urinal," to be delivered to H. Morten Turner, clerk to the Council, 14, High Street, Watford, by noon on June 6.

June 7. Cheadle.—*Construction of about 400 lineal yds. of gin. and 377 lineal yds. 12 in. earthenware pipe sewers, with manholes, &c., at Grove Lane, Cheadle Hulme, for the R.D.C.* Plans and drawings may be seen, and copies of the specifications and bill of quantities obtained on application to E. Sykes, C.E., between 10 and 12 daily until the 31st May (Saturdays excepted), on deposit of £1 1s. Tenders, duly sealed, and endorsed "Tender for Sewers," may be addressed to Arthur Briggs, clerk to Cheadle and Gatley U.D.C., Council Offices, Cheadle, near Manchester, on or before June 7.

June 7. Blything.—*Drainage works for the Guardians.* Works required to be done in taking up the old drains, &c., and laying new system and other works in connection therewith at the Workhouse and Bulcamp, near Halesworth, according to plan and specification prepared by Henry T. Wright, M.S.A., architect and surveyor, Ipswich. Copies, plan and specifications may be seen at Clerk's Office, Bulcamp, any week-day except Saturdays between 10 and 4, and on Saturdays between 10 and 2. Tenders, sealed and endorsed "Tenders for Drainage," to be delivered at the Clerk's Office, Union Workhouse, Bulcamp, Halesworth, not later than 5 p.m. on June 7.

June 7. Blaydon.—*Scavenging, &c., for the U.D.C.* Removal and disposal of scuttle ashes, contents of ashpits, house refuse, &c., at Blackhall Mill and New Chopwell. Specifications, form of tender, and full particulars may be obtained from Robert Biggins, sanitary inspector, at the offices of the Council, Blaydon-on-Tyne, between 9 and 10 a.m. Sealed tenders, endorsed "Tenders for Scavenging Contract," are to be delivered to Henry Dalton, clerk, Blaydon-on-Tyne, on or before noon on June 7.

June 9. Bolton-le-Sands.—*Construction of a gin, iron and earthenware pipe sewer at Bolton-le-Sands, for the Lancaster R.D.C.* Plans and specification may be seen and forms of tender obtained on application to W. Dixon, surveyor, 5, Dalton Square, Lancaster. Tenders to be delivered to W. D. Ball, clerk to the Council, 5, Dalton Square, Lancaster, not later than 10 a.m. on June 9.

June 13. London, S.E.—*Construction of an underground convenience for women in Arnside Street, Walworth.* Plans may be seen, and specification, conditions, and forms of tender and further particulars obtained between 10 a.m. and 5 p.m. on application to A. Harrison, M.I.C.E., borough engineer, Town Hall, Walworth Road, upon payment of a deposit of £1 1s. Fair wages clause. Tenders, which must be on the prescribed form, sealed and endorsed "Tender for Construction of Underground Convenience," must be sent to J. A. Johnson, town clerk, Town Hall, Walworth Road, S.E., not later than noon on June 13.

June 15. Uckfield.—*Construction of the following works, for the R.D.C.* About 10 miles of stoneware and iron sewers, ranging from 8 ins. to 15 ins. in diameter, with the necessary manholes, flushing tanks, &c.; purification works, consisting of covered settling tanks, double contact bacteria beds, storm-water beds, &c., and other works, in accordance with the specification and plans prepared by John Taylor, Sons, and Santo Crimp, civil engineers. Copies of the specification and quantities, with forms of tender, may be obtained from and the drawings inspected at the offices of the Engineers, at Caxton House, Westminster, upon payment of £5 (cheque only). Tenders, endorsed "Crowborough Drainage—Contract No. 1," are to be delivered to Frederick Holman, clerk, 85, High Street, Lewes, on or before 10 a.m. on June 15.

June 19. London, E.—*Cleansing and whitewashing the latrines and urinals at the various schools, for the East Ham Borough Council, as described in the form of tender.*

Specification and form of tender may be obtained at the Education Office, East Ham. The work must be done during the summer vacation. Each contractor must deposit £5 with his tender. Fair wages clause. Tenders, on the printed form, must be endorsed "Tender for Cleansing and Whitewashing," and delivered to H. C. Padgett, secty., Education Office, East Ham, E., not later than 4 p.m. on June 19.

No date. Long Eaton.—*Forming, making, severing, herbing, channelling, &c., extensions of Breodon Street, Curzon Street, and Canal Street, on the estate of the Mutual Land Society according to the plans, specifications, and bills of quantities prepared for the above society by J. F. Dodd, surveyor, Long Eaton.* Contractors desirous of tendering are requested to make application to Herbert W. Sunman, secty., "Ellerslie," Cleveland Avenue, Long Eaton, for copies of the said bills of quantities. Such application to be accompanied by a deposit of the sum of £2 2s.

TIMBER.

June 7. Penrhiwceiber.—*Supply of the following timber for twelve months, for the Penrhykber Navigation Colliery Co. 1:—Pitch-pine deals, red pine (best quality), American birch boards and deals, poplar and elm combs, elm, G. & T. match and flooring boards.* Form of tender may be obtained on application to the Secretary. Tenders to be in by June 7.

MISCELLANEOUS.

May 31. London, E.C.—*Supply of the following stores, for the Great Indian Peninsula Railway Co.:—Platelayers' tools; loco. brass tubes; spring steel; brass sheets, copper pipes, &c.; brass hinges, bolts, &c.; paints, &c.; firebricks.* Specifications and forms of tender may be obtained at the office on payment of the fee for the specification, which payment will not be returned. Tenders must be delivered in sealed envelope, marked "Tender for Platelayers' Tools," or as the case may be, to J. I. Berry, secty., 48, Cophall Avenue, E.C., London, not later than 11 a.m. on May 31.

May 31. Llantrisant.—*Supply of seventy street lamp pillars and seventy glazed lanterns for public lighting purposes, for the Llantrisant and Llantwit Fardre R.D.C.* Quotations will only be received upon the Council's forms, which, together with the specifications and conditions, may be obtained from the Surveyor. Persons desirous of quoting must deposit the sum of £1. Quotations must be delivered to the Council's clerk, W. Spickett, solicitor, Pontypridd, before 10 a.m. on May 31.

June 1. Middlesbrough.—*Supply of stores for the ensuing twelve months:—Bolts and nuts, brushes, galvanized buckets, copper and brass wire and 1 tubs, roofing felts, files, glass, grates, shovels, iron bars, steel sheets, lead nails, oils, paints, screws, wrought-iron steam tubes and fittings, varnish, &c.* Specification and form of tender may be had on application to R. V. Thompson, junr., Stores Superintendent, 42, Commercial Street, Middlesbrough. Sealed tenders, endorsed "Tenders for Stores," to be forwarded to Alfred Sockett, town clerk, Municipal Buildings, Middlesbrough, not later than June 1.

June 2. Hull.—*Supply of all or any of the materials and labour required by the water and gas committee in the execution of ordinary work during the six months from July 1 to Dec. 31, 1905, under the following trades:—Joiner, bricklayer, ironmonger, plumber, engineer and ironfounder.* Forms of tender for the last three appointments may be obtained on application to F. J. Bancroft, Water and Gas Engineer, Alfred Gelder Street, Hull. For the other appointments only ordinary letters of application are required. Applications, endorsed for each trade, to be addressed to the Chairman of the Water and Gas Committee, and delivered at the Town Clerk's Office before noon on June 2.

June 11. Dundee.—*Supply of the following materials for the Water Commissioners:—Contract No. 1: 4,000 tons of cast-iron pipes, 27 ins. diameter. Contract No. 2: Excavator work, &c., in removing over 3,000 tons of existing pipes, and for carting, laying and jointing new mains. Contract No. 3: Disposal of over 3,000 tons of old pipes and broken metal zincs, to 1½ ins. thick.* Drawings, specifications and schedules may be obtained from the Engineer's Office on receipt of £5 ss. No tender will be recognized unless it is made on the prescribed form, properly filled up in every respect. Sealed tenders, properly endorsed for each contract, must be received at the office of W. H. Blyth Martin, town clerk of the city of Dundee and Clerk of the Commissioners, before June 11.

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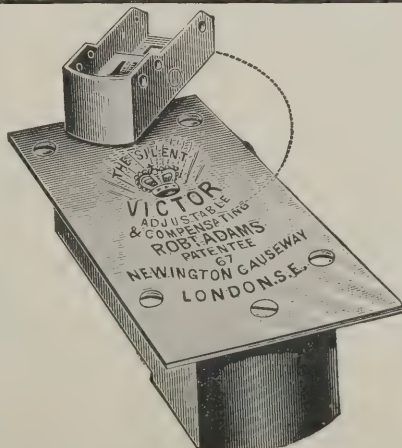
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Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Ad.—Adjudication.]

DURING THE WEEK ending May 25th twenty-seven failures in the building and timber trades in England and Wales were gazetted.

S. L. GRIST, builder, Enfield. Deficiency £1,715.
T. S. FRANCE, painter and decorator, Northwich. R.O. May 19th.

T. RHODES, joiner and builder, Macclesfield. P.E., Macclesfield Town Hall, June 28th, at 10.30.

G. HOLME & F. GRAY, builders and contractors, Burbage. R.O. May 16th.

J. H. WATSON, painter, Willington. P.E., Durham C.C., June 12th, at 10.40.

CUNNINGHAM & Co., contractors, Fleet. P.E., Guildford Town Hall, June 12th, at 1.

C. F. COOK, builder, Catford. P.E., Greenwich C.C., June 12th, at 1.

HUNTABLE & Co., builders and contractors, Harrow and Twickenham. R.O. May 10th.

J. GALLANT, carpenter and builder, Great Yarmouth. R.O. May 18th.

J. WHITE, builder and contractor, Eastbourne. R.O. May 18

G. CLACY, carpenter and builder, Reading. Liabilities £202; assets £111.

J. W. VAUGHAN, builder, Colwyn. Liabilities £2,166; deficiency £378.

SHAWCROSS & ORR, painters and plumbers, Ashton. Deficiency £90.

J. E. HODSON, builder and contractor, Rainford. First meeting, O.R.'s, Liverpool, May 30th, at 12. P.E., Liverpool C.C., June 18th, at 11.

J. LOCKHART, painter and decorator, Grantham. First meeting, O.R.'s, Nottingham, May 30th, at 11. P.E., Nottingham C.C., June 1st, at 10.30.

MADLEY & PERRY, builders, Pergam. First meeting, 135, High Street, Merthyr Tydfil, May 30th, at 12. P.E., Tredegar C.C., June 15th, at 10.45.

S. PINNEGAR, plumber and house decorator, Wotton-under-Edge. First meeting, O.R.'s, Gloucester, May 30th, at 11. P.E., Shirehall, Gloucester, June 19th, at 12.

H. FOSTER, plumber and painter, Clayton. First meeting, O.R.'s, Manchester, May 30th, at 4. P.E., Ashton-under-Lyne Town Hall, June 21st, at 12.

C. GUYAN, builder and contractor, Bristol. First meeting, O.R.'s, Bristol, May 30th, at 11.45. P.E., Bristol Guildhall, June 29th, at 12.

Coming Events.

Wednesday, May 30.

ROYAL INSTITUTE OF PUBLIC HEALTH.—The Harben lectures at 5 p.m.

Thursday, May 31.

WORSHIPFUL COMPANY OF CARPENTERS.—Mr. S. Barter on "Setting-out, Preparing and Fixing Staircases and Handrails," at 7.30.

Friday, June 1.

INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.—Meeting at Scarborough. Mr. Harry W. Smith, A.M.I.C.E., on "Municipal Work in Scarborough."

Saturday, June 2.

INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.—Scarborough meeting continued.

Partnerships.

Dissolutions of Partnerships.

[The date when the partnership was dissolved is given in parenthesis where known.]

G. DOWNS & F. J. DOWNS, builders and contractors, Bristol. (May 1.) Debts by F. J. Downs, who continues.

J. HENDERSON & J. HALL, architects and surveyors, Sunderland. (May 4.) Debts by J. Hall, who continues.

A. SMITH & W. BONNALL, builders and joiners, Derby. (Feb. 3.) Debts by A. Smith, who continues.

J. W. COOPER & R. H. EDWARDS, builders and contractors, Moss Side, Manchester. (Oct. 28, 1905.) Debts by R. H. Edwards.

W. H. DAVIES & T. E. DAVIES, asphalter and contractors, Manchester. (Feb. 6.) By death of T. E. Davies. Debts by W. H. Davies, who continues.

J. EDMONDSON, S. W. CORRIN, J. CLEGG & E. BANKS, builders, Barrow-in-Furness. (Dec. 31.) Debts by S. W. Corrin, J. Clegg & E. Banks.

G. HUMPHREYS & G. W. HUMPHREYS, builders and contractors, Bristol. (Mar. 25.) Debts by G. W. Humphreys, who continues.

E. H. LAWFORD & C. E. GIBBINGS, builders and decorators, Regent's Park. (Mar. 31.) Debts by C. E. Gibbings.

E. E. SCRIVENER, A. SCRIVENER & E. D. M. SCRIVENER, architects and surveyors, Hanley. (Jan. 1.) Debts by E. E. & A. Scrivener.

J. STURDY & MARGARET AGNES WARD, builders and contractors, Middlesbrough. (May 1.) Debts by M. A. Ward, who continues in her own name.

N. GRAINGER & S. H. PHILLIPS, plumbers, painters and paperhangers, Netherton, Dudley. (April 30.) Each partner continues at Netherton on his own separate account.

E. H. BOURCHIER, J. W. S. BURMESTER & F. GALS-WORTHY, architects and surveyors, Westminster. (Feb. 28.) Debts by E. H. Bouchier & J. W. S. Burmester, who continue.

New Companies.

A. W. BLACKLER & SONS, to acquire the business of marble workers and merchants carried on by T. A. Blackler at St. Marychurch, Torquay, as A. W. Blackler & Son Capital: £15,000.

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May 30th, 1906.

CONTRACTORS' SUPPLEMENT (MONTHLY).

FIFTY YEARS' PROGRESS IN THE CARPENTER'S AND JOINER'S WORKSHOP.

The Man assisted by Hand Tools and the Man assisted by Machine Tools.

By G. Macfarlane (of Manchester).

President, National Federation of Building Trade Employers of Great Britain and Ireland.

THE purpose of this article is to show the remarkable improvement that has taken place in the conditions of manufacture in joinery work for new buildings during the last fifty or sixty years.

Strictly speaking, as we now use and understand the name in this country the "carpenter" does the heavy framing and outside construction in woodwork, whilst the "joiner" is in the workshop and prepares the lighter and finer class of woodwork required in buildings. In the United States the term carpenter is commonly understood to include that of joiner. In ancient times the name "carpenter" was the comprehensive name for all woodworkers. "Jesus of Nazareth was a common working carpenter till he was thirty years of age."

Specialization.

It is only in modern times, since all kinds of work has become more or less specialized, that the above-mentioned distinction has been made. Even fifty years ago the same individual was generally called a "carpenter and joiner," as he then did both classes of work. Now, however, we have, and have had for a number of years, at least in shops of any size, what is known as "inside" or "bench hands" and "outside hands," a distinct class of workmen although paid at the same rate of wage. As a rule the bench hands are the superior craftsmen, and good workmen retain their situations without much risk if work is anything like plentiful. A good bench hand is always worth his money, and he can generally get it.

The part that modern woodworking machinery has played in lessening muscular labour has principally affected the bench hand and only to a lesser extent the outside hand. But both have gained in increased wages and in shorter working hours; both these advantages became economically obtainable through the introduction and development of labour-saving machines.

Conditions in 1854.

I cannot do better than describe the condition of things as they existed in 1854 in the shop where I went to serve my apprenticeship in a large-sized city in the North of Scotland. This shop was one of the four largest in the town and turned out work equal to any of the other three. None of these shops had machinery of any kind—not even a circular saw. There was, however, a public sawmill in the town with two circular saws, a large-sized log frame for upright saws, and a planing machine for floor-boards that had just been put down. To this mill the trade went to get their sawing done.

Pit sawing was then the general method of cutting up timber from the log into boards. To be a "top sawyer" in those

days was to be a man of importance. Pit sawing was, however, hard heavy work, and to earn good wages the sawyers had to keep close at it, as the payment was as a rule by measure. Although a slow process compared with modern methods, the old-fashioned saw pit died hard. It struggled on for years after the introduction of the upright saw-frame; in the opinion of many there was less waste in the saw-cut than by machinery. But the machine at last defeated the man, as it always does, and the saw pit is now practically extinct in this country.

Cutting up by hand.

Having no power upon the shop premises, all the cutting up had to be done by hand saws in the yard. This was done up to the thickness of 3in. planks. A "rip saw" was an essential tool for each workman to have in those days. I do not know if there are any made now. I have not seen a workman with one in his possession for at least a quarter of a century.

When a number of sashes and frames had to be made the journeyman who had the job, after setting out his staffs and getting the sizes and quantity of stuff that he required written down upon a board, would go downstairs with his board to the yard foreman, who would seek it out for him to rip up. He would most likely, if the job was a large one, have the assistance of the foreman and two apprentices. It was often enough two or three days' continuous ripping, and a heavy and tiresome job. The important point in the hand ripping was to keep straight to the marked line and keep the saw perfectly perpendicular. I can well remember how easy it was to get off the line and to let the saw get off the square, and how difficult it was afterwards to get it straight and back to the upright position. There was in that experience a pretty simile for the moralist. These were troubles that are now practically unknown either to the workmen or apprentices of the present day. Doors and all work of a similar character had all to be cut up by hand in the same way. If you kept steadily at it it brought the sweat out of you, and before 6 p.m. came your back ached.

Dressed up by hand.

After getting all his stuff cut out, the journeyman carried it with the assistance of the apprentice upstairs to the back end of his bench. Then all had to be dressed up by hand, taking the rough face off with the jack plane and finishing with the trying plane, carefully choosing the best face and edge, and after being made exactly square marking the face and edge with a distinctive pencil mark, then gauging each piece of stuff to a uniform width and thickness. To the man who had to do all this planing up it was no light job. In fact, the physical effort of so much planing told so upon most workmen that you could generally tell a joiner when you saw him on the street, as his left shoulder was considerably higher than his right one. This was brought about by the heavy task of planing, the right arm and right side of the body having to bear the heavy strain of bench-work. In time the exertion pulled the body down towards the

work, and as years went on, except in cases of exceptional physical strength, the tendency to stoop became very marked, and round shoulders were the usual thing amongst old joiners. I do not mean to infer that joiners, from the changed conditions of their work, are now entirely free from this physical danger, but it is now minimized most considerably.

Mortising and Tenoning.

When the stuff was all dressed up, after being set out the mortising and tenoning began—the moulding and rebating, in the case of sashes—and in the case of doors the grooving for panels in addition. All the tenoning had to be done by hand, using the rip saw for the cheeks and the tenon saw for the shoulders. In the case of doors the heaviest part of the work was the lock and bottom rails. A device sometimes used to give assistance to the workman's right arm was to fix a small hand vice to the point of the saw, and an apprentice took hold of it and pulled the saw as the man shoved it, working together as if the saw had a handle at each end. A common type of door at this period was the "ogee-moulded" moulded upon both sides on the solid. More pains and skill were required for this work than for planting the ordinary loose moulds round the panels. The sticking of the moulds and the mitering at the angles required not only muscle but skill and deftness of hand.

In making sashes, although the work was not so heavy as in making doors, when moulding and rebating had to be done by hand, it meant tired arms and aching back when evening came.

Mortising-machines

were introduced about this time and became a great boon to the trade. In the shop where I was apprenticed our mortise-machine was a wooden one, and instead of being worked by an iron arm like the modern type it was worked by an iron treadle. The pressure of the right foot upon the treadle sent the chisel into the mortise and a spring upon the release of the treadle lifted the chisel up out of the mortise. This machine was usually worked by apprentices, but was shirked by them as much as possible; it had a way, if your foot slipped off the treadle, of giving a nasty blow on the shin. Only one of the apprentices took kindly to the treadling business. I suppose he must have got into the knack of it. His name was Tom. Tom and a brother of his slept together. The brother told some of the other lads in the shop that he could not sleep at night from Tom kicking him. And when nudged by his brother and told to lie still, he would repeat in his sleep as he kept kicking away, "Doors, doors." Tom had to stand a lot of chaff when this tale got out, and when any of the other lads wanted to vex him he had but to pretend to be treadling with his foot and repeat "Doors, doors." That story is now over fifty years old, and most likely many of those who gave rise to it have gone "where the wicked cease from troubling and the weary are at rest."

Lads had longer hours and had to work harder then than now. Apprentices were also sooner thrown upon their own resources.

Suppose someone came into the shop and asked for a joiner to be sent to do some small repairs. A youth in his second or third year would probably be sent. He would have to scheme for himself how to do the work, measure for his material, go back to the shop and get what he required. It might be two or three days' work, or it might be more. But to come back and confess inability to carry out the work or to ask for superior assistance was a confession of weakness that very seldom happened. It would probably mean some other youth being sent, and the bare idea of another being sent to take on the job, and the chaff and humiliation that would follow, put even the most timid upon their mettle, stiffened their resolution to persevere, made them resourceful and self-reliant. They had, as the proverb puts it, "either to make a spoon or spoil the horn." There was less of that habit of leaning upon others than exists to-day. It is the boy that makes the man; and to train an apprentice to think for himself, to be able to reason out from first principles any sudden or unusual problem that arises, is to place a young man upon a higher plane during the rest of his life. To be compelled to do everything for yourself is to put manhood and self-reliance into a youth, and begets that self-confidence which is absolutely necessary for a thoroughly qualified and efficient tradesman.

Mouldings.

The facility with which modern machinery turns out all kinds of wood mouldings makes the present-day workmen quite unconscious of the task that was accomplished by their predecessors. In the case of large mouldings the work when executed by hand was very arduous. Sometimes two planes had to be made for the one mould, each plane being adapted to do its own part of the work. To sharpen and keep the irons true to the correct profile of mould was also a difficult job. In all mouldings some parts of the iron had to cut away timber during the whole process of "sticking," and other parts did not come into action until the mould was nearly finished. This caused unequal blunting of the iron and a continuous wearing out of shape. The workman had not only the heavy physical effort in pushing the plane along, but also of so sharpening and keeping his irons in order that all the mouldings would be made one shape. To get over this trouble in large moulds sometimes two separate irons were put into one plane; this made the sharpening and grinding easier, and in some cases a second plane was used for finishing after the first one had done all the shaping of the mould.

"Sticking" Moulds

was one of those jobs that most workmen were willing to be without, and although joiners looked rather askance at the introduction of machinery, and in some instances were so actively antagonistic that they broke it up, yet in spite of the foolish opposition which it had to face it came to stay, and is now recognized as having lightened the task and reduced the physical strain that former workmen had to bear.

The young men of the present day have no conception of the kind of work that was done by joiners in the no-machinery days. I have seen men when sticking large moulds stripped to the waist, with the sweat streaming from every pore. To assist the man, a lad pulled a light rope fastened through a hole in the nose of the plane as the man pushed it. I can remember a plane we used to call "Gallop Jack"; it rebated and chamfered sash stuff for factory windows at one operation. It had a handle like a jack plane. "Gallop Jack" had nearly always a hole in his nose through which a rope was fixed, so that there could be a push and a pull going on together. But, back-aching and arm-aching as this sort of work was, it

was not so dreadful as the horsework of planing and jointing, and sometimes grooving and tonguing, spruce floor-boards. This job for a week or two on end was about as hard a physical task as a man could endure. Few would stop at it that could get another job. There used to be a tale told of an old joiner who was dying; whilst on his death-bed he was asked if he freely forgave everybody who had in any way injured him, as he could not expect forgiveness himself if he did not forgive others. "Yes," he said, "I forgive everybody; but there are two things I will never forgive—spruce knots and old nails." Joiners will appreciate the old man's reservation.

The Cost of Tools.

Not only are joiners now spared the laborious task, and physical effort, that their fathers had to bear before the introduction of machinery, but their financial burden in the way of providing tools is also lightened. A joiner's complete chest of tools in the early half of last century cost a small fortune. It was no unusual thing for a man who was "tool proud"—and there were plenty of such men—to have over £50 worth of tools in his chest. In those days a man could not get a job in a first-class shop except he had a good chest of tools. To enumerate all the various planes, ploughs, badger planes, philisters, rebate planes, beads, snipes, sash planes, chisels, gouges, saws, bits, &c., &c., would make a catalogue of very great length, the whole kit making a heavy and expensive boxful. A Manchester builder of the old days made a practice of trying the weight of each newcomer's chest by lifting one end of it by the handle; to his mind the weight of a man's box determined the value of the man. A joiner who had got a job in this builder's shop and had but a poor box of tools, knowing the test that was usually made, took the precaution to put a screw through the bottom of his chest into the floor. When it came to be tried in the usual way it could not be lifted. So satisfied was this gentleman with the man that he immediately went to the shop foreman and told him that they had got a splendid man; he had got such a good chest of tools that he was not able to lift the end of it—an oft-repeated story, showing that to have a "chest" was in those days a *sine qua non* for a duly qualified workman.

A Scotch Story.

Another large employer of joiners in Manchester, a Scotsman, was said to have a leaning towards his own countrymen. When one of them came to ask for a job—so the story goes—the first question put was, "What kirk d'ye gang to?" The man generally knew his lesson, and replied "Grosvenor Square." "Where d'ye sit?" "Fornet the minister." "Oh, weel, bring your 'kist' in the mornin'," was the welcome injunction.

A joiner's "fitting" in those days was a heavy job. The large chest with rope handles at each end is, however, now obsolete. To have a well-made well-filled chest was at one time the ambition of every first-class workman. It was usually lined with polished baywood fitted with polished baywood trays, and the panelling on the inside of the lid was generally a masterpiece. Specimens are still to be seen in museums and such places, but none find their way now into modern workshops. Workmen are now able to carry all the tools they require in a "bass," and they can store away those not in immediate use in a drawer or shelf in the end of their bench.

"Racing."

From fifty to sixty years ago a pernicious practice existed in some workshops, called "racing" or "running." Masters at that time had pretty much their own way, and as usual they were not all model employers; some, indeed, were very hard taskmasters. It was the usual thing in this type of shop to "race" or "run" all new hands by way of testing their abilities. A few old hands

specially expert and speedy at certain kinds of work, such as door- or window-making, were told off to make the pace for the newcomer. The new man would get, say, eight or nine doors or windows to make. The old hand would also get the same number at the same time. Then the race commenced as to who should finish first. If the new man was behind he was told that he was not able to do the proper amount of work required and could not get full money. This racing became such a harass and injustice that workmen began to combine together, for self-protection, to put a stop to the harassing methods of unscrupulous employers. Trade-unions were formed in many instances to suppress local tyranny, and they have done much no doubt to equalize, and it might be said "standardize," their members, and have removed many of the genuine grievances of former times. Human nature is often very selfish, and ever ready to drive a hard bargain when there is the power to enforce it and when it can be done without risk. Now, however, we are told the "swing of the pendulum" is the other way, the policy of "ca' canny" having taken the place of the "running" policy, the slowest man now making the pace. Doubtless there is much exaggeration introduced in arguing against either of these extremes, both of which are equally harmful to workmen and employers. The only proper and satisfactory course under all industrial conditions is to avoid exacting more than is due and, on the other hand, in return to give that which is due, or, to put it in another way, "do unto others as ye would they should do unto you."

Changes due to Modern Machinery.

Modern woodworking machinery has entirely changed the methods of the joiner's workshop. All the laborious work is now taken from the man and given to the machine. The moulding plane is now obsolete. What used to be the thriving trade of joiners' tool-making has dwindled down to a very small business. One man is only employed where nine or ten men used to have plenty of work.

The question might well be asked, How has all this change affected the workman's earnings? Going back to 1854, the time of the Crimean War, in the shop where I was apprenticed a journeyman's wage was 18s. per week and the foreman 20s.; the hours were 56 per week—about 4d. an hour—we commenced work at 6 a.m. and worked until 9 a.m.; had an hour for breakfast, then from 10 a.m. worked until 1 p.m.; had an hour for dinner; and from 2 p.m. worked until 6 p.m. every day except Saturday, when work ceased at 1 p.m., the Saturday half-holiday having been introduced a year or two before this time in Scotland. Now the wages in that city are 8d. per hour and the time worked 51 hours per week.

Wages then and now.

Coming to England. In 1862 the wages in Bolton, Lancs, were 26s. per week, the hours from 6 a.m. to 5.30 p.m., allowing half an hour for breakfast, from 8 to 8.30, and an hour for dinner, from 12 to 1, and on Saturdays work ceased at 4 o'clock, making 58½ hours per week and the wage about 5½d. per hour. Now the wages are 9½d. per hour, the hours for nine months being 49½ and for the three winter months 47 hours, making £1 19s. 2d. in summer per week and £1 17s. 2½d. in winter, an increase of wage in forty-four years equal to £33 per annum, and a reduction of time equal to fifty days of 10 hours each per annum.

These two towns offer fair specimens of what has taken place in the larger towns during the last fifty years. In addition to the higher wages and shorter hours, the work is not nearly so heavy and arduous.

Although workmen are now working shorter hours and receiving higher wages, the prices that employers get for their work have varied very little. This means that the use of machinery has kept the price of the finished

article at a fairly level rate. It also shows that the workman has gained most from the introduction and the now general use of labour-saving machinery. He earns more wages, with shortened hours and with less muscular fatigue.

Prices then and now.

I have before me now an old set of quantities fully priced out. It shows the contract prices for work obtained in competition for the Birmingham and Gloucester Railway in the year 1839. The prices obtained at that time differ very little; if anything they are rather higher than the prices obtained in competition at present. The following are some of the prices for leading articles:—2in. sashes and frames, with oak sunk sills, at per foot, 1s. 6d.; 2in. circular-headed do., 2s. 3d. per ft.; 1½in. four-panel moulded and square doors, 10d. per ft.; 2in. four-panel doors, moulded both sides, 1s. 1d. per ft.; 2½in. six-panel doors, moulded both sides, 1s. 5d. per ft.: the prices for other kinds of work being in the same proportion. To those who know anything of present-day prices it will be seen that the prices ruling over sixty years ago for carpenter's and joiner's work were equal to what can be obtained in competition to-day, although workmen's wages have nearly doubled in that time.

From the above it will be seen that the economy that has accrued from the increased substitution of machine- for hand-labour has not gone into the employer's pocket, the keenness of present-day competition rendering it almost impossible for a contractor to obtain any advantage from the cheapening of work

by labour-saving machines. The gains have certainly not gone to the capitalist in anything like the proportion that they have gone into the pocket of the workman. Taking into consideration the amount of capital required to carry on a moderately large builder's establishment, the risks that have to be incurred from accidents to workmen, and other charges that have to be met, the profits upon work done at the present time are now lower than they have been for more than half a century.

The struggle for existence, notwithstanding all modern improvements, was never keener, and the efforts to get work to keep expensive machinery going have not been so continuously severe for years. As a gentleman in the trade remarked to me the other day, "It is not now a question of what profit I can get out of a job; it is how much shall I have to give away to get a job at all."

Who is Benefited by Machinery.

Mr. Giffen, in speaking some years ago before the Statistical Society upon the progress that had been made by this country, said: "It would not be far short of the mark to say that the whole of the great improvement of the last fifty years has gone to the masses. I think it must be perfectly clear to every unprejudiced mind that the progressive advances the country has made in mechanical contrivance to reduce the demand of muscular energy from the workman has not only eased his body but increased his wage, and made life upon the whole more agreeable and comfortable."

The social reforms that have been made throughout the country during the lifetime

and within the experience of many now living should be looked at and considered as largely brought about by the mechanical progress of this age, and the artizan class has gained more social advantages during the last half century than any other class of the community.

It has been my endeavour to show that labour-saving machinery, if judiciously used, is the workman's friend, both industrially and socially. It may for a time dislocate hand-made manufactures, but ultimately both the public and the workman especially will gain considerably from the economic saving that the machine produces.

One has only to imagine what the condition of things would be if we had to revert to the laborious methods that our fathers had to adopt to realize the vast changes that have been accomplished by the introduction of machinery during the last fifty or sixty years—changes that have entirely transformed the outlook of the worker, and that have made possible the greatly improved social position he now occupies.

THE PICCADILLY HOTEL.

THE photograph given below shows the present condition of work at the new Piccadilly Hotel. On comparing this with the view taken two months ago, and published in our last Contractors' Supplement (April 25th issue), it will be seen that very considerable advance has been made, more especially on the front to Regent Street Quadrant, where the brickwork has now reached the upper floors.



THE GREAT EXCAVATION FOR THE PICCADILLY HOTEL, LONDON. WILLIAM WOODWARD, F.R.I.B.A., AND WALTER EMDEN, JOINT ARCHITECTS.
Photograph taken on May 24th, 1906.

The Month's Trade.

(Reports by our Special Correspondents.)

THE STONE, GRANITE AND MARBLE TRADES.

These trades remain dull, although there is a slight seasonable improvement. The Board of Trade reports for April are as follows:—Employment in limestone quarries was good in Weardale. It continued fair in North Wales, and it was fairly good in South Durham. In the Plymouth district employment continued to improve, though it was still reported quiet. In the Bath stone quarries employment was slack, short time being worked, and it was bad in the Somerset blue-lias quarries.

As regards other stone, Chert quarrymen in Derbyshire were fully employed and overtime was general. Employment was fair in sandstone quarries in North Wales. It was also fair in the Sheffield district and in grindstone quarries in the Rotherham district and at Normanton. It was better than a month ago at Gateshead, where the weather caused less interruption. In grindstone and building stone quarries in the Rowsley district employment was quiet. It continued moderate in the Cleve Hill road-material quarries. It was moderate at Portland and slack in the Gloucestershire pennant stone quarries. In Forfarshire employment was bad, and short time was general.

Employment in the granite quarries remained dull on the whole in Aberdeenshire, and bad in Devonshire and Cornwall, where the improvement noted a month ago was not maintained and short time was general. Employment in Leicestershire was reported as slightly better than a month ago, when it was fairly good. It was fair in North Wales.

Employment with settmakers was fair in Aberdeenshire, Leicestershire, North Wales and at Edinburgh, and moderate in the Cleve Hill district and at Airdrie.

The returns for imports of stones, slabs and marble, rough, hewn and manufactured, for the month of April, 1906, as compared with the same month in 1904 and 1905, are as follows:—

Tons.			Value.		
1904.	1905.	1906.	1904.	1905.	1906.
99,299	97,768	109,274	£117,562	102,640	115,432

THE SLATE AND TILE TRADES.

There is still no improvement to report during the past month in the slate and tile trades. Enquiries have certainly been somewhat more numerous, but in most cases there have been no fresh contracts. Consequently there is little prospect of any improvement in demand till the end of the year. In London especially the demand has been greater from the suburban and outlying districts, which points to the fact that factories are being transferred to these localities as rapidly as possible, most of them being for well-known firms. This transference has become a somewhat serious matter to the larger merchants in London who hitherto found an advantage lay in the possession of riverside premises, but at the present time this is proving somewhat of a disadvantage inasmuch as these merchants are expected to take the bulk of their supplies from the larger quarries by sea. The result is that the cost of conveying them to the new areas is considerably in excess of the alternative way of having them despatched by rail to the most convenient station.

Westmorland Slates.

The demand for Westmorland slates has fallen off somewhat. Enquiries have been fewer and substitution of a cheaper slate more frequent, as it is almost invariably the roof which strikes attention when a reduction in cost of a building has to be made. The cases have been much more frequent in our

own personal knowledge recently where Westmorland slates (originally specified) have been cut out for purposes of economy. There seems to be a strong feeling among the quarries that merchants are mainly responsible for this state of affairs, but our opinion is that it is entirely due to the necessity for obtaining as much accommodation on a given site at the lowest possible cost.

Welsh Slates.

We understand there is a slight improvement in the demand for slates generally. This is not peculiar to any locality, but applies to England generally, with the exception of London, where the general opinion in the slate trade is that the demand is less than in any part of the British Isles. A difficulty has recently been experienced in obtaining even small quantities of some favorite sizes at more than one of the leading quarries. It may be interesting to learn that only some million and a half sterling has been paid for slates produced outside the British Isles during the last four years, although the import of French slates has increased by about 50 per cent. during the past seven years. As the shipments of slates from Portmadoc average about 120 million tons a year and the shipments from three other ports are about equal, giving an approximate output of about two million tons a year, the foreign incursion into the British market does not appear on the face of it to be very serious.

Tile Trade.

There does not appear to be any general improvement in the tile trade; though some of the larger works in the Broseley district report having received good orders. Judging from the majority of buildings which have been recently completed, or are in course of erection, the tile trade has a fair share, and among architects there is a decided feeling at present in favour of this roof covering. The demand for hand-made sand-faced tiles is apparently continuous. We hear from the Keymer Brick and Tile Co., Ltd., that their stock of sand-faced tiles is absolutely nil, and that they will be unable to execute fresh orders until the beginning of June. The demand for pressed tiles from this district shows an improvement upon that of the corresponding period of last year, and the makers are fortunate in having as many orders for these as they can comfortably execute. They, however, state that contract work in their district is improving both for tiles and red bricks.

Glazed Roof Tiles.

Apparently a demand for glazed tiles, ridges and finials, which are seen so frequently on the Continent, is springing up in this country. They are specified at the present time, we hear, for the new University Hotel (Messrs. Colclutt & Hamp, architects). These tiles are obtained from the Continent, and whilst some are burnt and subsequently glazed over, we hear of one manufacturer who makes these by covering the moulded clay with a chemical composition which gives the desired effect when burnt. These tiles are put only once through the kilns, the burning of the clay and of the glaze being effected simultaneously. As this tends to avoid any variation in expansion during the burning and on subsequent exposure on the roofs, the danger of the enamel cracking or flaking off, which might exist with glazed tiles which have undergone two separate firing processes, would appear to be non-existent. Messrs. Roberts, Ad'ard & Co., of Bermondsey, who have secured the sole agency for these tiles in this country, inform us that artistic finials in various stock patterns or to architects' own designs are made in the same manner by these tile-makers.

THE CLAYWORKING INDUSTRY.

The brick trade continues to be depressed. To the prevailing monotony there are few breaks, and signs of a general revival are as yet not visible. The Board of Trade labour returns for April state that employment on the whole in the brick and tile trades continued slack, but that it was good in the Oldham district and in Norfolk nad Cambridgeshire. It was fair in South Wales, in the Tees and Hartlepool district, and in the Plymouth district.

THE PORTLAND CEMENT TRADE.

"Subject to acceptance within seven days" is a new feature in quotations for Portland cement. This clause has been seen by the writer several times lately, and is naturally subject to comment, as the Portland cement market has been lifeless now for so many years, and the necessity for such a clause shows that the trade has evolved from its lethargic state into one of extreme activity. This change of affairs is not so much due to any exceptional activity in the home building trade, but is more due to the rapidly increasing popularity of concrete as a building material and the new and varied uses for which it is now employed in all branches of engineering. This fact, coupled with the large demands for cement in the leading export markets, including the Pacific Coast of America, has severely taxed the resources of the Thames and Medway manufacturers, who supply the foreign demands.

San Francisco's Demand.

The recent disaster at San Francisco will at some future date be the cause of a large demand for cement, but it is fairly safe to assume that it must be some months before cement will be required in this connection. The offices are only just being reopened, and the municipal authorities will be some little time before they decide on what lines the city will be rebuilt. Architects will prepare their plans, and tenders for construction will be invited, and even in such an energetic country as the United States these things cannot be done in a week. The steel and concrete system of construction appears to have resisted the ravages of the fire, as well as the shock of the earthquake, better than the ordinary brick buildings. This incident is naturally a good advertisement for the qualities of concrete, and is bound to result in this style of construction being employed not only in the rebuilding of the city but also in other parts of the world.

Improvement Abroad.

The improvement in the Portland cement industry is not confined to this country, for reports from the Continent show that the demand has of late been so considerable that winter stocks have already to a large extent been disposed of, and almost without exception German and Belgian manufacturers are quoting substantially higher prices for their various grades, good, bad and indifferent.

Regarding the statistical position of the trade as disclosed by the Board of Trade returns for the four months to April 30th last, it may be pointed out that while the exports for the period increased by no less than 56,267 tons, the imports decreased by 23,937 tons, representing a total tonnage in favour of the country's trade of 80,204 tons.

Prices have well maintained the recent advance mentioned in our last report, and quotations for future delivery show a still higher range.

Although manufacturers are securing better prices, it must not be assumed that this is all extra profit, as it must be borne in mind that the cost of fuel, labour and packages are all dearer than they were a year ago.

THE TIMBER TRADE.

The Board of Trade reports that employment in April with millsawyers and wood-cutting machinists on the whole was about the same as a month ago. Trade Unions with a membership of 4,839 reported 205 (or 4.2 per cent.) as unemployed at the end of April, compared with 4.5 per cent. at the end of March, and 5.6 per cent. at the end of April, 1905. Employment was good at Preston, Northampton, Coventry and Portsmouth; fair at Hartlepool, Sunderland, Huddersfield, Liverpool, Birmingham; improving at Nottingham, Oldham and Burnley; and bad at Hull, Leeds, Wolverhampton, Leicester and Dublin.

The Liverpool Market.

Business in builders' timber in the Liverpool market has been satisfactory, having regard to the season and to local and inland conditions. In the commoner woods, excepting pitch-pine, there has been no approach to a shortage, nor is there at present any indication that a shortage is likely to occur.

The custom of sending timber forward by "liners" has established new conditions of importation and supply, under which white-wood in some form is continually coming forward. The quantities are not so large, per lot, as one of the older timber ships would bring, but the lots are numerous, and have lately come to hand with such regularity that supplies can now be counted on, and business be safely done on the strength of stocks to arrive per liners.

With regard to business done, this, on the whole, has been satisfactory. Inland merchants and builders have lately taken more timber, and prices, as a whole, have been full and firm. The output from the yards continues, and the activity at the railway goods' stations shows that much of the timber is being sent inland. This can be explained by the continued activity in building factories or works in Lancashire and Cheshire.

Spruce and Pine Deals

from St. John, N.B., and Halifax, N.S., have arrived steadily by liners, and timber of this class has sold more freely. The stock in hand is somewhat larger than that held a year ago. The demand continues, with prices firm.

Canadian wood, received by direct shipments from Quebec, has come to hand only in small quantities. Sales have been fairly numerous, and business generally good.

Baltic Red Deals and Boards

have arrived very sparsely. The deliveries have been larger, so that the stock is slightly reduced, but is more than sufficient for the demand, taking recent sales as the basis.

Norway Flooring Boards

have come to hand more freely. The demand for boards of this class has been quiet, so that the stock has increased, and is well in advance of requirements. Prices have, however, hardened more in sympathy with the mood of the market generally.

American Whitewood

in planks and boards has come to hand freely. Wood of good quality has been more inquired for, and deliveries have been on a larger scale. The stock is adequate, and values are well maintained.

Pitch-pine

sawn and in planks has arrived in greater quantities. The deliveries of sawn have been on a larger scale, the demand for this wood having been active. Planks have been in less demand. Hewn has been in good demand. The prices of pitch pine continue full and steady.

Oak

of United States growth has been imported less freely, while the demand has been much more active. Planks have been imported much more freely. Sales have improved.

Birch

in logs has been received in larger quantities.

Sales have been on a larger scale, and the demand is maintained at date. The stock is, however, greater and prices are easier.

Ash

has been imported less freely, and has also been in less demand.

Elm

has been imported in moderate quantity and the consumption has been practically equal to the importation.

Teak

of East Indian growth has been received in logs and planks in less quantity. The demand has improved materially, so that the stock at date is lighter, with values practically unchanged.

Mahogany

of late has come to hand in small quantities and the recent auctions completely cleared the market of some kinds. Old stocks have been drawn upon. Even faulty wood offered as such has sold at full prices. The market continues in a healthy state, there being eager demand for attractive wood, at full prices, and a very fair demand for useful mahogany of almost any growth, at good prices.

A Proposed New Scale of Landing Charges

on deals has for some time past occupied the attention of the Committee of the Liverpool Timber Trade Association. A few days ago, the secretaries to the Association issued a circular on the subject of the proposed new charges to the members of the Association,

in which they stated that the executive committee unanimously resolved to recommend the members of the Association not to accept any bill of lading containing the new clause or to purchase on c.i.f. terms without the stipulation that the goods are landed free of charge to the buyer.

THE IRONMONGERY TRADE.

The Board of Trade returns for April show that employment at Wolverhampton continued bad in the lock and latch trade, and short time was general. It was good on cast-iron hollow-ware, and with makers of iron hurdles and fences. In the hollow-ware trade it continued good at Wigan, fair at Birmingham and slack at Sheffield, and was quiet at West Bromwich.

Employment in the stoves, grates, &c. trades continued fair at Falkirk and quiet at Rotherham. At Glasgow it was still quiet, at Bolton it had improved and was good, and at Leeds it was good.

With nut and bolt makers employment was fair at Winlaton, Birmingham and in South Wales, and had improved at Darlaston. With wire nail, shoe rivet and cut nail makers at Birmingham it was fair. At Black Heath it continued fair with nail workers and quiet with rivet makers.

Employment with wire workers continued good generally, and better than a year ago.

The returns for imports and exports for April 1906, are compared with the same month in 1904 and 1905, are as follows:—

	IMPORTS.			Tons.			Value.		
	1904.	1905.	1906.	1904.	1905.	1906.	1904.	1905.	1906.
Wire nails	-	-	-	3,146	3,591	3,763	£30,996	36,111	36,666
Nails (other than wire nails), screws and rivets	-	-	-	912	1,042	994	16,017	17,136	14,373
Bolts and nuts	-	-	-	483	467	766	6,793	7,568	12,553
	EXPORTS.			Tons.			Value.		
	1904.	1905.	1906.	1904.	1905.	1906.	1904.	1905.	1906.
Nails, screws and rivets	-	-	-	1,929	1,848	2,557	36,555	36,687	46,021
Bolts and nuts	-	-	-	1,365	1,113	1,806	22,491	19,375	32,478

THE GLASS TRADE.

The glass trade continues fair. The Board of Trade reports that employment with sheet-glass makers and flatteners was good at St. Helens, and fair with flint glass makers and plate glass bevellers at Birmingham.

The returns for imports and exports of glass for the month of April, 1906, as compared with the same month in 1904 and 1905, are as follows:—

	IMPORTS.			Cwts.			Value.		
	1904.	1905.	1906.	1904.	1905.	1906.	1904.	1905.	1906.
Window and German sheet, including shades and cylinders	53,893	45,579	69,905	53,893	45,579	69,905	£239,541	187,244	281,773
Plate	46,013	44,799	30,320	46,013	44,799	30,320	187,622	194,318	161,152
	EXPORTS.			Cwts.			Value.		
	1904.	1905.	1906.	1904.	1905.	1906.	1904.	1905.	1906.
Plate	5,120	6,485	9,063	5,120	6,485	9,063	6,697	9,150	13,712

An international exhibition of glass, pottery, and allied industries will be held in Paris from July to October of the current year. The exhibits will comprise raw materials and machinery, as well as finished products. Particulars may be obtained from 19, Rue Saint-Roch, Paris.

THE PAINT TRADES.

The paint trades are fair. As regards materials, the returns for imports and exports for April, 1906, as compared with the same month in 1904 and 1905, are as follows:—

	IMPORTS.			Cwts.			Value.		
	1904.	1905.	1906.	1904.	1905.	1906.	1904.	1905.	1906.
White lead	25,240	24,875	28,113	25,240	24,875	28,113	£20,357	20,126	24,979
Zinc oxide	126,386	18,797	22,870	126,386	18,797	22,870	99,681	19,125	24,041
Other colours and pigments	-	152,145	117,618	-	152,145	117,618	47,798	66,274	17,793
Turpentine	24,133	33,710	12,430	24,133	33,710	12,430	102,936	59,713	93,252
Lac-dye, seedlac, shellac and sticklac	10,551	8,317	9,846	10,551	8,317	9,846	102,936	59,713	93,252
Linseed oil	270	846	2,433	270	846	2,433	4,590	15,613	48,164
	EXPORTS.			Cwts.			Value.		
	1904.	1905.	1906.	1904.	1905.	1906.	1904.	1905.	1906.
White lead	24,398	26,464	30,089	24,398	26,464	30,089	23,925	24,042	32,125
Zinc oxide	118,941	6,087	5,479	118,941	6,087	5,479	157,569	7,946	6,483
Other colours and pigments	-	118,007	117,148	-	118,007	117,148	155,906	158,895	158,895
Linseed oil	3,394	3,333	1,645	3,394	3,333	1,645	63,810	58,390	39,095

The revised Egyptian tariff that came into operation on February 22nd has placed the following duties on painters' materials imported into that country:—Cotton-seed oil, "prime winter yellow," 20½ millièmes per kilog.; cotton-seed oil, refined, and "summer yellow," 18½ millièmes per kilog.; linseed oil, raw, 20 millièmes per kilog.; linseed oil, boiled, 21 millièmes per kilog.; zinc, white (first quality), including "Vieille Montagne," 26 millièmes per kilog.; zinc, white (second quality), including "Nouvelle Montagne," *ad valorem*; red lead, 19 *ad valorem*. 1,000 millièmes, it may be mentioned, equal £11, or 20s. 6d.

THE IRON AND STEEL TRADES.
Recent Progress.

Many and picturesquely varied are the accounts to which we have been treated respecting the markets which are to be called upon for steel to make good the damage at San Francisco. "Cavendo Tutus" is the motto of the ducal chairman of one of our greatest steel corporations, and its purport may well be adapted to apply to the present attitude of the English steel markets.

Our markets are not to be persuaded into violent bull performances on the strength of mere hypotheses. We are content to await the events of the next few weeks, and merchants and manufacturers will not be found wanting in enterprise and activity when a call is made on this country for any quantity of steel of the best that the world produces.

Meanwhile there is no cause for lament in the prevailing conditions, and whether the volume of business emanating from the Pacific coast prove great or small the progress of events is distinctly in the right direction.

There are one or two points, however, which we may put on record apropos of this subject without taking upon ourselves the responsibility of drawing inferences of any kind.

The consensus of opinion appears to be decisive that on the whole the steel structures have acquitted themselves very well, taking into account the extraordinary vicissitudes through which they have passed.

That more steel will be wanted, and in large quantities, may be taken for granted. Still more obvious is the position of the United States as regards its capacity to cope with the prospective demand. Advices from Pittsburg state that the condition of the works, through orders already on hand for the home markets, is one well-nigh bordering on congestion, and that "every mill in Western Pennsylvania is booked up for many months to come."

In Germany the state of affairs which has prevailed during the past month or two bids fair to be well maintained. The home demand is as strong as ever it has been, and through the whole range of the syndicated works there is the same story of full books and retarded deliveries. Nevertheless, Germany is making a spirited bid for San Francisco business, and there is no doubt that they are in a position to handle a pretty large quantity if it should come their way.

Turning to recent happenings in our own industrial centres, we find, whilst there has been nothing exciting to put upon record, the past few weeks have displayed a tolerably active and a satisfactory condition of affairs.

The tonnage of shipbuilding on the Clyde, which is always an index to the state of the steel trade in that district, shows some very pleasing figures.

The new tonnage output in the Clyde for April amounted to 31,650 tons. This is not a record figure, but it is a good one, especially when an estimate is formed by adding it to the tonnage of the previous three months. The output for January-April amounted to 177,260 tons, which is an unprecedented figure in the history of Clyde shipbuilding.

The month opened in Scotland with a pretty brisk demand for structural steel shapes, but there was no appreciable stiffening in prices. In fact, a very satisfactory tone of steadiness prevailed, which subsequent events do not appear to have disturbed. The following prices may be taken as representative :-

Steel angles	-	-	£ s. d.
" bars	-	-	7 0 0 per ton.
Iron angles	-	-	7 19 0 "
" bars (best)	-	-	7 2 0 "
" bars (common)	-	-	7 10 0 "
" bars (common)	-	-	7 0 0 "

Middlesbrough also opened the merry month of May with the cheerful optimism which

is supposed to generally obtain at that period. It is the pig-iron figures which dominate the perspective there, and the retrospect was one which fully justified their bounding spirits. The exports from the district for April are about the best on record. The total showed the imposing figure of 131,340 tons, or 43,000 tons (nearly 50 per cent.) in excess of the tonnage for April last year. Germany took a large portion, bringing the total shipped to that country during January-April up to nearly 100,000 tons. In structural steel there was not a large influx of orders during the commencing days of the month, but works were well employed with orders on hand, and prices kept pretty firm all round. Steel angles were quoted at £6 10s., joists at £6 5s., and iron bars (best) at £7 10s. per ton.

The Birmingham district did not open out with any great degree of briskness. The building trade was reported as being distinctly dull, and consequently the demand for structural steel was far from what this time of the year usually brings forth. Angles ranged from £6 7s. 6d., channels £6 12s. 6d. and joists £6 15s. per ton.

Taking a general survey of the iron and steel trade of this country for the four months of the present year, as represented by the tonnage exported, there are some very interesting and satisfactory figures returned. We select a few representative lines :-

IRON AND STEEL EXPORTS, JANUARY-APRIL, 1905 AND 1906 (TONS).			
	1905.	1906.	
Pig iron	266,650	400,050	
Black plates	18,480	19,450	
Cast-iron	13,725	13,850	
Wrought-iron	13,250	15,800	
Hardware	262,000	310,100	
Galvanized sheets	132,600	150,000	
Steel girders	19,450	37,400	
Steel bars	40,000	57,600	
Iron castings	2,050	2,950	

The Present Position.

So far as the month has advanced nothing very brilliant has taken place in Scotland as regards sales in structural steel shapes. The pig-iron market brightened up considerably, but this is not, of course, a reliable index as regards the lines which dominate in the building trades. A meeting of Scotch makers was held early on at which the question of reducing the official price for angles was discussed. Nothing, however, came of it, in spite of the general slackness in demand, and as matters are proceeding at present the decision appears to be only a case of deferring the inevitable.

In Birmingham a degree of quietness still prevails, but whether it is one of those calms which precede a storm is very much open to doubt. "Marked" iron bars seemed to be the only descriptions which were able to maintain a superior indifference to their environment. The official figure of £9 per ton still survived, although their poor relations, the "common" bars, were reported to be selling at 5s. below their normal £7 per ton. The following may be taken as representing outside quotations for their respective lines:-Steel angles, £6 10s.; steel joists, £7; girder plates, £7 12s. 6d.; mild steel bars, £7 7s. 6d. per ton.

In the Middlesbrough district the early anticipations were pretty well realized throughout. There was no very remarkable increase in demand or stiffening of prices, but the general tone of business was decidedly strong. The prices already mentioned were well maintained, and in steel shapes there was a prevailing impression that advances might be looked for towards the close of the month.

Looking at the trade in the country as a whole, we may describe it as being decidedly steady, displaying no indications of impending degeneracy, and, if we may venture a mild premise, quite likely to amble in an upward direction.

The following list shows a few com-

parisons of current prices with those quoted twelve months ago (all per ton):-

	1905.	1906.
"Marked" iron bars (Staffs.)	£8 0 0	£9 0 0
"Common"	6 0 0	7 0 0
Steel rails (Middlesbrough)	5 5 0	6 5 0
Steel angles	5 15 6	6 15 0
" (Glasgow)	5 10 0	7 0 0

Continental ordinary steel shapes have certainly been very active during the past few weeks, if not actually rampant.

Briskness of business in their home markets appears to have been the cause of their independent attitude towards their customers on this side. All the German works are very well booked with orders, and the quotations for export have, by degrees of modest half-crowns per ton, risen to quite imposing figures of c.i.f. The price we gave last month for rolled steel joists delivered ex steamer Thames, viz., £5 15s. per ton, has swollen to something in the region of £6 2s. 6d. and upwards. Channels show a corresponding advance, present prices for ordinary shapes being about £6 5s. per ton. Steel angles and tees have not gone up to the same extent, and prices now range respectively from £6 10s. 6d. and £6 13s. 6d. upwards.

On the whole these figures do not present anything very attractive to buyers on this side, especially when the slow deliveries are taken into account.

Other Metals.

The Tin market has been indulging in an anticipatory lapse of Midsummer madness, and some of its feats during the present month will be remembered for a long time to come. Starting the month in a mild way with a figure of £182, prices advanced by one, two, three and five pound stages up to £215 per ton. The condition of affairs generally gave rise to considerable doubt as to how the situation was going to develop, and buyers began to hold back, anticipating a drop. Subsequent events have fully justified this reserve. The timely arrival of a good shipment last week put fresh warrants quickly on the market, and prices have receded considerably. The figure for Straits metal (cash) is now comparatively steady in the region of £190.

The price of copper has shown its customary capriciousness, but the fluctuations have not been great either one way or another. Heavy sales have taken place, and reports seem to indicate that the present figures for standard copper of £85 10s. and thereabouts will be well maintained.

Lead has shown a steady advance recently, present prices being well in front of those of a month ago. Soft foreign is quoted at £16 15s., English at 5s. to 10s. per ton higher, pipes at £19 15s. and sheets at £19 5s. per ton.

Spelter has been comparatively quiet, and prices have not varied very much. Present quotations for G.M. are £27 5s. to £27 10s., and about 2s. 6d. higher for special brands.

In galvanized sheets the normal figure of £12 7s. 6d. per ton is fully maintained and frequently exceeded. Buyers who held back in anticipation of a slackening in this line have once more been disappointed and have placed their orders in the region of the above figure.

THE WALLPAPER TRADE.

The wallpaper trade is stagnant. It is not worse, certainly, than last year, but there is no movement either way. Our exports are less than a month ago, and less than a year ago, and still further behind 1904, as the following return of paperhangings for April will show :-

IMPORTS.			
	1904.	1905.	1906.
Cwts.	-	5,504	4,737
Value	-	£14,638	13,222
EXPORTS.			
	1904.	1905.	1906.
Cwts.	9,683	7,811	7,094
Value	£21,569	19,247	17,676

Tenders.

Addressed postcards on which lists of tenders may be sent will be sent post free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Fetter Lane, E.C. Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Alnwick.—Accepted for the whole of the work required in the erection of a new infirmary. Mr. J. Wightman Douglas, Alnwick, and Messrs. Boyd & Groves, Newcastle, joint architects:—
 Elliot Brothers £4,508

Birmingham.—For the erection of shops, bakehouses, &c., in Dale End and Moor Street, for Mr. Alfred Hughes, Messrs. Nowell, Parr, & Kates, architects, Brentford. Quantities by Mr. G. Kenwick, Colemore Row, Birmingham:—

	Estimate	Estimate	Credit.
No. 1.	No. 2.		
J. Smith & Sons	£6,400	£1,978	—
T. Cole & Son, Selly Oak	6,100	1,900	£100
T. H. Kingierlee, Oxford	5,950	1,850	50
W. Sapcote & Son	5,885	1,764	50
J. Moffatt & Sons	5,990	1,800	205
J. Bowen & Son	5,900	1,779	100
T. Lowe & Sons, Burton-on-Trent	5,977	1,627	175
J. Barnsley & Sons	5,845	1,696	300
G. Robinson	5,745	1,598	125
C. Bryant, Small Heath	5,600	1,673	200
T. Rowbotham	5,490	1,627	120
J. Dallow & Sons	5,440	1,610	164
B. Whitehouse & Sons	5,525	1,620	300
John Webb	5,259	1,587	150
R. Fenwick, Ltd.*	5,175	1,545	275
* Accepted. (Rest of Birmingham.)			

Bognor.—For the erection of a house in Nelson Road, Bognor, Sussex, for Mr. G. T. Poock, Chichester. Mr. Blunden Shadbolt, architect, "Allingham," Horley, Surrey:—

A. Tupper & Sons, Chichester	£815	16	10
H. Oliver, Bognor	755	0	0
E. Harfield, Bognor	730	0	0
Booker Brothers, Bognor	635	0	0
E. J. Richardson,* Bognor	587	0	0
* Accepted with slight alterations.			

Byfleet.—For the erection of a house and premises in Church Road, for Mr. A. Sharp. Mr. D. G. Andrew, architect, Bridge Road, East Molesey:—

W. G. Torrant	£2,490		
Higgs & Outhwaite	2,347		
W. A. Smyrk	2,114		
W. H. Brown	1,990		
S. R. Spinner	1,970		
Lane, Son & Farley	1,928		
G. Willis	1,919		
Wallis & Bennett	1,916		
W. Greenfield	1,761		
H. E. H. Buckingham, Ltd.	1,700		
J. H. Tanner	1,675		
H. J. Butt	1,650		
C. Horsell	1,313		

Cardiff.—Accepted for the furnishing of the new municipal buildings in Cathays Park. Messrs. Lanchester & Rickards, architects, London:—

John P. White, Bedford	£2,171	10	0
Desks.			
Waring & Gillow, Ltd., London	1,280	6	6
Chairs.			
Hampton & Sons, London	2,023	16	6
Bookcases.			
Turner & Sons, Cardiff	819	10	4
[Total, £6,295 3s. 4d.]			
[Architects' estimate £6,650.]			

Devizes.—Accepted for the erection of new training stables with drainage installation at London Road:—
 H. Ash, Devizes £2,473

Epping.—For the construction of nurses' and infants' quarters at the Epping Workhouse, for the Guardians. Mr. H. T. Coley, architect, Buckhurst Hill:—

J. Keen	£1,600	0	0
K. Thedon, Theydon Bois	1,485	5	7
Newell & Lusty, Poplar	1,396	0	0
Kenworthy Brothers, Catterham Valley	1,310	10	0
Foster & Son, Loughton	1,300	0	0
Martin, Wells & Co., Vauxhall	1,299	0	0
Wells & Sons, Buckhurst Hill	1,287	0	0
Parren & Sons, Erith	1,281	0	0
Cowlin & Sons	1,275	0	0
T. W. Heard, Buckhurst Hill	1,257	0	0
P. Wood & Sons	1,256	0	0
Fitch & Cox, Enfield	1,250	12	0
E. E. Winch	1,243	8	7
S. Page & Sons, Croydon	1,236	0	0
J. Barker & Co., Kensington	1,209	0	0
R. Warriner, Loughton	1,168	9	0
E. Streathe, Croydon	1,166	0	0
Myall & Upson, Clacton-on-Sea	1,158	0	0
W. Hyde, Norwood Junction	1,140	0	0
J. Whiffin & Sons*	1,134	8	0
Lawrence & Sons, Waltham Cross	1,124	0	0
Woolaston & Son, South Hackney	1,100	0	0
[Architect's estimate, £1,300.] [Rest of Epping.]			
* Accepted.			

Hanley.—For the extension of Glost Stock Warehouse at Trent Sanitary Works, for Johnson Brothers, Hanley. Messrs. E. L. Maddock & Sons, architects, Hanley. Quantities by the architects:—

T. Godwin	£1,139		
T. R. Yoxall	1,128		
G. Ellis	1,110		
Tomkinson & Betterley	1,103		
P. H. Bennion	1,094		

J. Bagnall	£1,040		
Cornes & Sons*	1,000		
* Accepted.			

Lincoln.—For the erection of a Wesleyan school chapel, West Parade. Messrs. Green, Knowles & Russell, architects, Adelphi Bank Chambers, South John Street, Liverpool:—

W. Wright & Son	£2,205	0	0
Halkes Brothers	1,778	0	0
Lansdown & Son	1,752	16	0
Mawer Brothers	1,690	10	0
R. Marriott,* Rushden	1,656	0	0
* Accepted.			

London.—For the alteration and enlargement of the Bethnal Green fire station, for the London County Council:—

C. Wall, Ltd., London, E.C.	£5,626		
E. Lawrence & Sons, City Road, N.	4,969		
Kirk & Randall, Woolwich, S.E.	4,898		
F. G. Minter, Putney, S.W.	4,759		
H. L. Holloway, Deptford, S.E.	4,719		
Holloway Brothers (London), Ltd., London, S.E.	4,662		
Leslie & Co., Ltd., London, S.W.	4,636		
Spencer, Santo & Co., Ltd., Westminster, S.W.	4,595		
H. Lovatt, Ltd., London and Wolverhampton	4,550		
Kerridge & Shaw,* Sturton Street, Cambridge	4,444		
* Recommended for acceptance.			
[Architect's estimate, £4,540.]			

London, N.—For the extension of the existing electric tramways route between Aldwych and the "Angel," Islington, by reconstructing, for the underground conduit system of electric traction, the tramways in High Street and Upper Street, Islington, to a point near Highbury (N.L.R.) station, for the London County Council:—

J. Mowlem & Co., Ltd.	£30,039	0	0
Dick, Kerr & Co., Ltd.	28,063	19	11
J. G. White & Co., Ltd.	27,496	2	5
R. W. Blackwell & Co., Ltd.*	26,538	16	11
* Recommended for acceptance.			

New Bolsover.—For the erection of new infants' school at New Bolsover, for the Derbyshire County Education Committee. Mr. H. Tatham Sudbury, architect, Estate Offices, Ilkeston:—

Haskard, Rudkin & Beck, Leicester	£4,395	0	0
G. Peach, Derby	4,162	0	0
D. Roberts, Ilkeston	4,053	15	0
G. Haynes, Bolsover	4,010	17	3
W. Maule & Co., Nottingham	3,995	10	0
H. Oakey, Hillstown	3,960	0	0
A. Earnshaw, Ilkeston	3,820	0	0
F. H. & J. W. Moore, Shirebrooke	3,800	0	0
J. Cooper & Son, Nottingham	3,625	0	0
T. Cuthbert, Nottingham	3,598	0	0
Lund & Swan, Eckington	3,550	0	0
Lee & Kirk, Chesterfield	3,540	0	0
Harris & Hunt,* Ripley, Derby	3,499	18	6
H. Vickers & Son, Nottingham	3,415	0	0
* Accepted.			

Newcastle-on-Tyne.—For the erection of new county offices, for the Northumberland County Council. Mr. J. A. Bean, C.E., F.G.S., county surveyor:—

W. Forster	£16,558	0	0
J. Lant	16,395	0	0
J. C. Ferguson	16,209	0	0
W. T. Weir	16,000	0	0
J. Jackson & Sons	15,560	0	0
E. & A. Storey	15,501	0	0
J. W. White	15,455	0	0
J. Howe & Co.	15,372	10	0
Purdie & Thompson	15,343	10	4
Kirk & Brown	15,335	15	6
J. Milne	15,306	9	0
T. Weatheritt	15,300	0	0
E. Henderson & Son	15,206	0	0
J. L. Miller	15,194	5	0
S. Easton	14,873	0	0
J. Parkinson & Sons	14,833	12	1
P. & W. Simpson	14,825	0	0
J. C. Hope	14,763	5	1
T. Hunter	14,655	0	0
J. Craven	14,591	8	8
North Durham Stone Co.	14,506	0	0
A. Bingle	14,408	0	0
J. & W. Lowry	14,309	0	0
S. F. Davidson	14,300	0	0
Middlemiss Brothers	14,280	0	0
T. Lumsden	14,250	0	0
G. H. Mauchlen	14,177	9	0
Elliott Brothers*	14,082	19	6
* Accepted.			

Newhaven.—For the erection of new council offices and fire-station in Fort Road, for the Urban District Council. Mr. F. J. Rayner, architect, 34, Meeching Road, Newhaven:—

Potter Brothers, Horsham	£2,056	0	0
Rowland Brothers, Horsham	1,849	0	0
Lindfield & Son, Horsham	1,848	0	0
R. Cook & Sons, Crawley	1,800	0	0
T. Rich, Hailsham	1,800	0	0
M. Woolger, Newhaven	1,798	0	0
C. Cooke,* Newhaven	1,757	16	0
* Accepted.			

Newton Purcell (Oxon).—For the erection and completion of a block of three cottages, at Fimmere Station (G.C.R.), for Mr. E. Slater Harrison, J.P. Mr. C. M. C. Armstrong, architect, 5, High Street, Warwick:—
 W. H. & T. Hawkins, Brackley £893
 T. Grimley & Son,* Biicester 775
 * Accepted with modifications.

Plymouth.—For the erection of Plymouth sanitary steam laundry:—
 E. Endicott £2,448
 J. Paynter 2,407
 Wakeham Brothers 2,389
 A. Andrews 2,370
 Pearn Brothers 2,354
 Pethick Brothers 2,314
 G. B. Turpin* 2,247
 * Accepted.

Reigate.—For the erection of a dwelling-house in Colley Lane, Reigate, Surrey, for Mr. E. M. Stephenson, Horley. Mr. Blunden Shadbolt, architect, "Allingham," Horley, Surrey:—

E. Buckman, Redhill	£995		
Cummins & Sons, Ltd., Betchworth	988		
J. J. Pink, Horley	915		
E. E. Mitchell,* Horley	850		
* Accepted.			

Royston.—Accepted for the erection of a new public elementary school at Byron Street, Royston, near Oldham, for the Lancashire Education Committee:—
 J. W. Kent, Park Street, Sawmills £9,130

Stapleford.—For the erection of a vicarage house at Stapleford, Cambs. Mr. A. P. MacAlister, F.R.I.B.A., architect, Cambridge. Quantities by the architect:—

Coulson & Lofis, Cambridge	£1,769		
A. Negus & Sons, Cambridge	1,715		
Mason & Sons, Haverhill	1,699		
Kerridge & Shaw, Cambridge	1,690		
W. Bell & Sons, Cambridge	1,635		
Oak Building Co., Cambridge	1,599		
E. Willmott & Sons, Cambridge	1,450		
* Accepted.			

Surbiton.—For the construction of a gin. sewer and the reconstruction of house drains, &c., at Oak Hill Grove, Surbiton, for the Urban District Council. Mr. H. T. Mather, surveyor:—

S. Lane	£663	7	7
C. W. Killingback & Co.	653	0	0
G. G. Rayner	630	0	0
J. Chapman	564	0	0
H. E. H. Buckingham, Ltd.	557	0	0
G. Atkins	547	10	0
S. Kavanagh & Co.	505	3	4
G. Chesswas	475	10	0
G. Napier & Sons,* Southampton	453	13	9
* Accepted.			

Totnes.—For the erection of a new board-room, for the Guardians:—

R. Wilkins & Son, Bristol	£1,583	0	0
G. Arscott & Son, Buckfastleigh	1,555	0	0
Kinsman & Full, Totnes	1,539	19	0
G. B. Andrews & Son, Ivybridge	1,524	14	6
W. Reeves & Son, Totnes	1,455	0	0
J. Reeves & E. Selwood, Totnes	1,398	8	0
R. E. Narracott, Stoke Gabriel	1,352	2	9
T. Brook,* Totnes	1,290	16	0
* Accepted.			

Warrenpoint (co. Down).—For the erection of

baths, for the Warrenpoint Urban District Council:—			
P. McClean, Castlemullan	£7,50		
McKee & McNally, Dungannon	6,361		
A. Hull & Co., Dublin	5,890		
H. Lavery & Sons, Belfast	5,728		
R. Colhoun, Londonderry	5,680		
J. W. Stewart, Belfast	5,620		
Collin Brothers, Portadown	5,488		
Courtney & Co., Belfast	5,374		
Lavery & Percy, Belfast	5,295		
W. J. Campbell & Sons, Belfast	5,240		
D. Neary, Newry	5,066		
D. Mohood, Newry	4,950		
R. Coty & Co., Belfast	4,900		
M. Laughlin & Harvey, Dublin	4,900		
H. & J. Martin, Dublin	4,843		
A. Frazer, Bray	4,749		
O'Connor & Martin,* Drogheda	4,654		
I. Copeland, Belfast	4,652		
Brebner & Co., Edinburgh	3,403		
* Recommended for acceptance.			
† Material only.			

Wells-next-Sea.—Accepted for the enlargement of school, for the Norfolk Education Committee. Mr. A. F. Scott, architect, Castle Meadow, Norwich:—
 J. Needs, Fakenham £1,032

Woolwich.—For the rebuilding of No. 6, Thomas Street, for Mr. David Lewis, secretary, Cheltenham and Gloucester Building Society. Mr. F. J. Gurney, architect and surveyor, 72, Cantwell Road, Shooters' Hill, S.E.11:—

Kirk & Randall	£1,320		
A. J. Ware	1,073		
H. L. Holloway	1,027		
J. Sanford	963		
Thomas & Edge*	957		
* Accepted. [Architect's estimate, £1,050.]			

Wrexham.—For the erection of warehouse, two houses, offices, stables and cart-sheds, &c., at Pentrefelin, for Mr. George Viggers, Wrexham. Mr. M. J. Gummow, A.R.I.B.A., architect, Egerton Street, Wrexham:—

Current Market Prices

FORAGE.

	£	s.	d.	£	s.	d.
Beans ... per qr.	1	15	0	1	16	0
Clover, best ... per load	4	0	0	4	7	6
Hay, good ... do.	3	12	6	3	17	6
Sainfoin mixture ... do.	3	12	0	4	0	0
Straw ... do.	1	8	0	1	14	0

MISCELLANEOUS.

Bricks Stocks, d/d to job	per 1,000	1	14	0	—
Do. Flettons on rail ...	do.	1	4	0	—
Do. Pressed Wire Cuts, d/d to job	do.	1	16	0	—
Do. Blue brindled wire cuts ...	do.	1	1	0	—
Do. do. wire cuts ...	do.	1	5	0	—
Do. do. pressed facings ...	do.	1	17	6	—
Coke Breeze, into carts at gasworks ...	per load	0	2	0	—
Do. d/d to job ...	do.	0	4	0	—
Sand ...	per yard	0	7	6	—
Ballast ...	do.	0	6	6	—
Granite Chippings ...	do.	0	10	6	—
Do. do. 2in. ...	do.	0	11	6	—
Cement ...	per ton	1	11	6	—
Lime ...	do.	1	4	0	—
Granite Broken, 1½in. ...	do.	0	15	6	—
Do. do. 2in. ...	do.	0	15	0	—
Do. do. 2½in. ...	do.	0	14	6	—
Do. Kerb, Norwegian, 6x12 and 12x6 in river ...	per foot	0	1	2	—
Do. do. do. circular ...	do.	0	1	5	—
Do. do. do. 12x8 in river ...	do.	0	1	5	—
Do. do. do. circular ...	do.	0	1	8	—
Do. do. Guernsey, 6x12 in river ...	do.	0	1	4	—
Do. do. do. circular ...	do.	0	1	6	—
Do. do. do. 12x6 do. ...	do.	0	1	6	—
Do. do. do. do. ...	do.	0	1	8	—
Do. do. do. 18x8 do. ...	do.	0	1	8	—
Do. do. do. do. ...	do.	0	1	10	—
Do. Pitchings, Norwegian, 3x6 ...	per ton	1	8	0	—
Do. do. do. 3x7 ...	do.	1	10	0	—
Do. do. do. 3x5 ...	do.	1	9	0	—
Do. do. do. 4x5 ...	do.	1	8	0	—
Do. do. do. 4x4 ...	do.	1	13	0	—
Do. do. do. 4x6 ...	do.	1	5	0	—
Do. do. do. 5x6 ...	do.	1	4	0	—
Do. do. do. 5x7 ...	do.	1	4	0	—
Do. do. do. Special, 4x6 ...	do.	1	11	0	—
Do. do. do. 5x7 ...	do.	1	18	0	—
Do. do. Guernsey, 3x6 ...	do.	1	10	0	—
Do. do. do. 3x7 & 3x9 ...	do.	1	8	6	—
Do. do. do. 3x5 ...	do.	1	10	0	—
Do. do. do. 4x5 ...	do.	1	10	0	—
Do. do. do. 4x4 ...	do.	1	13	0	—
Do. do. do. 4x6 ...	do.	1	9	0	—
Do. do. do. 4x7 ...	do.	1	6	0	—
Do. do. do. 5x6 ...	do.	1	6	0	—
Do. do. do. 5x7 ...	do.	1	5	0	—
Do. do. do. Specials add. ...	do.	0	6	0	—
Glass, English Sheet, in crates of stock sizes, 15 oz., 2nds ...	per sq. ft.	0	0	3½	—
Do. do. do. do. 3rds ...	do.	0	0	2½	—
Do. do. do. do. 21 oz. 2nds ...	do.	0	0	5	—
Do. do. do. do. 3rds ...	do.	0	0	3½	—
Do. do. do. do. 26 oz. 2nds ...	do.	0	0	6	—
Do. do. do. do. 3rds ...	do.	0	0	4½	—
Do. do. do. do. 32 oz. 2nds ...	do.	0	0	8	—
Do. do. do. do. 3rds ...	do.	0	0	6	—
Do. English patent plain rolled plate in stock crates ½ ...	do.	0	0	2	—
Do. do. do. do. ¾ ...	do.	0	0	2½	—
Do. do. do. do. 1 ...	do.	0	0	2½	—
Castor Oil, French ...	per cwt.	1	1	10	1 2 0
Colza Oil, English ...	do.	1	5	9	—
Copperas ...	per ton	2	0	0	—
Lard Oil ...	per cwt.	2	15	0	2 17 0
Lead, white, ground, carbonate ...	per ton	16	0	0	—
Do. red ...	do.	15	0	0	0 19 0
Linseed Oil, barrels ...	per cwt.	1	1	3	—
Petroleum, American ...	per gal.	0	0	6½	0 0 6½
Do. Russian ...	do.	0	0	5½	0 0 6
Pitch ...	per barrel	0	8	0	—
Shellac, orange ...	per cwt.	9	0	0	—
Soda, crystals ...	per ton	3	2	6	3 5 0
Tallow, Town ...	per cwt.	1	7	6	1 8 3
Tar, Stockholm ...	per barrel	1	5	0	—
Turpentine ...	per cwt.	2	0	0	—

METALS.

Standard Copper ... per ton	85	5	0	85	10	0
Do. Strong sheets ... do.	99	0	0	99	10	0
Lead, Soft Foreign ... do.	16	10	0	16	15	0
Do. English ... do.	17	0	0	17	5	0
Do. pipes ... do.	19	15	0	19	17	6
Do. sheets ... do.	19	15	0	19	10	0
Galvanised Corrugated sheets ... do.	12	7	6	12	10	0
Spelter G.M. ... do.	27	5	0	27	10	0
Angles, Scotland ... do.	6	15	0	7	0	0
Bars ... do.	7	17	6	7	19	0
Marked bars, Staffs ... do.	9	0	0	—	—	—
Common bars do. ... do.	6	17	6	7	0	0
Angles, M'boro. ... do.	6	10	0	6	12	6
Joists ... do.	6	2	6	6	5	0
Angles, Midlands ... do.	6	7	6	6	10	0
Joists ... do.	6	12	6	6	15	0
Girders plates, Midlands ... do.	7	10	0	7	12	6

Angles, Foreign, c.i.f. Thames	per ton	£	s.	d.	£	s.	d.
Tees do. do.	do.	6	10	0	6	11	6
Joists do. do.	do.	6	12	6	6	15	0
Channels do. do.	do.	6	0	0	6	2	6
Plates do. do.	do.	6	12	6	6	15	0
Tin, Foreign ...	do.	7	0	0	7	5	0
Do. English ingots ...	do.	190	0	0	190	10	0
Zinc, sheets, Silesian ...	do.	189	0	0	190	0	0
Do. do. Vieille Montaigne ...	do.	30	0	0	30	10	0

TIMBER.

Soft Woods.

Fir, Dantzic and Memel	per load	2	10	0	5	0	0
Pine, Quebec, Yellow ...	do.	4	0	0	7	0	0
Do. Pitch, American	do.	2	16	0	5	0	0
Laths, loc. Dantzic	per cu. fath.	4	0	0	6	0	0
Deals, Tornea, Yellow, 1st & 2nd, 4x9	per std.	10	10	0	—	—	—
Do. Nederkalix, Yellow, 1st, 3x7	do.	10	0	0	—	—	—
Do. do. 2nd, 4x7	do.	9	0	0	—	—	—
Do. do. 2nd, 2½x9	do.	9	10	0	—	—	—
Do. Pernoviken, Yellow, 1st & 2nd, 2½x8	do.	9	0	0	—	—	—
Do. Transund, Yellow, 1st & 2nd, 2½x7	do.	10	5	0	—	—	—
Do. Ljusne, Yellow, 4th, 3x11	do.	9	5	0	—	—	—
Do. Galatz, White, 2nd, 3x11	do.	9	15	0	—	—	—
Do. Mesane, Yellow, 4th, 3x8	do.	9	15	0	—	—	—
Do. Söderham, Yellow, 5th, 3x9	do.	10	5	0	—	—	—
Do. Quebec, Bright Pine, 1st, 3x9 & 10	do.	23	15	0	—	—	—
Do. do. 1st, 3x8	do.	21	10	0	—	—	—
Do. do. 1st, 3x7	do.	22	5	0	—	—	—
Do. do. Spruce, Unsorted, 3x9	do.	9	5	0	—	—	—
Do. Archangel, White, 1st, 3x9	do.	11	15	0	12	0	0
Do. Halifax, Bright Spruce Unsorted, 1st, 2nd & 3rd, 3x9	do.	8	15	0	—	—	—
Do. do. do. 1st, 2nd & 3rd, 3x8	do.	8	5	0	—	—	—
Do. do. do. 1st, 2nd & 3rd, 3x7	do.	8	5	0	—	—	—
Battens, Halifax, Bright Spruce, Unsorted, 1st, 2nd & 3rd, 3x6	do.	8	0	0	—	—	—
Do. St. John, Bright Spruce, Unsorted, 1st, 2nd & 3rd, 3x6	do.	7	15	0	—	—	—
Do. do. do. 1st, 2nd & 3rd, 3x5	do.	7	10	0	—	—	—
Do. Gefle, Yellow, Unsorted, 2½x3	do.	9	0	0	—	—	—
Do. do. do. 2x4	do.	10	0	0	—	—	—
Do. Sandarne, Yellow, 5th, 2x9	do.	8	15	0	9	0	0
Do. do. 5th, 2x7	do.	8	15	0	—	—	—
Do. Helsingfors, Yellow, 1st & 2nd, 2x5	do.	8	15	0	—	—	—
Floorings, Gefle, Yellow, 1st, 1½x6	per square	0	14	9	—	—	—
Do. do. 2nd, 1½x7	do.	0	14	0	—	—	—
Do. do. 2nd, 1½x6	do.	0	13	9	—	—	—
Do. do. 2nd, 1x7	do.	0	11	0	—	—	—
Do. do. 3rd, 1x7	do.	0	9	6	—	—	—
Do. Dram, Yellow, Unsorted, 1x7	do.	0	9	9	—	—	—
Do. Kubikenborg, Yellow, 2nd, 1x7	do.	0	11	3	—	—	—
Do. Fredriksstad, Yellow, Mixed, 1x6	do.	0	9	6	—	—	—
Do. do. do. 1x5½	do.	0	9	0	—	—	—
Do. do. do. 1x5	do.	0	8	9	—	—	—
Do. do. do. 1x4½	do.	0	8	3	—	—	—

HARD WOODS.

Ash, Quebec ... per load	4	2	6	7	5	0
Birch, New Brunswick ... do.	2	0	0	5	0	0
Do. Quebec ... do.	3	0	0	5	5	0
Box, Turkey ... per ton	6	0	0	20	0	0
Cedar, Cuba ... per ft. sup.	0	0	4½	0	0	5½
Do. Honduras ... do.	0	0	5½	—	—	—
Do. Tobasco ... do.	0	0	5½	—	—	—
Do. Brazilian ... do.	0	0	4½	—	—	—
Elm, Quebec ... per load	4	2	6	8	10	0
Jarraah, plank ... per ft. cu.	0	2	6	0	3	0
Mahogany, Average Price for Cargo, Honduras ... per ft. sup.	0	0	5	—	—	—
Do. Tobasco ... do.	0	0	4	0	0	5½
Do. Cuba ... do.	0	0	4	0	0	5
Do. African ... do.	0	0	3½	—	—	—
Do. Lagos ... do.	0	0	3½	—	—	—
Oak, Wainscot ... per log.	2	10	0	6	5	0
Teak, Indian, logs ... per load	8	10	0	19	0	0
Do. do. planks ... do.	11	10	0	20	0	0
Whitewood, American, logs ... per ft. cu.	0	1	3	0	1	6
Do. do. planks and boards ... do.	0	1	3	0	3	6

NEW LONDON BUILDINGS.

At yesterday's meeting of the London County Council the Building Committee reported the following applications under the London Building Act, 1894, their recommendations as to consent or refusal being appended in *italics* :—

Projecting porch and four projecting balconies in front of No. 17, Hill Street, Berkeley Square, on the application of Hindley & Wilkinson, on behalf of C. (Consent.)

Building at the corner of Horseferry Road and Elver Street, Westminster, on the application of D. B. Hedrick, on behalf of the Board of Officers of the Westminster Dragoons. (Consent.)

Open portico in front of No. 76, Upper Berkeley Street, on behalf of Mrs. B. Cohen. (Consent.)

Two houses on a site on the east side of Elming Road, Camberwell, with the forecourt fences at less than the prescribed distance from the centre of the roadway on the street, on the application of W. M. Proudfoot, on behalf of S. F. Cope. (Consent.)

Working-class dwelling on the southern side of Thorpe Place, Kensington, on the application of W. C. Leese, on behalf of the Kensington Royal Borough Council. (Consent.)

Retention of an iron forecourt railing in front of No. 1, Aubrey Walk, Kensington, at less than the prescribed distance from the centre of the roadway of the street, on the application of F. Selby, on behalf of A. Withers. (Consent.)

Extension of the periods within which the erection of buildings on a site abutting upon the south side of Clapham Park Road and the east side of Park Hill Road, Clapham, was required to be commenced and completed on the application of H. G. Hills, on behalf of the Wandsworth Metropolitan Borough Council. (Consent.)

Porches to Nos. 57 to 75 (odd numbers only) inclusive, Frankfort Road, Heme Hill, on the application of F. Goddard. (Consent.)

Three houses on the site of Nos. 11, 12, 13 and Hobart Place, St. George, Hanover Square, on the application of Boshmer & Gibbs, on behalf of G. Trolle & Sons and Colls & Sons, Ltd. (Consent.)

One-storey shop in front of No. 124, Queen's Road, Peckham, on the application of J. E. Murch. (Refusal.)

Buildings on the south-eastern side of Fulham Road, Chelsea, to abut also upon College Street and Kimbolton Row, on the application of Elms & Jupp, on behalf of Bingham and T. Crapper & Co., Ltd. (Refusal.)

Four houses with porches on the southern side of Ladbroke Park, Camberwell, westward of No. 1, on the application of A. E. Mullins, on behalf of J. Ham. (Consent.)

Buildings on the eastern side of Blendon Road, Phileas, northward of Wernbrook Street, on the application of J. Wernham. (Consent.)

Re-erection of Nos. 21, 22 and 23, Great Pearl Street, Spitalfields, at less than the prescribed distance from the centre of the roadway of Great Pearl Street, and with irregular open space at the rear of No. 23, on the application of W. Gilbert, on behalf of A. Wearing. (Consent.)

Retention of a building at the rear of No. 124, Holland Park Avenue, Kensington, abutting upon Princes Road, on the application of S. J. B. Stanton, on behalf of Holland Park Motor Co. (Refusal.)

Erection of buildings on the eastern side of Richmond Road, Paddington, on the space at the rear of No. 1, Westbourne Grove, on the application of J. A. Gimblett. (Refusal.)

Deviation from the plans approved on November 1899, for the formation of new streets on the Suffolk Farm and Bostal Farm, Abbey Wood, Plumstead, so as to relate to an alteration in the position of Conference Road, on the application of W. B. Sheppard, on behalf of the Royal Arsenal Co-operative Society, Ltd. (Consent.)

New street for carriage traffic to lead from Frog Lane to Barbary Avenue, Hampstead, on the application of Farebrother, Ellis & Co., on behalf of Sir Spencer P. Marjory-Wilson, Bart. (Consent.)

Street, to be used for the purpose of foot traffic only, on the site of Nos. 619 to 631, Fulham Road, Fulham, and connection therewith the erection of buildings, on the application of Polgrave and Co. (Consent.)

Amended plans, dated March 5, May 10 and May 1906, submitted with the application of S. W. Baynes, on behalf of the St. Pancras Metropolitan Borough Council, for the construction of an ash hopper, dust screen to a hopper, exhaust steam pipe from turbines and dust screen to the coal conveyors at the Pratt Street generating station, Camden Town. (Consent.)

Sub-station on the southern side of Randolph Mews, Portsdown Road, Paddington, on the application of Metropolitan Electric Supply Co., Ltd. (Consent.)

Additional Buildings at Colney Hatch Asylum are to be erected at a cost of £62,000 or £197 10s. per bed.

The Society of Architects has been presented by the Corporation of London with a complete set of the commemorative medals which it has struck from time to time during the last seventy-five years. These medals, which will be placed in the Society's reading room, include the following :—1831, London Bridge; 1834, City of London School; 1840, Coal Exchange; 1869, Blackfriars Bridge; 1878, Temple Bar; 1882, New City of London School; 1884, New Council Chamber; 1894, Tower Bridge.

The new Bridge over the Wear at Sunderland is making satisfactory progress. The ston

THE LABOUR MARKET.

Board of Trade Returns for April.

THE Board of Trade returns show that employment in the building trades in April continued to show a general improvement. It was better than a year ago.

Returns received from fifty-nine London employers showed that in the last week of April they paid wages to 11,306 workpeople of all classes, compared with 11,487 in March, and 12,792 in April, 1905. Employment generally was much the same as a month ago, but worse than a year ago. Painters and decorators were fairly busy. Other branches were very quiet.

Returns were received from employers' associations in sixty districts outside London. In rather more than half of these employment was dull generally. At Burnley it was good; at Ashton, Stratford-on-Avon, Exeter and Taunton it was fairly good; and at the remaining towns (rather more than a third of the total) it was moderate or fair. Compared with a month ago, no change was reported in forty-five towns. At Nuneaton and Cheltenham employment was worse, and at thirteen towns, including Burnley, Bury, Birkenhead, Stockport, Swansea, and Dublin, it was better. Compared with a year ago no change was shown in thirty-six towns, in seven employment was better, in seventeen worse.

The following information is based on returns from trade unions and local correspondents:—

Bricklayers.

With bricklayers employment was dull generally, but in most districts showed an improvement on the previous month. Not much short time was reported.

Stonemasons.

Employment with stonemasons was bad generally, but showed some improvement on the previous month.

Carpenters and Joiners.

With carpenters and joiners employment was better in every district, the greatest improvement being shown in Lancashire and Cheshire, and Ireland. Compared with a year ago, there was a slight decline in Yorkshire. The percentage of trade union members unemployed at the end of April was 5.4, compared with 7.4 in March and 7.5 in April, 1905. Employment was dull generally.

Slaters and Tilers.

Employment with slaters and tilers was better than a month and a year ago. Generally it was fair, but it was bad in the northern counties, Yorkshire, Scotland (excepting Glasgow) and Dublin.

Plumbers.

With plumbers employment was better in all districts, the greatest improvement being in Ireland, Wales and Monmouth, and the eastern, southern and south-western counties. Compared with a year ago some decline was shown in London and the Midlands. The percentage of trade union members unemployed at the end of April was 9.0, as compared with 11.1 in March and 11.2 in April, 1905. Generally employment was bad.

Plasterers.

Employment with plasterers showed a further improvement. It was dull generally, but was fair at Oldham, Bolton and Belfast, and in Scotland.

Painters.

Owing to spring cleaning and Easter holiday work, painters were busy and were better employed than a month ago. Overtime was worked in many cases.

Labourers.

Labourers were rather better employed. Generally employment was quiet.

Current Rates of Wages in Large Centres.

TOWNS.	Masons.	Bricklayers.	Carpenters and Joiners.	Plasterers.	Slaters.	Plumbers.	Painters.	Labourers.
Aberdeen -	d. 8	d. 8	d. 8	d. 8	d. 8	d. 8	d. 8	d. 4½-5½
Accrington -	9	9	8½	9	8½	8½	8½	5-5½
Ashton - under-Lyne -	9½	10	9	10	8½	9	8½	5½-6½
Barnsley -	9	9	8½	9	8½	8	8	5½-6½
Barrow-in-Furness -	9	9	8½	9	9	8½	8½	6-6½
Bath -	7½	7½	7½	7½	7½	7½	6½	5-5½
Belfast -	8½	8½	8½	8½	8	8	8	19s. wk.
Birkenhead -	9½	9½	9½	9½	9	9½	8½	5-5½
Birmingham -	10	9½	9½	10	9	9½	8½	6½-7
Blackburn -	9½	10	9	9	9	9	8½	5½-6½
Blackpool -	9½	9½	8½	9½	8½	9	8½	5½-6
Bolton -	9½	10	9½	10½	9	9	8½	6½-7
Bournemouth -	8½	8	8	8	8	8	7½	5½
Bradford -	9	9	8½	8½	9	9	8	6-6½
Brighton -	9	8	8	8	8	9	7	5½
Bristol -	9	9	9	9	9	9	8½	6-6½
Burnley -	—	—	8½	—	—	—	—	—
Burton-on-Trent -	8½	8½	8½	—	—	—	—	5½-6
Bury -	9½	10	9½	9	9	9	8½	5-5½
Cambridge -	8½	8	8	8½	8	8½	6½	5-5½
Cardiff -	9	9	9	9	9	9	8½	5½
Carlisle -	8½	8½	8	8	9	8	8	5-5½
Chatham -	9	9	8½	9	10	8½	7	5½
Cheltenham -	8-8½	8	8	7½	—	8	7½	5-5½
Chester -	9	9	8½	9	9	8½	7½	5-5½
Coatbridge and Airdie -	9½	9½	9	9½	9	8½	9	6
Colchester -	8	8	8	9	8	9	6-6½	5-5½
Cork -	7½	7½	7½	7½	7½	8	8	3½-5
Coventry -	9½	8½	9	8½	8	9	8	6
Crewes -	8½	8	7	9	8	8	7	5
Darlington -	9	9	8½	9	9½	8	7½	6
Darwen -	9½	9½	9	9	9	9	8½	6
Derby -	9	9	8½	9	9	8½	7½	5½-6
Dublin -	8-8½	8½	8-8½	8	8	8½	7½	4½-4½
Dudley -	8½	8	8	8½	8	9	7	5½
Dundee -	8-8½	10	9	8½	8½	8½	8½	5½-5½
Eastbourne -	8½	8	8	9	pce.	8	7½	5½
Edinburgh -	8½	9½	9	—	—	9	—	—
Exeter -	8	8	7½	7½	7½	7½	6½	5
Glasgow -	—	9½	9½	9½	9	9	9	5½-6
Gloucester -	7½	8	8	7½	7½	8	7½	5
Greenock -	9½	10	9	9½	9½	9	9	5½
Grimsby -	—	9	8	—	pce.	—	7½	6-7
Halifax -	9	9	8½	8½	8½	8½	7½	6
Hartlepool -	9½	10	9½	9½	—	—	—	7-7½
Hastings and St. Leonards -	8	8	8	8	—	8	7	5½-6
Huddersfield -	9	9	11	8½	9	7½-8	8	6
Hull -	9½	9	9	9	9	9	8	6½-7
Ipswich -	8	8	8	9	9	8	7½	5-5½
Keighley -	8½	8½	8	7½	8½	7½	7½	6
Lancaster -	9½	10	8½	9	9	8	8½	5½-6
Leeds -	9½	9½	9	9½	9	9	8	6½-7
Leicester -	9	9	9	10	9	9	8	6-6½
Leigh -	9½	9½	9½	9	8½	9	8	6-6½
Lincoln -	8½	8	8	9	8	8	7½	5-6
Liverpool -	9½	9½	9½	9½	9½	9½	8½	5-6
London -	10½	10½	10½	11	—	11	—	—
Londonderry -	7	7	7	7	—	7	7	15s. wk.
Macclesfield -	8	8	8	7½	6½	7½	7½	5
Manchester -	9½	10	9½	10	9	9	8½	5½-7
Merthyr Tydfil -	8½	8½	8	8½	8	8	7½	5½
Middlesbrough -	9	9½	9½	9½	9	9	8	6½-6½
Newcastle -	9½	9½	9½	9½	9	9	8½	6
Newport (Mon.) -	8½	8½	7½	8½	8½	8½	7½-8	5½
Northampton -	8½	8½	8½	8½	—	8½	7½-8	5½
North Shields -	10	10	10	10½	9½	9½	9	6½-7
Norwich -	8	8	8	8	7½	8	6½	5
Nottingham -	9½	9	9	10	9	9	8½	6½-7
Oldham -	9½	10	9½	9	8½	9	8½	5½-7
Oxford -	8½	8	8	8	8	8	7	5½
Paisley -	9	9½	9	9	9	9½	9	6
Perth -	8	10	8	8	8	8	7½	5½-6
Plymouth -	8	8	8	8	8	8	7	5
Portsmouth -	8½	8½	8	8½	pce.	7½	6½-7	5½-6
Preston -	9½	10	9	8½	8½	8½	8½	5½-6
Rochdale -	9½	10	9	9	8½	9	8½	5½-6½
Rotherham -	9½	9½	8½	8½	8	8½	7½	6
Scarborough -	8½	8½	8	8½	33s. wk.	8	7½	6
St. Helens -	9	9	9	9	9	8½	8½	5½-6
Sheffield -	9½	9½	9	9	9	9	8½	5½-6½
Southampton -	7½	8	8	8	pce.	8	7	5
Southport -	9	9	8½	9	9	9	8½	5
South Shields -	9½	—	9½	—	9½	9½	9	6
Stockport -	9½	9½	9	10	8½	8½	8	4½-7
Stockton - on-Tees -	9	9½	9½	9½	10	9	8	6½-6½
Sunderland -	9½	10	9½	9½	9½	9	8	6½-7
Swansea -	8½	—	8½	8½	—	8½	7½	5½
Torquay -	7	7	7½	7	7	7	7	4½-5
Wakefield -	9	8½	8	8½	8	7½	7½	6
Walsall -	9	8½	8½	8½	8½	8½	7	5½-6½
Warrington -	8½	9½	9½	9½	8½	8½	8	5½-6½
West Bromwich -	9½	9	8½	9	pce.	8½	7	6-6½
Wigan -	9½	10	9	9	8½	9	8½	5½-7
Wolverhampton -	9	9	9	8½	8½	9	7½	6-6½
Worcester -	8	8½	8½	8½	8½	8½	7	5½
Yarmouth -	7	7½	7½	A	7½	3½-7	6	4-4½

A. Done by bricklayers.

Builders' Notes.

Mr. William Atkinson (of Messrs. Welch & Atkinson, surveyors, of 10, Lancaster Place, Strand) has retired from the firm, the business of which will be continued at the above address under the old name by Mr. George Stephenson who has for several years been a member of the firm.

A Scottish Contract.—The British Aluminium Co. have given a contract to Messrs. M'Laughlin & Harvey, of Belfast, to build 207 workmen's and officials' houses for them at Kinloch, Leven, in connection with their works there. Operations are to commence immediately.

A Sale of Freehold Building Land at Welwyn is to be held by Messrs. Hampton & Sons at the Mart, Tokenhouse Yard, E.C., on June 26th, at 2 p.m. This land, known as the High Welwyn Estate, will be sold in lots of one-half acre to 17 acres. The estate is 300ft. to 400ft. above sea-level and command fine views of the country round.

Dunfermline Masons.—A year ago the wages of builders in the Dunfermline mason trade were reduced from 9½d. to 8½d. per hour, and those in the hewing department from 9d. to 8d. There have been negotiations between masters and men, and as a result of a conference held last week, a renewal of the old agreement was signed.

The British Uralite Co. of London have appointed Messrs. Parnall & Sons, Ltd., of Narrow Wine Street, Bristol, as their agents for Bristol, West of England, and South Wales. Messrs. Parnall & Sons, Ltd., are an old established firm of shop fitters and weighing machine manufacturers, and they propose holding stocks of "Uralite" in Bristol and various other centres, so that builders may be able to obtain prompt delivery of material required for urgent jobs.

A New London Hotel.—A palatial private and residential hotel with public restaurant de luxe is to be erected on the site of Wellington House, Buckingham Gate, recently vacated by the War Office. The building will have a frontage of 177ft. to Buckingham Gate with a return frontage to York Street of 144ft. The public restaurant will be entered from the apex of the building—the site being triangular—and the hotel proper from Buckingham Gate. The fittings and appointments will be of a sumptuous character, and the hotel will be provided with three electric passenger lifts, goods and service lifts. The elevations will be carried out in cherry red bricks and terra cotta dressings and enrichments with "dragged" surface. The cost of the scheme, including site, will exceed £100,000. Mr. Charles Gray, of Kensington and Shepherd's Bush, is the contractor, and Messrs. Palgrave & Co. are the architects. The work is to be commenced immediately.

Architect to Llandaff Cathedral.—The Dean and Chapter of Llandaff have appointed Mr. F. R. Kempson consulting architect to the Cathedral. Mr. Kempson received the early part of his professional education at Llandaff as a pupil of Messrs. Prichard & Seddon.

Dr. Gore on Church Brasswork.—Addressing the Birmingham art students last week the Bishop of Birmingham said that, going about from church to church, he saw so much brasswork on which so much money had been lovingly spent—altars, eagles, lecterns and screens—almost without exception mechanically ugly, formless, barren of ideas, turned out at so much a yard. There was hardly any of it they would wish to retain, or which they could think of handing down to generations yet to come without a sense of shame.

Builders' Current Price List of Specialities.

This list is not intended to promote undercutting, and prices are subject to discounts for a quantity and for cash. Readers are advised to write for these discounts. Where prices for goods are standardised and fluctuation takes place in trade discounts, our prices have the discounts deducted. In some cases it is difficult for firms to quote prices, and we have stated where they will be pleased to send catalogues and quotations immediately on receipt of applications.

Goods.	Description.	Merchants or Manufacturers.	Address.	Size.	Weight.	Quantity. per	Price		
							On Rail.	Divrd. at London Termini.	Divrd. to Buyer.
Baths:									
Iron	Rolled edge, white vitreous enamelled.	Doulton & Co., Ltd.	Lambeth, London	5ft. 6in. inside.	—	each	£4 7s. 6d.	—	—
Bathroom Suites	Complete as advertised	Standard Sanitary Manufacturing Co.	22, Holborn Viaduct, London.	—	—	—	—	—	£18 18s.
Blinds:									
"Japa"	Sanitary	Japa Blinds, Ltd.	55, Barbican, London, E.C.	All sizes	72 long 36 wide.	—	—	From 2s. 6d. to 16s. doz.	Free.
Boilers:									
Saville	Wrought-iron for hot-water heating and supply.	Hartley & Sugden, Ltd.	Halifax	30 x 13 to 72 x 30.	3 cwt. to 17 cwt.	each	£9 5s. to £52.	Free in Great Britain.	—
Bricks:									
Blue	Staffordshire pressed	Hathern Station Brick and Terra Cotta Co., Ltd.	Loughborough	9 x 4½ x 2½	3½ tons	1000	£2 15s.	£3 13s.	—
Facing	Blue and brindled	G. Woolliscroft & Sons, Ltd.	Hanley, Staffs.	9 x 4½ x 3	3½ tons	1000	35s. to 37s. 6d.	£4 3s. to £3 3s. 6d.	—
Facing	Red terra-cotta	G. Woolliscroft & Sons, Ltd.	Hanley, Staffs.	9 x 4½ x 3	3½ tons	1000	£2 10s.	£3 18s.	—
Stocks	Sand stocks	Gibbs Brothers	Loughborough	9 x 4½ x 2½	2½ tons	1000	£2	£2 15s.	—
Casements and Sashes:									
Metal Casements	Iron, steel, and bronze	George Wragge, Ltd.	London and Manchester	Registered sections.	—	each	From 15s.	16s.	—
Metal Sashes	Ditto	Ditto	Ditto	Ditto	—	ft. super.	From 6d.	—	—
Castings:									
Iron	Plain and ornamental	Walter Macfarlane & Co.	Saracen Foundry, Glasgow	—	—	—	Prices on application.		
Cement, Lime, &c.:									
Cement	Portland	Associated Portland Cement Manufacturers (1900), Ltd.	Dixon House, 72, Fenchurch Street, E.C.	—	—	—	Prices on application.		
Lime	—	Associated Portland Cement Manufacturers (1900), Ltd.	Dixon House, 72, Fenchurch Street, E.C.	—	—	—	Prices on application.		
Chimney-Pieces:									
Marble	—	J. & H. Patteson	7, Bayley Street, Bedford Sq., London, and Oxford St., Manchester.	—	—	—	Prices on application.		
Chimney Pots	"Notlor" patent self-flanching and weathering.	Notley & Taylor	Finsbury Pavement House, E.C.	9 x 9 and 14 x 9 flues.	—	—	—	From 3s. 6d.	—
Closets:									
Cisterns, Seats, &c.	For houses	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	set, with fittings.	£2 to £10	—	—
Latrines	For schools and workmen	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	stall each	30s. to 70s.	—	—
"Simplicitas"	—	Doulton & Co., Ltd.	Lambeth, London	—	—	—	£1 15s.	—	—
Columns	Cast-iron	Measures Bros., Ltd.	53B, Southwark, Street, London, S.E.	stock patterns.	—	ton	£7	£7	—
Compoboard	Swedish	Messers, Ltd.	79½, Gracechurch Street, E.C.	4ft. x 8 to 18ft. x 3in. and 4in.	1 ton	2,000ft. super.	Prices on application.		
Concrete:									
Armoured	Floors and roofs	Trussed Concrete Steel Co.	Caxton House, Westminster.	—	—	sq. yard	—	—	8s.*
Conduits:									
"Simplex" steel	Screwed wireduc.	Simplex Steel Conduit Co., Ltd.	Garrison Lane, Birmingham.	½ to 2 diam.	20lbs. to 140lbs.	100ft.	—	—	12s. 8d. to £3 3s.
Door Furniture:									
Door Springs	With silent check	Robert Adams (patentee)	3 & 5, Emerald Street, London, W.C.	For medium doors.	—	each	D.A. 46s. S.A. 42s.	D.A. 46s. S.A. 42s.	—
Sliding Door Fittings	Top and bottom rollers and guide rails.	John Bousfield	Bar Ironworks, York	various	—	each	—	rollers from 6s. 6d.	—
Drain:									
Testing Apparatus	For smoke or air test: No. 358	Burn Brothers	Rotunda Works, 3, Blackfriars Rd., London, S.E.	—	About 30lbs.	each	£4 4s.	—	—
Elevators:									
"Otis"	Electric and hydraulic	Otis Elevator Co., Ltd.	4, Queen Victoria Street, London.	—	—	—	Prices on application.		
Enamels:									
"Sanaline"	Pure white or colours	Asp'nall's Enamel, Ltd.	New Cross, London	—	—	gallon	—	—	18s.
Faience:									
White and coloured	For elevations	Alfred Whitehead	Prudential Build'gs, Leeds	—	—	sq. yard	74s. 6d.	79s.	—
Fans:									
Fans, Blowers, and Motors.	Belt, electric or steam driven.	Matthews & Yates, Ltd.	Cyc'one Works, Swinton, Manchester.	all sizes	—	—	Prices on application.		
Felt:									
Rubero'd Sacking Felt	High-grade inodorous felt	Robert W. Blackwell & Co., Ltd.	59, City Road, London, E.C.	36 x 72	44lbs.	roll, 24sq yds.	—	—	13s. 6d.
Fencing:									
Iron	"Greenhill" patent automatic railing.	Hill & Smith	Brierley Hill Iron Works, Staffs.	3 ft. high ¼ verticals.	40lbs. yd.	yard	4s. 5d.	4s. 9d.	—
Fireproofing (See also Partitions)									
Terrawode Brickwood	Fireproof floors	Jabez Thompson & Sons	Northwich, Cheshire	4ins. thick	—	sq. yd.	6s.	7s.	—
Columbian	Reinforced concrete floors and roofs.	Columbian Fireproofing Co.	37, King William Street, London.	—	—	—	Prices on application.		
Steel Sheetting	For partitions, reinforced concrete, damp-course, &c.	The Fireproof Co., Ltd.	10, York Buildings, Adelphi, W.C.	all sizes	all weights.	sq. yard	from 1s. 3d.	from 1s. 3d.	plus rail charge.
Expanded Steel	Reinforcement for every description of concrete work.	New Expanded Metal Co.	York Mansion, York Street, Westminster, S.W.	up to 16ft. x 8ft.	2lbs. to 30lbs.	sq. yard	5d. to 4s. 9d.	Price list on application.	
Floors and Roofs	Steel concrete	Homan & Rodgers	17, Gracechurch Street - Caxton House, Westminster.	—	—	sq. yd.	—	—	7s.*
Floors and Roofs	Reinforced concrete	Trussed Concrete Steel Co.	—	—	—	sq. yd.	—	—	8s.*
Floors and Roofs	Reinforced concrete	Potter & Co., Ltd.	66, Victoria Street, London, S.W.	—	—	sq. yard	—	—	From 6s.*
Floors:									
Columbian	Concrete fireproof floors and roofs.	Columbian Fireproofing Co.	37, King William Street, London.	—	—	—	Prices on application.		
Euboeolith	Patent flooring	Euboeolith Patent Flooring	3, Victoria Street, Westminster.	—	—	yard sup.	5s. to 6s.	—	—

* Erected.

This List is not intended to promote undercutting. Readers should write for discounts for quantity and for cash.

Builders' Current Price List of Specialities—(continued).

Goods.	Description.	Merchants or Manufacturers.	Address.	Size.	Weight.	Quantity.	Price		
							On Rail.	Divrd. at London to Termini.	Divrd to Buyer
Galvanised Iron:									
Sheets	Corrugated	Baldwins, Ltd.	5, Fenchurch St., London, E.C.	5ft. to 9ft. x 2ft. x 22 or 24 G.	—	ton	—	£14 10s.	—
Sheets	Flat	Baldwins, Ltd.	5, Fenchurch St., London, E.C.	72 x 24 to 36 x 20 or 24 G.	—	ton	—	£15	—
Buildings	Of every description	Baldwins, Ltd.	5, Fenchurch St., London, E.C.	—	—	—	Prices on application.		
Gas Generators:									
Acetylene	Five-light portable	Strode & Co.	48, Osnaburgh Street, London.	15ins. diameter, 24ins. high.	—	each	—	£3	—
Glass:									
Stained and Embossed	Leaded lights, embossed and brilliant cutglass.	Young & Martin, Ltd.	Stratford, E.	—	—	—	Prices on application.		
Stained	Memorial and other windows	E. E. Oldacre & Co.	Stirling Place, Hove	—	—	ft. super.	Prices on application.		
Guards, Wire:									
Straight Lattice	Half mesh	Richard Johnson, Clapham & Morris, Ltd.	Manchester	6ft. x 3ft.	14lbs.	sq. ft.	5d.	5½d.	5½d.
Hooks:									
Hat and Coat	"Schola" pattern for schools, &c.	Brookes & Co., Ltd.	4, Cateaton Street, Manchester.	—	—	—	Prices on application.		
Joinery:									
Paneling	High class 1-in. Austrian oak paneling.	Elliott's Moulding & Joinery Co., Ltd.	Newbury	3ft. to 7ft. high.	ft. super.	2s.	2s. 1d.	—	—
Joists:									
Steel	Broad flange beams	H. J. Skelton & Co.	71, Finsbury Pavement, London, E.C.	—	—	ton	—	£6 10s.	—
Steel	English and foreign	Columbian Fireproofing Co.	37, King William Street, London.	—	—	—	Prices on application.		
Steel	Belgian and German	Measures Bros., Ltd.	53B, Southwark Street, London, S.E.	3 to 20 deep.	—	ton	£6 10s. basis sections.	£6 10s. basis sections.	—
Laundry Machinery:									
Ironing Machines	High-class "Decondin"	W. Summerscales & Sons, Ltd.	Keighley, Yorks	54ins. to 120ins.	—	each	£50 to £180	£52 to £188 10s.	—
Lavatories:									
Glazed Ware	For schools, workmen, and private houses.	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	set, with fittings.	£1 10s. to £4.	—	—
Leaded Lights	All descriptions	E. E. Oldacre & Co.	Stirling Place, Hove	—	—	ft. super.	Prices on application.		
Lifts:									
Electric	All other types	A. Smith & Stevens	Battersea, London	All sizes.	All weights.	—	Prices on application.		
Hand-power	All kinds, for all purposes	George Johnson	227, St. John's Hill, London, S.W.	—	—	—	Prices on application.		
"The Premier"	Dinner and service lift to raise ½ cwt.	The Lift and Hoist Co.	Premier Iron Works, Prince Street, Deptford, S.E.	Cage inside 2ft. wide, 1 ft. 6 deep, 2 ft. 6 high.	—	—	—	£9 10s.	—
Lighting and Heating:									
Electric light and gasfittings, &c.	—	Young & Martin, Ltd.	Stratford, E.	—	—	—	Prices on application.		
Lightning Conductors	Copper tape	Joseph Lewis	5 & 6, Great Winchester Street, London, E.C.	¾ x ½ and upwards.	—	foot run	from 1s.	—	—
Locks:									
Coin Collecting	Bright brass or bronzed	New Century Co.	235, High Holborn, London, W.C.	14ins. x 4½ins.	—	each	—	—	35s.
Kaye's Patent	Four lever mortice, iron and brass.	Joseph Kaye & Sons, Ltd.	93, High Holborn, London, W.C.	—	—	each	—	—	7s. 6d. 10s. 6d.
"C. and B."	Registered mortise Nos. 1, 2, and 3.	Colledge & Bridgen	Midland Works, Wolverhampton.	6 inch	—	dozen	—	—	£3 6s. £2 5s. £1 9s.
Mantelpieces:									
White Wood	With overmantel	The Hardware Trading Co.	12, New Oxford Street, London, W.C.	Opening 38 x 38.	72ins.	each	£2	—	—
Marble, Mosaic, and Stone Work:									
Glass Mosaic	Coloured art	The Cloisonné Glass Co.	40, Berners Street, W.	—	—	sq. ft.	—	From 3s.	—
	Plain or to design	J. & H. Patteson	7, Bayley Street, Bedford Square, London, and Oxford Street, Manchester.	—	—	—	Prices on application.		
Motor Wagons	Steam	St. Pancras Ironworks Co., Ltd.	171, St. Pancras Road, London, N.W.	—	4 tons 19cwt.	each	—	From £530.	—
Paint:									
"Japonika," Enamel	Elastic, impervious, covers goyds. sup. per gal.	John Line & Sons, Ltd.	Alfred Place, Tottenham Court Rd., London, W.C.	—	—	gallon	18s.	—	—
Anti-corrosive, &c.	"Bitumastic" solution and enamel.	Wailles, Dove & Co., Ltd.	Newcastle-on-Tyne, London, Liverpool, Cardiff, Birmingham, and Glasgow.	—	—	—	Prices on application.		
Partitions:									
Dovetail Corrugated Steel Sheetting.	For partitions, reinforced concrete, &c.	The Fireproof Co., Ltd.	10, York Buildings, Adelphi, W.C.	All sizes	All weights.	sq. yard	From 1s. 3d.	From 1s. 3d.	1s. 3d. plus rail.
Partitions	"Kulm" slabs	H. W. Cullum & Co.	Craven House, Kingsway, London, S.W.	—	—	sq. yard	Prices on application.		
Patent Plaster	Hollow interlocking blocks	Havelock Patent Plaster Partition Co.	63, Finsbury Pavement, E.C.	29 x 17	70lbs. super. yard.	super. yard.	3s. 6d.	4s. 6d.	6s.*
Plaster	Partition slabs	Jabez Thompson & Sons	Northwich, Cheshire	12 x 12 x 2	—	sq. yard	3s. 6d.	4s.	—
Porous Brick	Porous terra-cotta blocks	Hempstead Patent Brick Co.	Hemel Hempstead	9 x 12 x 1½	—	sq. yard	2s.	2s. 4d.	—
Terrawode Brickwood School	Partition bricks	Jabez Thompson & Sons	Northwich, Cheshire	9 x 4½ x 3	2 tons	1000 sq. ft.	£3 5s.	£4 9s.	—
	—	John Stones	"Rosside," Ulverston	—	—	—	Prices on application.		
Pavement Lights	Prismatic	St. Pancras Ironworks Co., Ltd.	171, St. Pancras Road, London, N.W.	—	—	per ft. super.	—	From 4s. 6d.	—
Photo Prints, Copies, &c.:									
"True to scale"	(Dorel system)	W. F. Stanley & Co., Ltd.	13, Railway Approach, London Bridge, S.E.	Imperial	—	2 copies	—	—	2s. 3d. p free
True scale	Dorel and photo-litho methods.	Vincent, Brooks, Day & Son, Ltd.	48, Parker Street, Kingsway, London, W.C.	—	—	—	Prices on application.		
All Kinds	On any material	London Drawing and Tracing Office.	98, Gray's Inn Road	—	—	—	Prices on application.		

* Executed.

This List is not intended to promote undercutting. Readers should write for discounts and for quantity for cash.

Builders' Current Price List of Specialities—(continued).

Goods.	Description.	Merchants or Manufacturers.	Address.	Size.	Weight.	Quantity. per	Price			
							On Rail.	Divrd. at London Termini	Divrd. to Buyer.	
Pipes:										
Columbian	Armoured cement for water and sewage conveyance.	Columbian Fireproofing Co.	37, King William Street, London.	—	—	—	Prices on application.			
Drain (iron)	Immense assortment of fittings stocked.	Burn Bros.	Rotunda Works, 3, Blackfriars Rd., London, S.E.	2 to 6	L.C.C. weights.	—	Prices on application.			
Pipe joint paste	"Wisconsin" Graphite	G. F. Hopkins & Co.	112, Westminster Bridge Road, London, S.E.	—	—	1 lb. to 60 lbs.	1s. 1d. to 6½d.	—	—	—
Plaster:										
Fibrous, &c.	For relief decoration	G. and A. Brown, Ltd.	167, Hammersmith Road, W.	—	—	—	Prices on application.			
Keene's & Parian	—	Associated Portland Cement Manufacturers (1900), Ltd.	Dixon House, 72, Fenchurch Street, E.C.	—	—	—	Prices on application.			
"Pytho"	For interior plastering	Plaster, Brick, and Stone Co., Ltd.	Wall Grange, near Leek, Staffs.	—	1 ton	—	37s. 6d.	42s. 2d.	—	—
Rainwater Heads and Pipes:										
Rainwater Heads	Cast lead and iron	George Wragge, Ltd.	London and Manchester	stock designs.	—	each	From 16s. 6d.	17s. 6d.	—	—
Roofs:										
Rubberoid Roofing	High-grade prepared roofing	Robert W. Blackwell & Co., Ltd.	59, City Road, London, E.C.	36×72	40lbs. to 100lbs.	216 sq. ft.	—	½ ply, 17s. 4d.; 20s. 6d.; 2 ply, 31s. 6d.; 3 ply, 41s. 6d. From 6d. upwrds.*	1 ply, 20s. 6d.; 3 ply, 34s. 6d.	—
Steel	Principals and corrugated iron	E. F. Blakeley & Co.	Vauxhall Ironworks, Liverpool.	—	—	ft. super.	—	—	—	—
Sanitary:										
Engineers' Appliances	Baths, lavatories, closets, pipes, cisterns, pumps, &c.	Young & Marten, Ltd.	Stratford, E.	—	—	—	Prices on application.			
Syphons and Tanks	Automatic flushing	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	each	£1 to £3	—	—	—
Waste Preventors	"Paisley," painted	Doulton & Co., Ltd.	Lambeth, London	2 gallon	—	each	£1 3s. 6d.	—	—	—
Waste Preventors	"Well," painted	Doulton & Co., Ltd.	Lambeth, London	2 gallon	—	each	16s.	—	—	—
Scaffolding:										
Putlogs	Hewn birch	Vigers Bros.	67-68, King William Street, E.C.	—	—	dozen	5s. 3d. in docks.	—	—	—
Shutters:										
Revolving	No. 7 convex wood lath	Clark, Bunnett & Co., Ltd.	New Cross Road, London, S.E.	—	—	ft. super.	1s. 6d.	—	—	—
Signs	Anything and Everything	H. B. Torode	22, Henrietta Street, Strand	L.C.C. regulation size	—	—	Prices on application.			
Sinks:										
Glazed Ware	"Krator," "Helios," "Bel-fast" and "Edinburgh."	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	each	10s. to £5.	—	—	—
Slates and Slating:										
"Arlon" Slates	Unfading green	Pearson Bros. & Campbell	18, Water Street, Liverpool	—	—	—	Prices on application.			
Buttermere or Cumberland and Westmoreland Green Slates	Light sea green, olive, and dark.	Buttermere Green Slate and Stone Works.	Keswick	30 to 12 long.	—	ton	£4 5s.	£5	—	—
Slating and Tiling	All kinds—green slating speciality.	Roberts, Adlard & Co.	London, Faversham, Brighton, &c.	as required	—	1,000	Prices on application.			
Slates and Slating	Portmadoc, French and American.	Young & Marten, Ltd.	Stratford, E.	—	—	—	Prices on application.			
Sound-Proofing:										
Deafening Quilt	Cabots' double ply	Arthur L. Gibson & Co.	19/21, Tower Street, Upper St. Martin's Lane, London, W.C.	—	120 lbs.	bale, 500sq. ft.	36s. 6d.	—	—	—
Springs:										
Door Checks	"Blount"	Charles Winn & Co.	Birmingham	—	—	—	Prices on application.			
Stone:										
Bramley Fall	Sandstone, light and grey	B. Whitaker & Sons, Ltd.	Horsforth, near Leeds	any sizes	14ft. to 1 ton.	cube ft.	rod.	1s. 9d.	—	—
Granite	Architectural and monumental.	Kirkpatrick Brothers	Trafford Park, Manchester	—	—	—	Prices on application.			
Dark-Bed Hopton Wood	Hard limestone, colour grey	J. Hodson & Son, Ltd.	Nottingham	random blocks.	—	foot cube	1s. 2d.	2s.	—	—
Yorkshire	Sandstone, various colours	J. Hodson & Son, Ltd.	Nottingham	random blocks.	14ft. cube to ton.	foot cube	From 2s.	From 2s. 10d.	From 3s.	—
Staircases:										
Spiral	—	St. Pancras Ironworks Co., Ltd.	171, St. Pancras Road, London, N.W.	From 3ft. 6ins. in diameter.	—	per ft. rise.	—	From 13s.	—	—
Terra-cotta:										
Window Heads	Buff or red	Walwyn T. Chapman	Cleethorpes	3×9 4½×10.	1cwt.	each	5s.	—	—	—
Tiles:										
Coloured Enamelled	Best quality in brown, blue, green, &c.	Carter & Co.	Encaustic Tile Works, Poole.	usual sizes	1 ton	55yds. sup.	10s. 6d. per yd.	11s. per yd. sup.	11s. 2d. per yd.	—
Tessellated	Best quality any plain pattern	Carter & Co.	Encaustic Tile Works, Poole.	usual sizes	2 tons	80yds. sup.	5s. 8d. per yd. sup.	5s. 4d. per yd. sup.	5s. 6d. per yd. sup.	—
Decorative	Floor	Craven, Dunnill & Co., Ltd.	Jackfield, R.S.O., Shropshire.	every size	56lbs.	sq. yard	from 3s. 6d.	4s. 6d.	4s. 6d.	—
	Wall	Ditto	Ditto	—	40lbs.	—	from 5s. 6d.	6s. 4d.	6s. 4d.	—
	Mosaic	Ditto	Ditto	—	48lbs.	—	from 12s. 9d.	15s.	15s.	—
	Faience	Ditto	Ditto	—	170lbs.	—	from £1 3s.	£1 5s.	£1 5s.	—
"Opalite"	Opal glass, with Sheldermine backing.	Wm. Griffiths	126, Hamilton Ho., Bishops-gate St. Without, E.C.	9×3 and 6×6.	—	sq. yard	—	—	10s. 6d.	—
Wall	Patent undercut back	T. & R. Beote, Ltd.	Burslem	6×6	50 lbs.	sq. yard	6s.	6s. 6d.	6s. 9d.	—
"Durolite"	Glass tiles, with patent fire-proof backing to prevent surface cracking.	Durolite, Ltd.	36, Camomile Street, London, E.C., and St. Helens, Lancashire.	white and tinted 6×6 and 9×3 marbles 12×6 30ins. x 24yds.	—	sq. yd.	—	—	white 10s. 0d. tinted 11s. 6d. marbles 12s. 6d.	—
Tracing Cloth:										
"Ivorie"	Pure white	Norton & Gregory, Ltd.	Castle Lane, Westminster	—	—	roll	—	—	—	—
"Koh-i-noor"	—	L. & C. Hardmuth	12, Golden Lane, London, E.C.	30, 36, 40, 42, 30ins. x 20yds.	—	roll of 24yds.	Prices on application.			
Urinals:										
Glazed Ware	Circular slab and T-backs	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	—	£3 to £15	—	—	—
Ventilators:										
"Acme" and Spherical	Exhausts and intakes	Acme Ventilating & Heating Co.	35, Tarleton Street, Liverpool.	6ins. to 24 diam. tube	—	each	—	—	17s. 6d. to £15.	—
Boyle's Patent	Latest "air-pump" ventilators (design No. 175).	Robert Boyle & Son	London and Glasgow	24ins. to 54ins. diam. jaws 9 ins. opening 12	—	—	—	—	25s. to £18 18s.	—
Vices:										
"Lightning"	Instantaneous action	C. Nurse & Co.	181-183, Waltham Road, London, S.E.	—	50 lbs.	each	17s.	—	—	—

* Erected.

† Approximate price fixed, complete, in London.

‡ Executed.

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Errors of the Craftsman. By this time we have had a surfeit of the nonsense about art and architecture talked by the amateur, the painter and the craft-worker. The ideals of their school of thought are the legacy of a few energetic spirits of the past, such as John Ruskin, William Morris, Pugin and other leaders of the Gothic Revival. These enthusiasts served a good purpose at the time, as all reformers do, but we cannot follow them to the lengths they went. Their practice was good in many directions, but this does not prove that all their ideas were correct; rather we should say that their practice was better than their theory, and that good results were obtained in spite of their ideals. The fact is, the craftsman—a man who works with his own hands and does things in their entirety himself—is unable to appreciate the necessities of a co-operative craft such as architecture. It is impossible for any one man to execute a whole building. He may design it, but other hands have to carry it out, and it is both impossible, and indeed it would be detrimental, to expect every worker to have a share in the design and conception of the building. The architect is the master craftsman, equivalent in position to the admiral or the general-in-chief, whose talents are the ability to direct and plan the scheme upon which the energies of the executants shall be put forth. Just as

a good general or a good admiral must be a master of every branch of the service, so must the real architect be thoroughly acquainted with all the crafts, but as we do not expect the first to be better at each and all the different occupations than those he directs, neither is it necessary for the architect to be a better craftsman than all those under his direction. We have an article before us which typifies the nonsense that is talked by the artistic craftsman. This is published in the first number of a journal which has just made its appearance with the title of "The Bond." The following are some of the statements in this article:—"The distance of the architect from his work, unless he is his own builder, implies the impossibility of getting the proper control of the materials he uses. The dressing of stone or any other material will be subject to the builder's men that he employs, even if he has faint intuitions about the importance—the incalculable importance—of surfaces. How is he to get his way? The builder he employs to-day will be employed to-morrow by another architect with totally different views. The danger of exalting craft for itself is a very serious one. Unless craft is informed with the 'idea,' it is, as rightly seen by Plato, a very low thing. In art, it is the least part that can be learned. Is there any way in which, instead of talking about it, architecture could really become the leader of the arts? Because at present every other craftsman is nearer to his work than the architect." The first mistake this writer makes is that there is a great difference in the method of working stone. The craft of masonry is simple, tools are used only in a few ways, and the scientific cutting of stone is easily learned. It does not require much practice for the architectural student to obtain the knowledge of the properties of stone by actual practice, and an architect who has thus worked, of which there are many, and who has studied scientific stonecutting, can give instructions to the craftsman as to what surface or form he desires; and so it is with other crafts. The reference to Plato in respect to the importance of idea and the minor importance of craft disproves the writer's own argument, and supports our contention. The craftsman is too close to his work to be able to train and develop those large ideas which are necessary in architectural design. The fact is that the architect is a craftsman on a large scale. His craft is architecture, of which the craftsmen in the smaller branches of building have no notion. Modern building calls for much greater knowledge from the architect than in the past, and he cannot be so close to the craftsman as formerly, but it is not impossible for him to have a mastery of the uses and methods of all branches, for our requirements in architecture have by no means reached the limits of human intelligence, and modern methods of education enable a

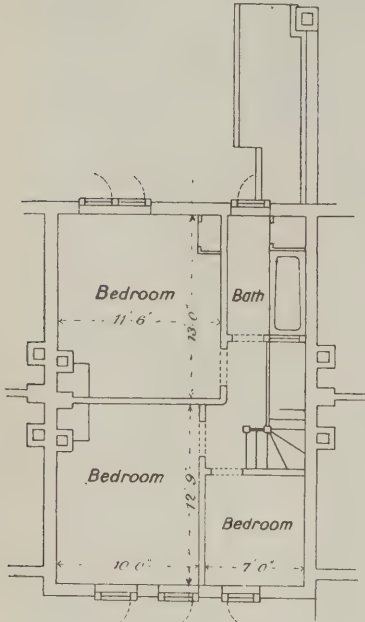
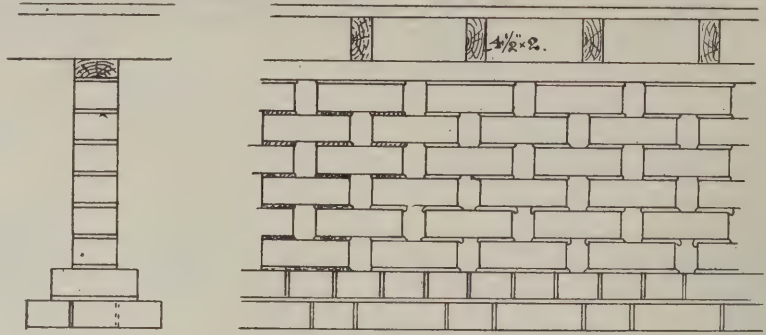
man to obtain knowledge in a few months which formerly took years to acquire. We all appreciate in Nature the fact that more complicated structural form presents more opportunities for defects, but we are not caught by surface defects, so that we value less highly forms imperfect, even deformed or deficient in parts, than those perfect in detail which are lower in the scale of evolution. Many craftsmen from inability to appreciate modern work betray a narrow outlook and merely show their ignorance.

Some Ideas from Mr. Shaw. SOME remarks of Mr. Norman Shaw, R.A., made in the course of an interview given last week to a representative of the "Daily Chronicle," are suggestive in connection with the foregoing. Mr. Shaw is very hopeful of the work of modern architects and of the architecture of the London of the future. He was full of faith in the impulses and even the achievements of our time. "Everywhere," said he, "I see energy, energy, energy. We make mistakes certainly, but after all it is not absolutely impossible to pull a building down. Nearly every beautiful building in the world replaced another. William of Wykeham destroyed some splendid old bits of Winchester Cathedral—and set better in their stead. Above all," Mr. Shaw contended, "our architects are working nowadays in what seems to me the right direction towards the evolving of what we have needed so long—a characteristic modern English style. They are beginning to devote themselves to structure instead of thinking, as used to be the case, that it was beneath an architect's dignity to do anything else but 'lay on the trimmings.' So far as I can see the reason why Victorian architecture has so poor a record is simply because our architects were jumping about from one foreign style to another—trying to find a tradition instead of making one of their own. I think Ruskin did a great deal of harm. On the other hand, what is needed, and what I think is being done, is the evolving of a native English style of architecture—domestic at any rate—based upon our own climate, our own materials, our own ways of life, and our own landscape. The arrival of steel girders is enormously important. They might be used quite boldly and characteristically, and with the most graceful results. The Americans have not turned them to very lovely purposes, but there is no reason where we should not, if only we are not ashamed of them. Everything will be evolved if we really love our own life and endeavor it to ourselves. Everything has its artistic uses. Did not London smoke give us Turner? It is intensely important that in great matters, as in small, the use and structure of the building should be the basis of every kind of ornament that is demanded. It is no good having ornaments that are merely ornaments, and not structural."

S.K. EXAMINATIONS IN BUILDING CONSTRUCTION.—STAGE II.

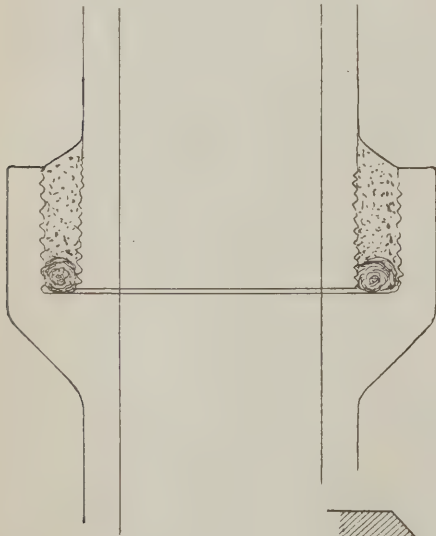
[Not more than six questions to be answered. The value attached to each question is shown in brackets. Time of examination, four hours.]

*21. Make a neat tracing in ink of the drawing, Fig. 21, with the writing and figures. The lines should be firm and solid and should finish accurately at the proper points. (30)



FIRST FLOOR PLAN.

22. Describe fully the preparation of the trench, the mixing and the laying of the concrete, and the laying and jointing of the pipes in a straight run of 4 in. glazed stone-ware house drain laid at an average depth of 3 ft. Draw, half-full size, a longitudinal section through one of the joints. (25)



The trench should be dug wide enough to allow for working room. If the earth is of a very loose character it will require shoring up, but in ordinary soils this will not be required for the depth given. The bottom of the trench is brought to a regular gradient by "boning" between points given by spirit-level agreeing with the working section. Any specially soft parts in the bottom of the trench should

be dug out and replaced by suitable material well rammed. The concrete should be mixed on a clean platform. The aggregate, which should not be coarse for this purpose, should first be spread out on the platform in a uniform layer, and the proper quantity of cement spread upon the aggregate. The whole should now be turned over by men with shovels ("tossed"), at least twice in a dry state and as often as appears to be necessary while the water is being applied. The concrete is then placed on the bottom of the trench to the requisite thickness, and the surface floated to the proper gradient. When the concrete has set, the pipes are laid upon it with the sockets uphill. The pipes are fitted as tight "home" as possible, the joints caulked with gasket, and filled and finished flush with cement-mortar. The body of the pipe between the sockets is flushed in with concrete and finished to the specified section. When the concrete is sufficiently set (and the drain tested) the trench is filled in, using the finer stuff around the pipe, and the upper layers rammed. When no caulking material is used the inside of the pipes at the joints should be carefully scraped clear of the cement.

[Note.—There are various kinds of pipes, self-jointing and otherwise; the description above deals with the ordinary spigot and socket pipe jointed with cement-mortar.]

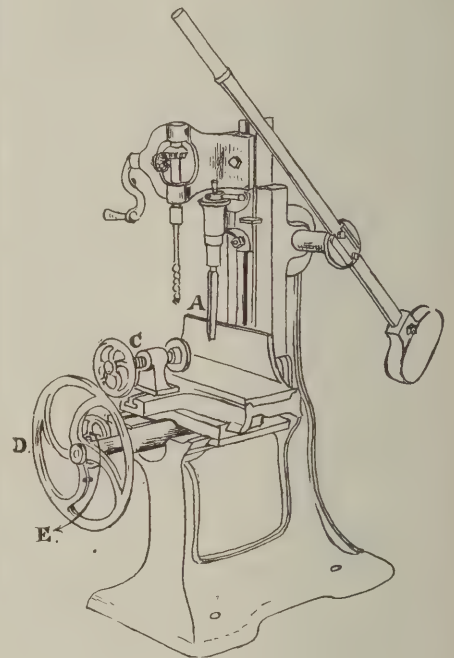
23. Draw to a scale of $\frac{1}{12}$ (1 in. to a foot) the elevation of 4 ft. run of a half-brick honey-combed sleeper wall eight courses high, including footing, and the ends of four joists suitable for a span of 6 ft.; also draw a cross-section of it showing the sleeper and joist. Show the joints of the brickwork and state under what circumstances a damp-proof course would be required. (25)

See drawing above. A damp-proof course is required when the subsoil is wet, and when the footings are laid directly upon it without a concrete footing or sub-floor.

24. Sketch on your squared paper a hand-mortising machine for working timber, and describe how it is used. (25)

The sketch shows both a chisel and an auger; it also illustrates the various motions of the bed on which the work is placed. The handle of the balanced lever is moved downwards; this brings down the chisel A by a rack-and-pinion movement, thus cutting

the mortise. The piece of timber is held on the bed by the screw C, which is adjustable by means of the slot shown. Right and left feed-movements are given by means of the



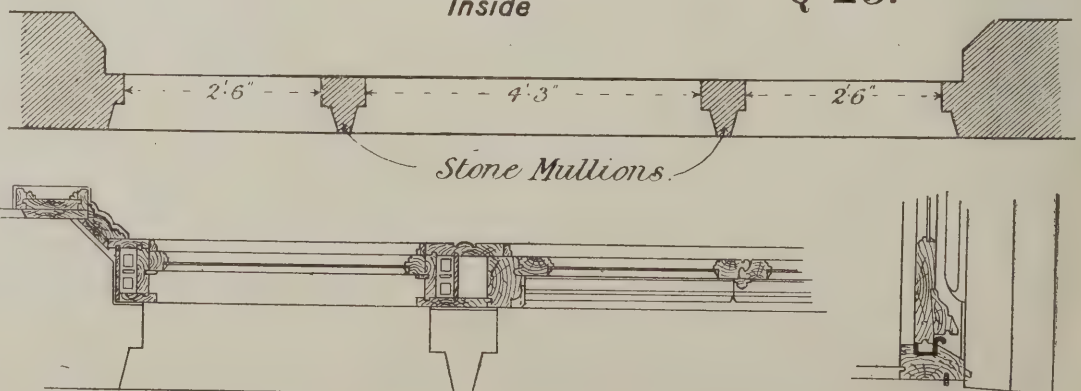
wheel D. The chisel is reversed by the small lever shown on top. The wheel E regulates the distance of the mortise from the face of the timber.

[Note.—A candidate would not be expected to give so elaborate a sketch, and he would be wise not to attempt to give unnecessary detail.]

*25. The diagram, Fig. 25, shows a three-light opening in a ground-floor room: the centre is to have a pair of French casements opening inwards and the side-lights double-hung sashes. Draw to a scale of $\frac{1}{12}$ (1 in. to a foot) a plan through the central and one side opening showing frames, casements, &c., and a vertical section to the same scale through the bottom rail of the French casement. (30)

See drawing at the foot of this page.

Q 25.



26. Explain fully what is meant by the terms "render, float and set" on brickwork. Describe the composition of the stuff used for each operation, and the mode of executing it.

(25)

Rendering is the first rough coat of plaster, usually roughened on the surface, i.e., "scratched"—in some localities called the scratch coat. Floating is the levelling-up coat, the surface of which is brought to a true plane, free from pits or hollows, by means of the "float" traversing the screeds which are previously set in the plane of the finished plaster. The "setting" coat is the last coat for giving a finished surface; it is applied with a plasterer's steel trowel and worked smooth, water being applied with a brush as required. "Render, float and set" specifies that the work is to be rendered, floated and set as above described. The plaster (called coarse stuff) is a rough mortar made of lime-putty and sand in the proportion of 1 of lime to 1 or 2 parts sand, thoroughly mixed with ox-hair (well-beaten to loosen it) in the proportion of 1 lb. of hair to 2 bushels of mortar. Coarse stuff is generally used for the rendering and floating coats. The setting-coat may be of fine stuff (lime-putty with a proportion of fine sand, and sometimes a small quantity of hair), "grey finish," or of putty gauged with plaster-of-Paris. In any case the description "render, float and set" would be further qualified by describing the setting coat.

27. A cistern is required to hold 1,000 gallons; what should be its length, breadth and height, and of what material should it be constructed if used for storing drinking water? What would be the weight of the water in the cistern when full?

(25)

A cubic foot of water contains $6\frac{1}{4}$ gallons, therefore the cubic contents of the tank should be $= \frac{1000 \times 4}{25} = 160$ cub. ft.

The dimensions of the tank may be 10 ft. by 4 ft. by 4 ft. A gallon of water weighs 10 lbs.; weight of water when full $10 \times 1,000 = 10,000$ lbs. = 4 tons 9 cwts. 1 qr. 4 lbs. If the water is a soft water it should not be stored in lead because soft water acts chemically upon lead, and certainly rainwater

stored in a lead cistern should not be used for drinking. The zinc from a galvanized tank is also dissolved by most waters, and though zinc is less deleterious than lead it is not good. Spring water as a rule does not act chemically upon lead, and a hard water also does not act upon it. It is said that an alloy of lead and tin is safe with soft boggy water. Oxide of iron is not dangerous to health, but a noticeable quantity is not pleasant to the taste and is not good. A painted iron tank after the oil of the paint has hardened is safe. A concrete tank, too, is safe.

*28. The diagram shows a block of stone being lifted by a sling chain and dogs; with a pull of 5 cwts. in the crane chain show graphically what the stress will be in each part of the sling chain surrounding the letter A, assuming free play at the eye of the dogs.

(30)

See criticism on next page. See diagram also. If it is attempted to draw a diagram of stresses, using the directions FE and GH we shall be led into absurdity. In our diagram it is seen that CD and BD are not parallel to FE and GH, as they should be if the original drawing were correct.

29. An internal brick wall 12 ft. long has to be removed and replaced by a fir beam which has to carry a distributed load of 4 tons. Calculate the scantling of the beam. If the same load, instead of being distributed, were concentrated at a point 4 ft. from one end, would you consider the beam strong enough? Give your reasons fully.

(40)

See criticism on next page.

Take 12 ft. as the span. Assume the breadth of the beam to be 8 ins. (to take the place of a 9 in. wall, allowing $\frac{1}{2}$ in. each side for furring). Moment of resistance = bending moment at centre $= 1 \times 6 \times 2240 = 13440$ ft.-lbs.

$= \frac{pbd^2}{6}$, where p = safe load in lbs. per square

foot, b = breadth ($\frac{3}{8}$), and d = required depth (in feet). Breaking load (taking Rivington's average), say, 6,500 lbs. per sq. in. = 936,000 lbs. per sq. ft. Factor of safety, say, $\frac{1}{3}$ $\therefore p = 117000$. $13440 = \frac{117000 \times \frac{3}{8} \times d^2}{6} \therefore d^2 =$

$\frac{18 \times 13440}{234000} = \frac{1344}{1300} = 1.033$. $d =$ say 12 ins.

Scantling of beam 12 ins. \times 8 ins. Suppose 4 tons placed 4 ft. from one end, bending moment $= \frac{32 \text{ ft.} \times 2240}{3} = 23893 \text{ ft.-}$

lbs. This is more than 13440, therefore the beam is not strong enough. Some students may more readily understand the following method:—Assuming span 12 ft., constant for centre load $3\frac{1}{2}$ (cwts.), factor of safety $\frac{1}{3}$, breadth of beam 8 ins. (Breadth and depth

in this case in inches.) $80 = 3\frac{1}{2} \times \frac{d^2 \times b}{12} \times 8$
 $= 80 = \frac{56d^2}{96} \therefore d^2 = \frac{7680}{56} = 137.14 \therefore d =$
 11.7 ins.

For the second part, $\frac{ws}{8}$ should be $= \frac{w4 \times 8}{12}$.

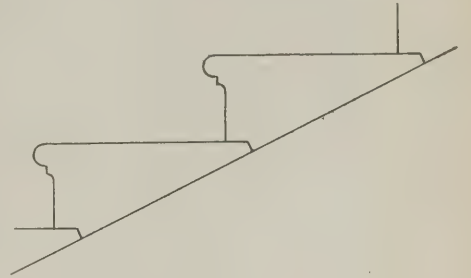
$ws = 120$. $\frac{w4 \times 8}{12} = 213.33$, so that the beam is not strong enough. The load should not exceed $\frac{120 \times 12}{8 \times 4} = 45$ cwts. = 2 tons 5 cwts.

[Note.—The student may have in his mind a stock question—how to take the strongest beam out of a round log where he gets a proportion of breadth to depth, but he should not forget that with a given quantity of timber per foot run the beam is the stiffer the narrower and deeper it is made, except that it must not be made so narrow that it will twist or fold.]

30. Draw to a scale of $\frac{1}{8}$ (1 $\frac{1}{2}$ ins. to a foot) a section through two consecutive spandrel steps with moulded nosings of a hanging stone staircase, and describe clearly how such a staircase is constructed.

(35)

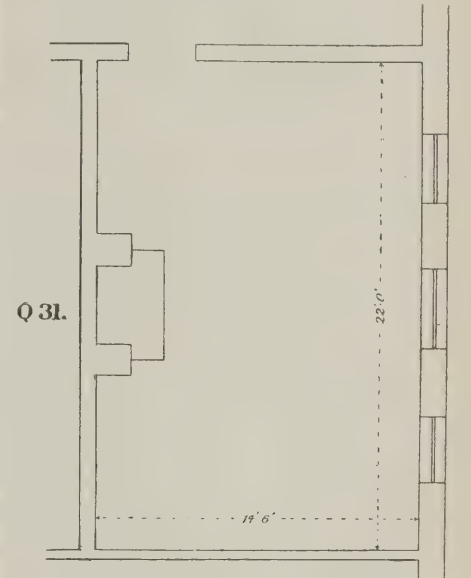
See drawing. These steps are built up one upon the other. The bottom step should be on a firm foundation. The inner ends of the steps are built into the wall (6 ins. to 9 ins.), thus having a direct solid support to that end; this also serves to prevent the step from twisting by any weight from the step above resting on its back edge. The rebating of the steps assists in preventing



any settling down of the outer ends. The whole of the steps should be well supported during fixing, and until the masonry or brickwork in the walls is sufficiently set.

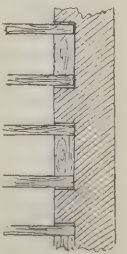
*31. The diagram is an outline plan of a first-floor room which is to have a single-joisted floor; state the number, lengths and scantlings of the timbers which you would require for the plates and joists—including trimmers—for this floor.

(30)



No. 14 bridging joists 16 ft. by gins. by 3 ins.; No. 7 bridging joists 12 ft. by gins. by 3 ins. (might be gins. by 2 ins.); No. 2 trimming joists 16 ft. by gins. by 4 ins.; No. 1 trimmer joist 9 ft. by gins. by 4 ins.; No. 1 trimmer joist 13 ft. by gins. by 2 ins. to frame in at the ends of hearth and breast.

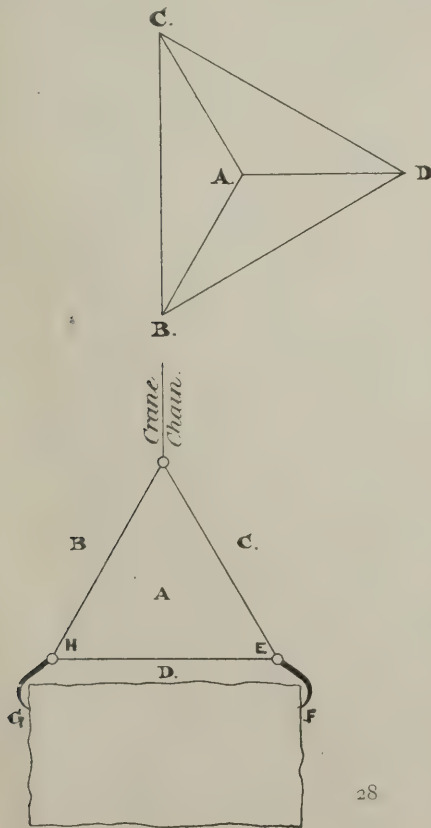
In getting out the above quantities a flue has been assumed at each side of the fireplace. In ordinary circumstances we should not recommend a continuous wall-plate. Where it is desirable to use a plate it may be put in in short lengths, as shown by the accompanying sketch. This allows for each alternate space between the joists being solid brickwork, so that in case of shrinkage or rot the wall is not weakened to anything like the same extent as in the case of a continuous plate.



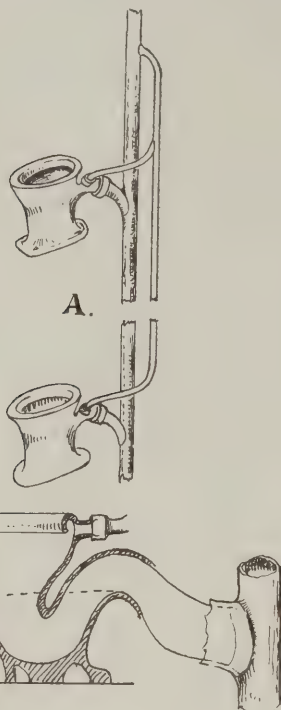
32. Explain clearly the various ways in which the water seal of traps of sinks and w.c.'s is lowered and rendered ineffective, and state what precautions you would take to prevent this; illustrate answer by sketches.

(35)

B



(a) By evaporation when the water closet or sink has been disused for a considerable length of time; (b) by what is called syphonage, that is, the formation of a partial vacuum in the soil-pipe by the rush of the flushing water, &c. Syphonage proper is mitigated by what is called an anti-syphonage pipe, shown on sketch A.



[Note.—The above is probably a sufficient answer to this question, but there is more in the trouble than syphonage accounts for, and it may be of use to refer to it, because, notwithstanding the great variety of wash-down water-closets, there is in this particular respect, perhaps, some room for improvement. The effect of syphonage in unsealing may be produced, and is always to some extent produced, apart from reduced air-pressure in the soil-pipe. The whole mass of water passing through the trap is given a velocity—it acquires an energy of motion—which carries the mass through, so that if the ceasing of the flushing supply is abrupt there may be no seal, even where there is not syphonage. This is provided for in good closets by the “after-flush.” Where a number of water-closets discharge into a common soil-pipe there may on occasions be an accumulation of solid matter forming a plug which, in its downward course, aggravates the ordinary action of syphonage in the closets where no flushing is taking place. There is great objection to the multiplication of pipes, and it will be found that with proper attention to have the soil-pipe sufficiently large and thoroughly ventilated above, to have the connection between the w.c. outlet and the soil-pipe wide and roomy, as shown on the rough sketch B—and probably with less of a “frontal attack”—so that the flush will not enter as a jet, but will adhere to the sides of the outlet and soil pipe, there will be little, if any, need for anti-syphonage pipes.]

Some Comments.

The following are some comments on the foregoing questions:—

21. The tracing example gives too much work for a compulsory question, and handicaps artisan candidates.

22. This is a fair question, but takes too much time to answer fully.

23. A fair question. It suggests that in very many cases the trouble from damp is very imperfectly understood. Where the site of a house is damp, which is the case

with most country houses, the trouble with moisture inside the building is largely due to “condensation.” The still air under the boards of a ground floor is in a “saturated” condition, always ready to give moisture to any surface at a lower temperature. In most cases money would be well spent in shutting out the moisture of the site by a sufficient sheet of concrete; if this is done there will be no danger from dry-rot and very little trouble from damp.

24. A fair question.

25. Too much work in this question.

26. An easy question to a man who knows it.

27. A fair question.

28. The drawing for this question is wrong and misleading. On the assumption, viz., “free play at the eye of the dogs,” a line joining the points E and F should bisect the angle. As shown on the drawing, there would actually be a thrust, instead of the pull of $2\frac{1}{2}$ cwt. which the assumption of “smooth” eyes in the dogs gives. We take the tension in the sling to be the same at D as for the other parts, an assumption which is of course not quite true, but reasonable for the purposes of the question. The sketch does not in any particular show that it was drawn from an actual example.

29. This question is ambiguous. If it is, as it appears to be, to decide upon the scantling of a wooden beam which is to span an opening of 12ft. and carry the loads mentioned safely, why is there mention made of an internal brick wall to be removed? Is it supposed that the load now borne by the foundations of the internal brick wall can safely be added to the load already carried by the outside walls, or is the opening to be less than 12ft.? But then the question says the wall is to be removed; this means the whole of the wall, and on this assumption we deal with it. If the wall to be removed is the lower part of a wall which rises to higher storeys, the load is not a uniformly distributed load. A uniformly distributed load is one which is like water over the bottom of a tank; the load does not help itself by any kind of arch action. We take it that “distributed load” means “uniformly distributed,” otherwise the question is nonsense as it stands. If the rôles of examiner and examinee were reversed, full marks could not fairly be given for this question.

30. This is a fair question.

31. A fair question.

32. A fair question.

Generally the paper is open to portion of our criticism of Stage I. It is not fairly apportioned among the trades. Building construction as a subject is not easy to define, but it is roughly taken to have to do with structures which are not to be moved about—retaining walls, bridges and houses mainly—and it is expected that the student of “Building Construction” shall be trained to enable him to act as a foreman, as a clerk of works, as a draughtsman, or higher office (we are afraid to say architect), and surely such men should know something of door and window fastenings, of mantels, grates and ranges, and of a very great number of other matters which do not appear to be dealt with in these papers.

A Secondary School for 200 Girls at Twickenham, together with a technical institute and pupil teachers' centre, is proposed to be built jointly by the Twickenham Urban District Council and the Middlesex County Council.

A new Colony of Workmen's Dwellings has been provided by the Ecclesiastical Commissioners in and about Mellow Street, Walworth Road, London, S.E. Cottages, flats and tenements are included in the scheme, the total cost of which (including acquisition of site) will be £200,000.

NOTES ON COMPETITIONS.

Southwark Library.

The award has been made in the competition for the proposed public library, Old Kent Road, and on the whole the result is most satisfactory. Unfortunately there are many who were debarred from competing through the uncertainty which existed, until after designs had been sent in, that a qualified assessor was to be appointed. These may take consolation that it was largely owing to their efforts that the promoters were brought ultimately to a reasonable view of affairs, and that they have assisted in saving a goodly number of rather imprudent brethren from a fate which might have been as undesirable as—one hesitates to say it—it would have been deserved. Promoters and competitors were both fortunate in having the services of Mr. A. W. S. Cross, who has made his selection in his usual conscientious manner, and has again issued with his award a list of critical remarks upon the designs. The three pre-miated designs are placed as follows:—First, design No. 46, Mr. Claude Batley, A.R.I.B.A., Kettering; second, design No. 60, Messrs. S. W. Grant & Bowden, 63, Moorgate Street, London, E.C.; third, design No. 8, Messrs. Springhall & Taylor, Manchester. Ninety-nine designs were sent in. Eight of these were disqualified through non-compliance with one of the conditions. These were Nos. 3, 21, 23, 31, 41 B, 64, 80 (scheme 2) and 92.

Convalescent and Nursing Home, Glossop.

It is satisfactory to learn that, so far, the efforts which have been made to obtain an assessor and a revision of the conditions have been successful. The town clerk has informed all applicants for conditions that it is intended to revise them and to extend the time for sending in designs.

Coopers' Company's School, Bow.

Mr. W. D. Caröe, the assessor in the competition for the rebuilding of the Coopers' Company's School at Bow, and the conversion of it into a secondary school, has awarded the first premium (£150) to Messrs. T. Phillips Figgis & C. G. Mumby; the second premium (£150) to Mr. George Elkington; and the third premium (£50) to Mr. H. O. Cresswell—all of London. The cost of the work is put at £32,000. There will be no public exhibition of designs.

The Peace Palace.

A very complete series of reproductions of the designs for the Peace Palace at the Hague submitted by Mr. John Belcher, Mr. A. W. S. Cross, Messrs. James Gibson and William Walcot, Mr. Henry T. Hare and Mr. Alexander Koch is given in Part 7 of “British Competitions,” published from 58, Theobald's Road, W.C., price 3s., an advance proof of which issue has been sent to us by the publisher. This competition was open to all the world, but twenty architects of different nations were specially invited to compete, being paid 4,000 guilders (£320) each. In all, there were 217 competitors. The awards were noted in these columns three weeks ago.

Perth Guildhall.

In the competition for a new guildhall to be erected at Perth the assessor (Mr. James Miller, F.R.I.B.A., of Glasgow) recommended that the design marked “Civis” be adopted, and at last week's meeting of the Perth Guildry Incorporation this was agreed to. The author is Mr. A. G. Heiton, architect, of Perth. The new hall is in seventeenth-century style, adapted to modern requirements, and will be erected on the old site. The cost is estimated at about £2,250.

Competitions Open.

The following is a list of competitions open:—

DATE OF DELIVERY.	COMPETITION.
June 26	NURSING AND CONVALESCENT HOME AT GLOSSOP, to cost £6,000. Premiums of £20 and £10. Particulars from Mr. T. W. Ellison, town clerk, Norfolk Chambers, Glossop.
.. 30	ELEMENTARY SCHOOL AT EAST WEMYSS. Particulars from Mr. A. Watson Taylor, clerk to the School Board, East Wemyss, R.S.O., Fifeshire.
July 2	SECONDARY SCHOOL FOR GIRLS AT AIGBURTH VALE, for the City of Liverpool Education Committee. Limited to architects in Lancashire and Cheshire. Particulars from the Town Clerk, Municipal Offices, Liverpool.
.. 4	SCHEME OF SEWERAGE AND SEWAGE DISPOSAL WORKS AT WARBLINGTON. Premiums of £100 and £50. Particulars from Mr. J. W. Loader Cooper, clerk to the U.D.C., Queen Street, Emsworth.
Oct. 1	ALPHABET COMPETITION. Prizes of £20, £10 and £5. For particulars see "Architectural Review."
.. 31	BOURSE AT CAIRO. — Premiums of £250 and £100. International competition. Designs to be submitted to the "Corporation des Agents de Change," Cairo, Egypt.
Date not yet decided upon.	NEW MUNICIPAL BUILDINGS AT STIRLING (to cost £12,000). Premiums of £100. Particulars from Town Clerk, Borough Buildings, King Street, Stirling.
No date	DETACHED AND SEMI-DETACHED HOUSES AT CLIFTONVILLE, BELFAST. — Premiums £700. Particulars from R. J. McConnell & Co., 51, Royal Avenue, Belfast.
..	SCHEME OF DECORATION for the interior of Cambridge Hall at Southport. Premium £5 5s. Particulars from Mr. J. Ernest Jarratt, town clerk, Town Hall, Southport.

Obituary.

Mr. E. E. Scrivener, of the firm of Messrs. R. Scrivener & Sons, architects, Shelton, died recently.

The late Mr. J. T. Smith, civil engineer, of Stratford-on-Avon, who died on March 31st, left estate which has been valued at £120,728 gross.

Views and Reviews.

Kelly's Building Trades Directory.

A fresh edition of this invaluable publication has just been issued. It is to be regretted that the demand does not allow its publication more frequently than at intervals of four years. We have received enquiries which show that many persons do not know even that it is published, or else have forgotten the fact. It deserves to be in every office of any importance. It will be found most useful for reference purposes when the names of specialists in any district are required by architects or contractors, as so frequently happens. There is no other reference book which gives anything like the same kind of information. Not only are the trades classified under towns and counties, but also as regards London, the country, and Ireland, the Channel Islands and the Isle of Man. There are also indices which materially aid quick reference. The present is the tenth edition of this directory, the first having been issued in 1870. It numbers nearly 3,000 pages.

"Kelly's Directory of the Building Trades," Tenth Edition, 1906. London: Kelly's Directories, Ltd., 182, 183, and 184, High Holborn, W.C., price 30s.

Notes and News.

Architectural Association of Ireland.—Mr. J. Holloway has been elected president for the current session.

Childwall Parish Church has been restored under the direction of Mr. J. Francis Doyle, F.R.I.B.A., of Liverpool.

The new **Royal Hotel at Brighton** has just been completed in Queen's Road. The architects were Messrs. Clayton & Black, of Brighton.

A new **Exchange at Cardiff**, independent of the Mount Stuart Square institution, is to be built. Mr. E. W. M. Corbett, A.R.I.B.A., of Cardiff, is the architect.

New Baths and Washhouses at Sunderland were opened last week. They are situated in Hendon Road and have been erected from designs by the borough engineer, Mr. J. W. Moncur.

Messrs. Patman & Fotheringham, Ltd., of 100 and 102, Theobald's Road, London, W.C., have secured the contract for new motor houses, &c., at Hendon, for Messrs. Schweppes, Ltd.

Simplex Conduits, Ltd.—The business hitherto carried on by the Simplex Steel Conduit Co., Ltd., is now continued under the name of Simplex Conduits, Ltd. The addresses of the head and branch offices remain as before—the London office being 20, Bucklersbury, E.C.

Messrs. R. Waygood & Co., Ltd., have erected five lifts at the Hearts of Oak Benefit Society's new building in Euston Road, two for passenger service (to raise five persons at 175ft. per minute, with handle control in the cage), two electric book lifts, and one electric service lift to raise 1½ cwt at 120ft. per minute.

A **Course of Six Lectures on Domed Buildings** has been given by Prof. Beresford Pite at the London County Council School of Building, Ferndale Road, Brixton. The concluding lecture, dealing with the domes of the Invalides and the Pantheon at Paris, is to be given next Thursday, at 8 p.m. It is open to all students.

The new **Lock at Molesey** was opened for traffic on Saturday. With the exception of Teddington it is the largest lock on the Thames, being 267ft. long and 30ft. wide—about 90ft. longer and 11ft. wider than the old lock that it replaces. The total cost of the work has been about £14,000. The narrow part of the cut above the lock is being widened and deepened for a distance of 280ft.

A **Dundee School.**—Dundee ratepayers are complaining about the great extra cost of building a new school in their town. The School Board's architect was commissioned to prepare plans for a structure to cost £15,000; but now that tenders have been accepted the total amount is £21,918, which, with furnishing and extras, will, it is estimated, bring the total cost probably up to £25,000.

Magistrate's Criticism of a new London Police Court.—The new police-court in Old Street, London, which has taken the place of the Worship Street Court, was opened last week. Mr. Cluer, the magistrate, complained of the noise from outside, also that the space which should have been devoted to the court accommodation had been wasted on a large hall and an elaborate staircase. Public money and space alike had been wasted, and the accommodation given was wholly inadequate.



ENTRANCE TO A COUNTRY VICARAGE
NEAR RYANWELL, ESSEX. S.A.T.V.F.S.

TESTS WITH FIREGRATES.

A VERY interesting and valuable series of tests with domestic firegrates has been conducted at the new Government offices in Whitehall by the Coal Smoke Abatement Society (represented by Dr. H. A. Des Vœux and Mr. W. H. Atkin Berry, F.R.I.B.A.) in conjunction with Sir Henry Tanner, chief architect to H.M. Government.

The objects of the tests were fourfold, namely, to ascertain (1) the amount of smoke given off, (2) heating power, (3) economy of fuel, and (4) suitability for office and household purposes.

In response to invitations to manufacturers, between forty and fifty grates were submitted. Of these, twenty-four were first selected after preliminary inspection and the elimination of such as were judged unsuitable.

The First Test.

The twenty-four grates were fixed in separate rooms on the mezzanine floor of the building, around an open square court, each room being about 4,000 cub. ft. in size and having one window (which was kept closed) and one door (also kept closed, except for ordinary purposes of ingress and egress); the chimney flues, too, were all of the same height and size, namely, 68ft. high and 11ins. diameter. The walls of the rooms were of brick left rough and unplastered, and the floors and ceilings of rough concrete, no floorboards being laid down. There was no furniture in the rooms.

The tests were conducted on four consecutive days.

The fires were lighted every morning at 8 o'clock and regulated throughout the day with the object of securing and maintaining a temperature of 60 degs. Fahr. in the room, or as near that as possible, the temperature being recorded every half-hour by three thermometers, one in the corridor outside the rooms and two in each of the rooms.

The amount of coal and wood consumed was carefully weighed and recorded, as well as the times of stoking. On the roof of the building special shelters were erected as posts for watchers of the twenty-four chimneys, each of which was numbered. The numbers, however, were unknown to the attendants in the rooms below, nor were any makers of grates, or representatives of makers, permitted to attend the tests. Every five minutes the watchers on the roof recorded on charts the amount of smoke emitted, using a series of shades designed by the late Mr. Bryan Donkin.

At 4 p.m., after eight hours, the fires were drawn, the cinders weighed, and the weight subtracted from the amount of coal put on the fire; the wood used was also weighed and half its weight added to the amount of coal, thus giving the total quantity of fuel actually consumed.

The results of the tests are given in Table I.

The Second Test.

Upon these results the examiners selected three grates out of the twenty-four for further test—namely, those of Messrs. Candy & Co., J. & R. Corker, Ltd., and the London Warming and Ventilating Co.; but prior to this further test with these three grates, tests were made with twelve other grates out of the remainder of those originally submitted, these twelve grates being fixed and tested under exactly similar conditions as the twenty-four. The results of this second series of tests are given in Table II.

The Final Test.

From the twelve grates tested together the examiners selected three for final test—namely, those of Messrs. Hendry & Pattisson, the Teale Fireplace Co., and Smith & Wellstood. As, however, the last-named grate was identical with that of the London Warming and Ventilating Co. it was omitted from the final selection. In the third and final test, therefore, there were five grates—namely,

TABLE I.—TESTS ON TWENTY-FOUR OPEN GRATES BURNING BITUMINOUS COAL.

Names of firms (in alphabetical order).	Distinctive names of grates, if any.	Average amount of coal, less cinders, plus halfwood, in lbs.	Temperatures (degs. Fahr.).				Smoke average.
			I.	II.	Difference between I. and II.	Radiation.	
Barnard, Bishop & Barnard	Slow-combustion	23'13	45'4	50'2	4'8	72'9	0'83
Boyd & Sons	"Cavendish"	33'07	"	56'5	11'1	78'4	1'24
Bratt, Colbran & Co.	"Heaped Fire"	28'18	"	52'2	6'8	76'8	0'87
Candy & Co.	"Devon"	23'43	"	52'8	7'4	71'6	0'79
Carron Co. B.	No. 391	34'68	"	53'6	8'2	83'03	1'17
Do. C.	Do.	32'05	"	51'8	6'4	77'0	1'11
Chavassee & Kerr	"Tropic in"	22'68	"	52'0	6'6	71'7	0'97
Corker, J. & R.	"Drawwell"	22'81	"	53'7	8'3	71'8	1'02
Coalbrookdale Co. B.	"Bostel"	41'43	"	54'4	9'0	82'5	1'49
Do. C.	—	21'73	"	51'8	6'4	69'2	1'32
Doultan & Co.	"Sunk Fire"	19'33	"	52'8	7'4	68'1	1'04
Downdraught Fireplace Co.	"Tiffin"	21'18	"	52'7	7'3	73'6	1'15
Eagle Range Co.	"Premier G.M. Eagle"	25'18	"	51'7	6'3	71'9	0'79
Falkirk Iron Co.	"Interior"	20'81	"	52'0	6'6	74'2	1'13
Hattersley Brothers	"Rage"	28'43	"	51'9	6'5	75'4	1'10
London Warming and Ventilating Co. A.	"Florence"	27'13	"	54'7	9'3	74'0	1'01
Do. do. B.	Do.	36'43	"	55'6	10'2	82'5	1'0
Longden & Co.	—	27'51	"	54'2	8'8	76'7	0'92
O'Brien, Thomas & Co.	"Aureole"	27'48	"	54'0	8'6	78'6	1'07
Ritchie & Co.	"Castle Baynard"	32'43	"	54'3	8'9	74'1	1'04
Sinclair Iron Co.	"Roseneath"	27'83	"	51'0	5'6	72'5	0'85
Wilmer & Sons	"Bond's"	23'9	"	53'3	7'9	78'8	1'05
George Wright & Co., Ltd.	"Tandem"	28'13	"	51'6	6'2	76'8	1'2
Yates, Haywood & Co.	"Bonfire"	25'68	"	52'8	7'4	74'8	0'81

TABLE II.—TESTS ON TWELVE OPEN GRATES BURNING BITUMINOUS COAL.

Arnott (J. Horsfall)	"Arnott"	31'13	44'9	54'5	9'6	83'6	1'13
Bell & Co.	Basket firegrate	38'63	"	54'6	9'7	91'5	1'28
Chavassee, J. J.	—	21'43	"	50'0	5'1	72'3	1'40
Firth	"Firth"	26'23	"	48'0	3'1	78'0	0'66
Hendry & Pattisson. A.	"Boyd's 'Hygiastic'"	28'3	"	52'1	7'2	90'2	0'13
Do. B.	"Boyd's 'Non warm Air Grate'"	33'18	"	53'7	8'8	91'9	1'22
Nautilus Fire and Heating Co.	"Nautilus"	34'93	"	50'9	6'0	76'2	1'22
Ritchie & Co.	"Castle Baynard 'level'"	18'63	"	49'6	4'7	76'4	1'45
Smith & Wellstood	—	25'43	"	52'0	7'0	84'6	1'05
Teale Fireplace Co. A.	"Economizer Popular Type"	24'18	"	48'3	3'4	72'1	1'26
Do. B.	Do.	40'93	"	50'8	5'9	76'0	1'49
Wilson & Smith	"Peveril"	34'9	"	51'2	6'3	82'9	1'11
Yates, Haywood & Co.	No. 1902	23'9	"	50'1	5'2	76'9	1'48

TABLE III.—RE-TEST OF FIVE SELECTED GRATES.

Names of firms (given in alphabetical order).	Amount of coal, less cinders, plus half wood, in lbs.	Ashes in lbs.	Stoking.	Temperatures (degs. Fahr.).				Smoke.
				I.	II.	Difference between I. and II.	Radiation.	
Candy & Co.	25'25	2'6	4'0	43'9	51'7	7'8	84'3	0'85
Corker, J. & R.	25'0	1'3	4'0	"	52'75	8'8	70'3	0'70
Hendry & Pattisson (Boyd)	35'9	2'25	5'75	"	55'4	11'5	98'1	0'88
London Warming and Ventilating Co.	25'75	1'9	4'2	"	50'6	6'7	82'2	0'79
Teale Fireplace Co.	26'25	1'3	4'0	"	52'6	8'7	83'9	0'84

those of Messrs. Candy & Co., J. & R. Corker, Ltd., Hendry & Pattisson, the London Warming and Ventilating Co., and the Teale Fireplace Co. This final test was conducted in exactly the same way as the others, and in addition a test for carbon dioxide was made with the object of ascertaining the efficiency of each grate as a coal-burning machine for producing heat. The results of the final test are given in Table III.

Heat Efficiency.

The test for thermal efficiency of firegrates showed that less than 7 per cent. of the total heat of the coal was utilized for warming the air of the rooms; with steam boilers from 70 to 75 per cent. of the calorific value of the coal is transferred to the water; so that the efficiency of steam boilers is more than ten times that of domestic firegrates. In his report on this portion of the tests Dr. J. S. Owens, A.M.I.C.E., says :—

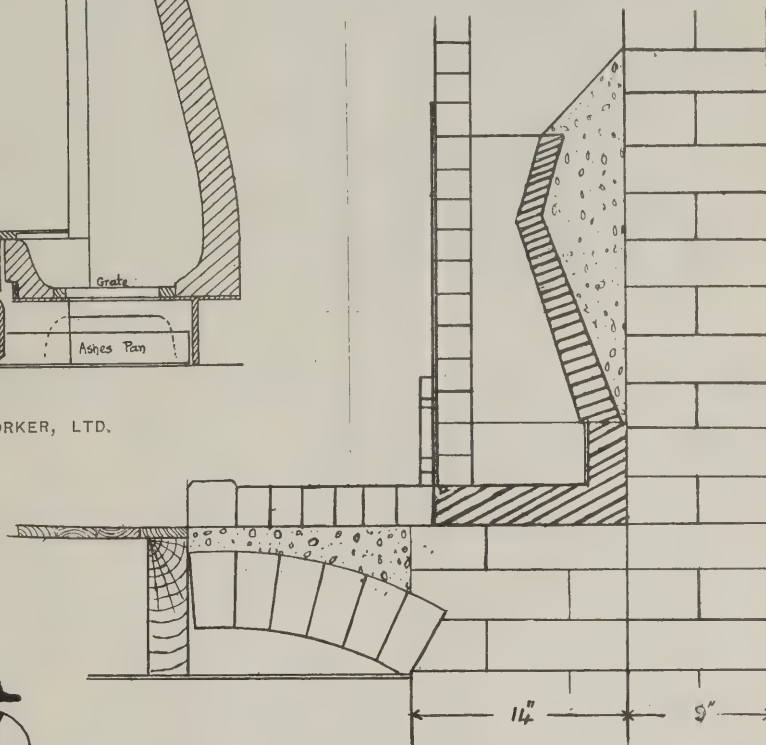
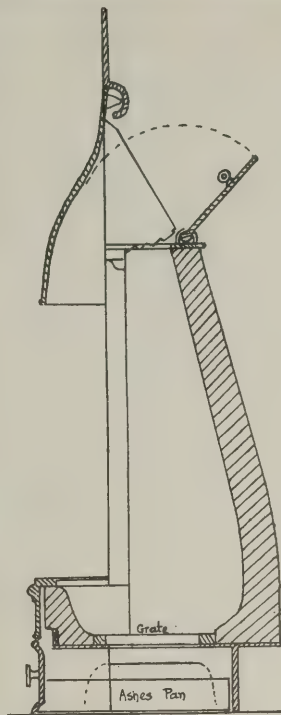
"Considering the two best grates, the quantity of heat given to the walls, chiefly by radiation, is very great, amounting to over 79 per cent. in one case and 76 per cent. in the other; but it must not be thought that this is all lost heat. It is well known that we feel warm in a room with warm walls in which the air is cold, but we feel cold in a room with cold walls in which the air may be warm. This is largely because

air is such a bad conductor of heat and because we are very sensitive to radiant heat . . . Mr. Ackermann carried out some very complete tests of a hot-water warming plant at a large London hospital, the results of which showed that 22 per cent. of the heat discharged from the radiators was utilized in warming the air of the room, while the remaining 78 per cent. was radiated into the walls and through the windows. Thus it will be seen that the percentage of heat taken by the walls was practically the same for the radiators and open fires, while the efficiency of the radiators in warming the air of the room was about three times as great as that of the open fires. If, however, we consider the efficiency of the hot-water plant, taking into account all heat losses from the furnace to the radiators, the figures become more alike, being 8 per cent. of the heat of the fuel burnt for the hot-water plant, as against 7 per cent. for the open fires. In the apparatus which Mr. Ackermann tested the distance from the source of heat to the radiators was abnormally great, and consequently a very large quantity of heat was lost in transit. In the case of the open fires the chimney losses, 14 to 16 per cent., are about twice as great as compared with the efficiency. In the case of the radiators there are no chimney losses, the rooms being the



"DRAWWELL" GRATE. J. AND R. CORKER, LTD.

equivalent of the chimneys and rooms together in the case of the open fires. If for the two open fires before-mentioned we add the chimney losses to the heat given to the air of the room, we have, say, 21 per cent. and 23 per cent. as the combined efficiency, which compares very well with the 22 per cent. which Mr. Ackermann obtained in the case of radiators."



THE "DEVON" FIRE. CANDY AND CO., LTD.

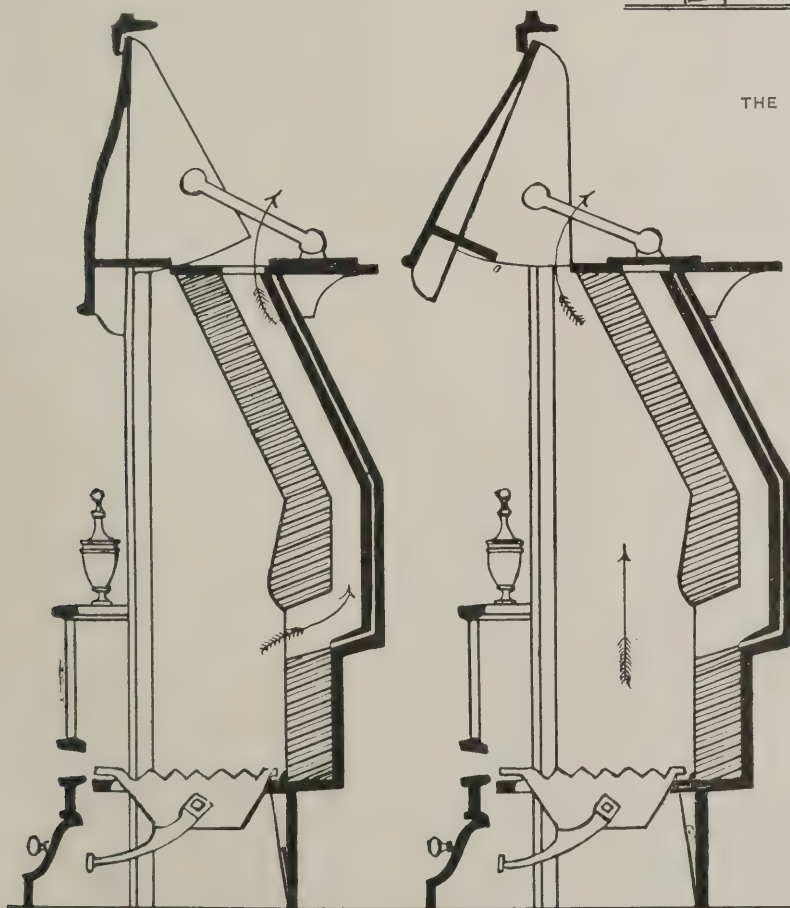
radiate the heat most effectually towards the centre of the room, for which purpose the hearth is raised to the level of the fire. Lower portion of fireplace has solid bottom on which fire burns, there being no metal grid or air-chamber beneath.

J. & R. Corker, Ltd.—"Drawwell" grate. Fitted with adjustable canopy, semicircular and solid brick back, with solid brick back in front sloping inwards, the bottom forming a basin with loose grate to lift out. Ventilating fret with pan attached.

London Warming and Ventilating Co., Ltd.—"Florence" grate. Self-contained auxiliary flue controlled by damper connected to adjustable canopy. When canopy closed and back flue brought into use, smoke drawn through fire to a point where heat is practically incandescent, and so appreciably consumed. Automatic shaking bars, mounted on square shaft and made abnormally deep in the body to heat ascending air-currents as weight of coal varies in different bars; bars intended to rock and clear fire of ashes and dust, thus allowing continuous current of heated air to pass and keep fire burning brightly.

Teale Fireplace Co., Ltd.—B. Teale "Economizer Popular Type." Firebrick back in four parts enclosed in double sheet steel casing forming air-chamber, air being drawn from outside and discharged through grating above. Warm-air outlet controlled by louver.

Hendry & Pattison, Ltd.—D. O. Boyd's "Hygiastic" warm-air grate. Fresh air from outside enters under hearth, circulates round back of grate, is warmed, and passes into room through grating above. Fireclay lumps sloped to assist radiation, and so built up as



Canopy closed and Back Flue open.

Canopy open and Back Flue closed.

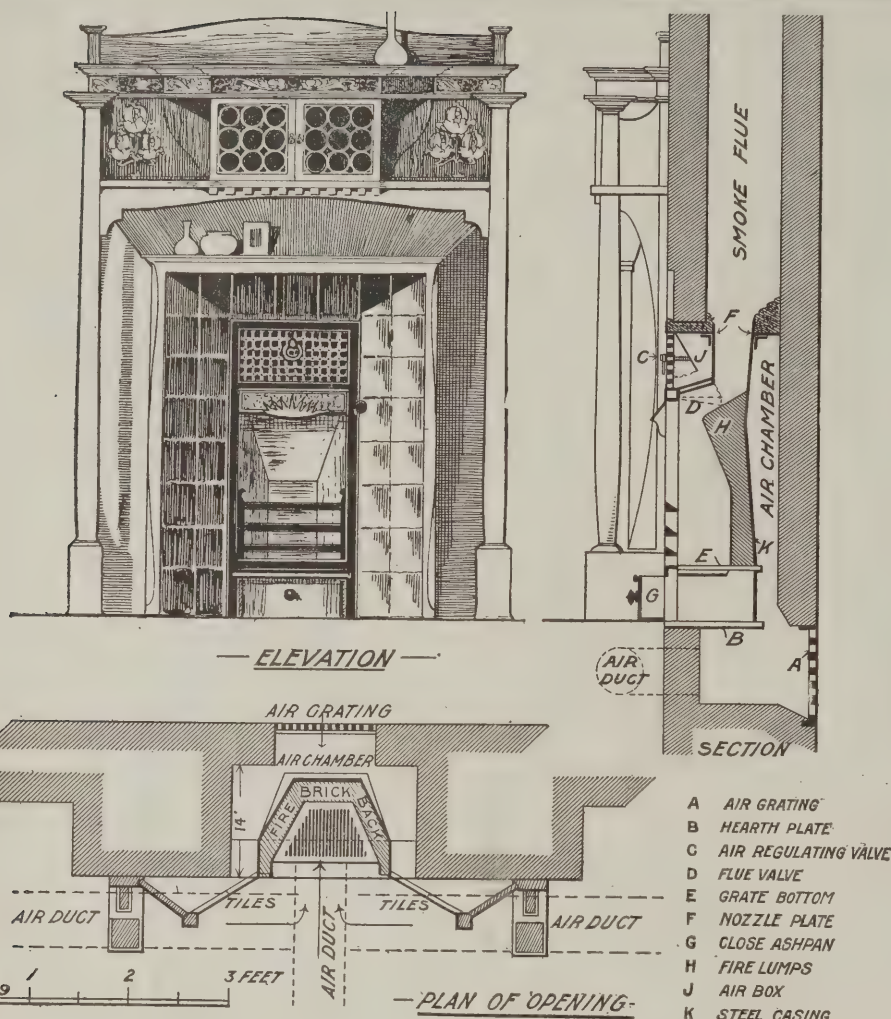
"FLORENCE" PATENT SMOKE-CONSUMING GRATE. LONDON WARMING AND VENTILATING CO., LTD.

Law Cases.

Dispute about South Shields Municipal Buildings.—In the Chancery Division of the High Court of Justice recently the case of *Neill and others v. The Corporation of South Shields* was heard. Counsel for the plaintiffs moved for an order that the defendants might be restrained, until judgment, from acting upon a notice of March 29th last, while counsel for the defendants had a cross-motion that proceedings might be stayed under an arbitration clause. The facts of the case were as follows:—The plaintiffs, a large firm of builders and contractors at Manchester, some time ago entered into a contract with the defendants for the erection of new municipal buildings at South Shields. The arbitrator under the contract was the architect, Mr. E. E. Fetch, A.R.I.B.A., of London. Unfortunately there had been constant friction from the commencement between the plaintiffs and the architect. Up to the present time work to the extent of about £10,000 had been completed and the architect's certificate given. Under the specification the plaintiffs were bound to put in mortar of a certain kind. They said they had done that, and that the mortar had from time to time been passed by the architect. The latter, however, had ordered the plaintiffs to remove the whole of the mortar and concrete, which could not be done without pulling the building down. The notice said this was to be done at the cost of the plaintiffs, who were to substitute therefor mortar and concrete "in accordance with the specification." That was the notice the plaintiffs sought to restrain the defendants from acting on. The plaintiffs asked for arbitration as well as the defendants.—Mr. Buckmaster, K.C., for the defendants, said that so far as the question in dispute involved whether this mortar was right or wrong, that was a matter in the discretion of the architect.—Mr. Justice Buckley: "Supposing that for one month he has passed the material, and it has been put in the building, and then he turns round and says, 'This mortar is all wrong; pull the building down?'"—Mr. Buckmaster said that under the contract the parties had agreed that the architect should be the final judge of the matter.—Mr. Justice Buckley: "If he acted reasonably."—Mr. Buckmaster admitted that the architect's capacity as a judge could be questioned, but he failed to see on what ground the exercise of his authority could be questioned.—Mr. Justice Buckley: "If the contractor uses what the architect directs, do you say he must do the work again at his own costs?"—Mr. Buckmaster said he did not intend to give up whatever rights the defendants might have in the arbitration.—Mr. Justice Buckley suggested that the proper course would be to make the costs of the motions costs in the action, and let the case go for trial without prejudice to any application either party might make to refer any of the questions to arbitration.—It was agreed that proceedings should be delivered as soon as possible, and leave to apply to advance the trial was given.

St. John's Church, Sleekburn (Northumberland), was dedicated recently by the Bishop of Newcastle. It has been erected from designs by the diocesan architect, Mr. Arthur B. Plummer, F.R.I.B.A., of Newcastle, the contractor being Mr. J. Goulding, of Blyth.

Lincoln Brick Co., Ltd.—The annual report states that the balance to the credit of profit and loss, including £2,726 brought forward, is £8,207. The directors propose a further dividend of $\frac{4}{5}$ per cent., making 7 per cent. for the year, writing off £1,000 from the plant and machinery account (which now stands at £55,000), and, after paying directors' fees, to carry £3,111 forward.



BOYD'S "HYGIASTIC" WARM-AIR GRATE. HENDRY AND PATTISSON, LIMITED.

not to crack through unequal expansion or intense heat; cased in riveted steel back, carried up and finished round flue so as to simplify and lessen cost of fixing. Regulating valves for smoke and air, and box ashpans under fire. Bars slope inwards to deflect air into fuel and prevent cinders and coal dropping out.

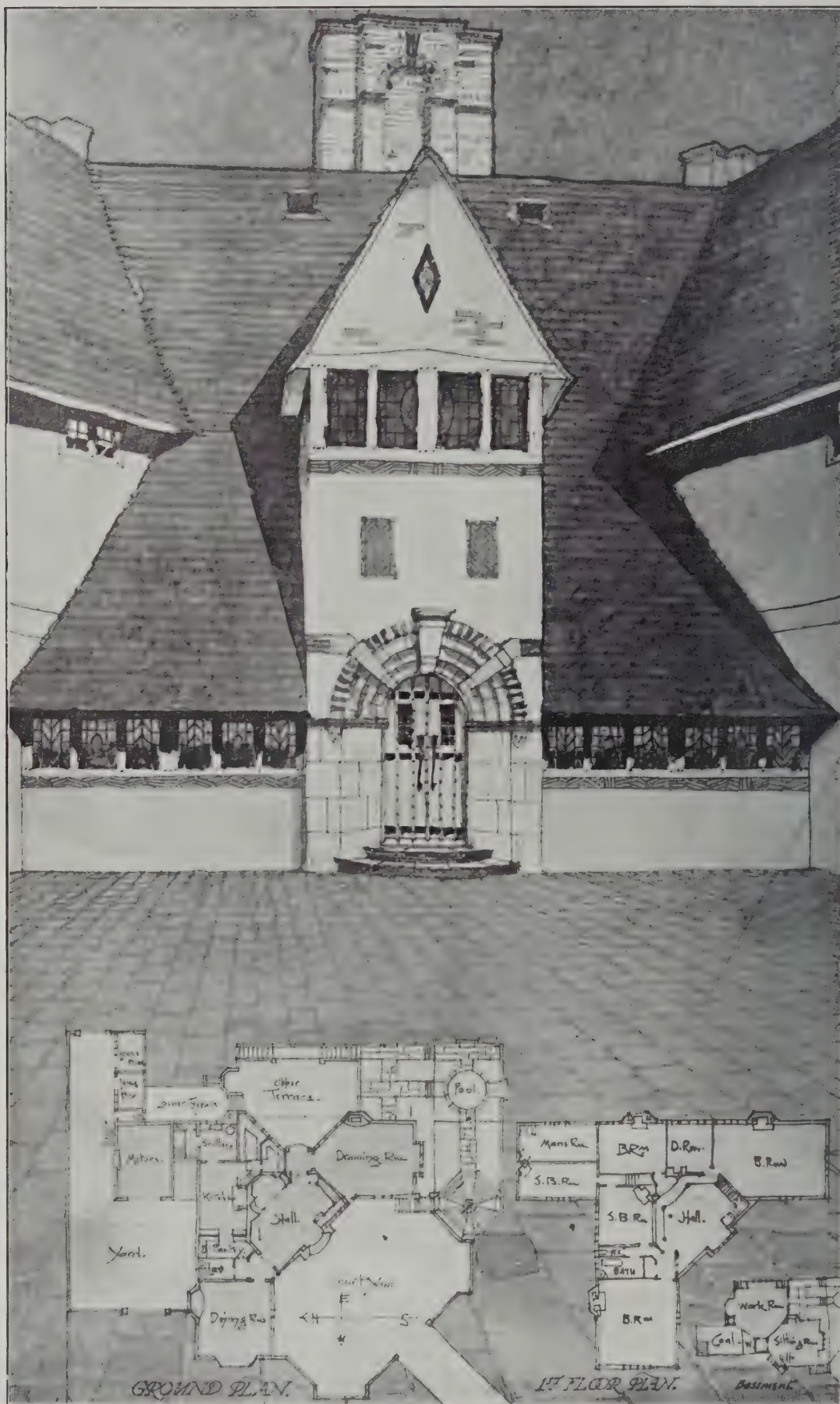
OUR PLATES.

Llanwit, Farnborough, Hants.

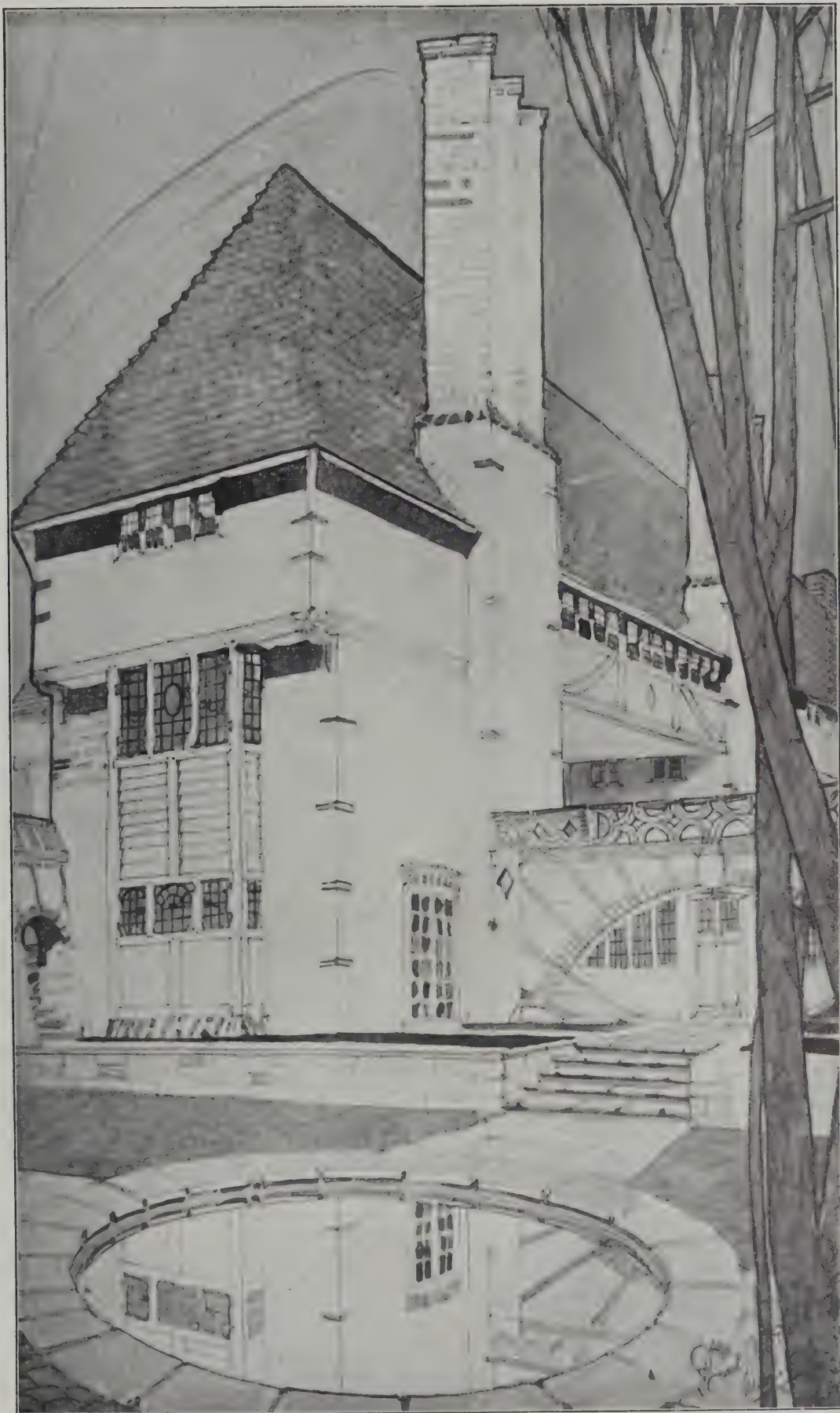
THE illustrations given as centre plates in this issue are from two water-colour drawings by Mr. Briant A. Poulter of a house called "Llanwit" at Farnborough, Hants, for Captain H. Iltid Nicholl. The main feature of the site is its rapid slope towards the south-east. The plans on the view of the entrance front fully explain the accommodation. The hall is carried up two floors with a gallery. The sloping nature of the site has been utilized for the planning of two sitting-rooms beneath the level of the main floor, and opening by French doors directly into the garden. Internally all the walls are finished in white plaster, and the woodwork painted very dark brown. The fireplaces, specially designed by the architects, are of Caen stone and local tiles, with Messrs. Bratt, Colbran & Co.'s "Heaped" fires. Externally the walls are of whitewashed brick with Portland stone and courses of old tiles sparingly used. The roofs are covered with old local tiles. The building was erected under the architects' personal supervision by Mr. Thomas King, builder, of Camberley, Surrey, who carried out the whole of the work, except the iron casements and leadlights, which are by Mr. J. A. Girdler, of Reading. The architects are Messrs. H. R. & B. A. Poulter, of Camberley.

RECONSTRUCTION OF GLASGOW CENTRAL STATION.

THE work of reconstructing the Glasgow Central Station of the Caledonian Railway Co., which has been in progress for five years, has now been completed. The outstanding engineering features of the scheme are the removal of the wall which supported the roof on the west side of the old station, and the substitution of steel columns, the reconstruction of Argyle Street Bridge, the building of the new bridge over the Clyde, the raising of the old bridge by about 2ft. 6ins., and the dismantling of Bridge Street Station. Over the new bridge which spans the river nine lines of rails are laid, making, with the four on the old bridge, thirteen bearing traffic to and from the terminus. The new bridge differs from the old one in this particular that the trains run on the tops of the girders instead of on the bottom, thus facilitating the use of all the available space for rails with no projecting girders above. The roof of the new section of the station is nearly 1,000ft. long. It consists of an elliptical-arched girder structure. Bridge Street Station has been dispensed with. In the old Central Station the aggregate length of the nine platforms was about 4,500ft.; in the extended station, with its thirteen platforms, the aggregate length is 8,880ft. With the exception of one or two, the old station platforms were only about 13ft. wide, whereas the minimum width in the new station is about 23ft. Commodious arrangements have been made for parcels traffic, and the luggage and other offices have been increased in size proportionately. There are now four entrances to the station, one each from Gordon Street, Argyle Street, Union Street and Hope Street.



"LLANWIT," FARNBOROUGH, HANTS.



R. AND B. A. POULTER, ARCHITECTS.

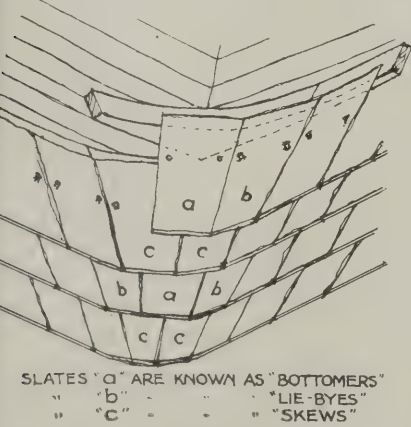
Enquiries Answered.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only. The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters. Correspondents are particularly requested to be as brief as possible. The querist's name and address must always be given, not necessarily for publication.

Valleys in Slating without Lead.

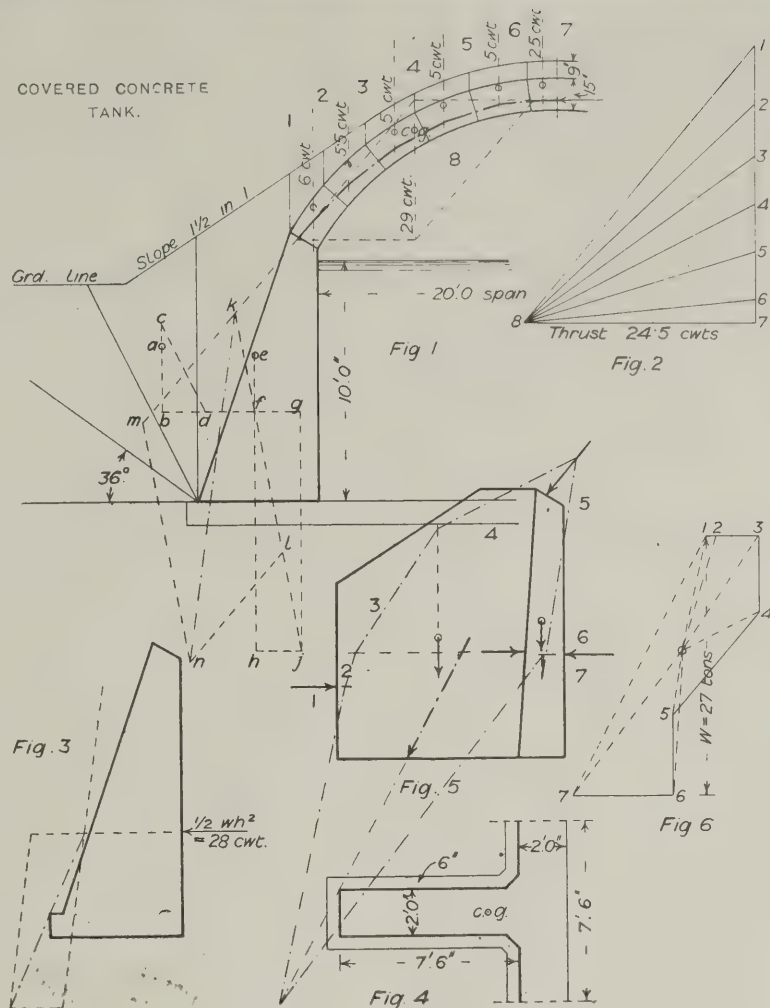
NORTH WALES.—GWYNEDD writes: "In our issue for May 16th you published a most interesting article on the traditional methods of tiling. Can the writer tell me how to do valleys in slating without lead? At present I either do a secret gutter or have bakers, and so no lead is seen, but I notice in the drawings of Mr. Guy Dawber's work that the slating seems to be carried round the valley without a break. How do the battens stand bending so much—or is it on boarding? In the old work about here they avoided gulleys whenever possible, but, when used, they laid a straight course of slates down the gutter first, as we now put lead, and made good the joint in hair mortar inside. But this is not a very watertight job. Has anyone tried a slate gutter made like the tiling one shown in your issue for May 16th?"

Near Collyweston I have often seen slate gutters laid on the lines of the old style tile-alley, but although it looks well this method does not appear to me to be so logical a treatment for slating as the other and more usual one of the Cotswold district. Slates in any case are cut, and it is but little easier to cut them square than to any other shape. For this reason I think that the old method still occasionally practised in Northamptonshire, Gloucestershire, and probably wherever else stone-slating is usual, is the right one; and this, I take it, is what you refer to in Mr. Dawber's work. It would certainly be difficult to accommodate battens to the compound curve of such a valley, and I believe the readiest method is to board the valley and nail thereon curved firrings (spaced as the battens), upon which the slates are laid, these being cut as shown by the sketch below. Alternately the firring could



be done first and the slates nailed to boarding as you suggest. I have seen some old roofs in which the valley was filled out to the necessary curve, apparently with lime and hair mortar, upon which stone slating was bedded direct. It is a terrible job to get these things done, unless by an imported country workman who has been used to such methods. A fine London example of a Westmorland slate roof with the valleys worked round is Mr. Wade's new Royal School of Art Needlework, next to the Imperial Institute at South Kensington.

E. G.



Design for Covered Concrete Septic Tank.

CARLIOL writes: "I send rough sketch of a septic tank to be built of concrete, and should be glad if you would show me the graphic method of working out the thickness of the walls. The thickness of the arch I have taken from Trautwine's formula

$$\sqrt{\frac{\text{Rad} + \text{half span}}{4}} + 0.2 \text{ ft.}$$

Would the following method be correct for all practical purposes?—(1) Find the thrust of the arch at the springing line by obtaining the centre of gravity of half arch and the load it sustains, taking this as being kept in equilibrium by the horizontal thrust at the crown acting at one-third height from the soffit, and the thrust at the springing line acting at one-third depth from the extrados. Having the direction of three forces and the amount of one, the triangle could be solved. (2) Combine the thrust thus found with the thrust of the earth backing and the weight of the wall. (Conditions when tank empty.) (3) Combine the thrust of the arch with the combined thrust of the earth and water, together with the weight of the wall. Please also show the method of introducing buttresses, not only their dimensions, but the mode of determining the distance apart."

Fig. 1 shows the design submitted for covered concrete tank. The thrust line of the arch which is added has been obtained in the usual way by the parallelogram shown and the reciprocal diagram, Fig. 2. The combined weight of wall and thrust of earth when the tank is empty is also shown on Fig. 1, the lettering representing the order of working. Fig. 3 shows the alteration produced in the resultant when the tank is full of water, and as the resultant comes outside the wall the thickness will probably require to be 6 ft. at the base instead of 5 ft. Fig. 4 shows the plan at base of a proposed modi-

fication, the wall being made thinner and buttresses added at intervals of 7 ft. 6 ins. The section of buttressed wall being as Fig. 5, all the weights and thrusts must be found and marked as shown by thick arrows; then, treating them as a series of independent forces of which the resultant is required in amount and position, draw the force polygon, Fig. 6, and the closing line 7—1 will be the value and direction of the resultant. To find the position of the resultant, select a pole, draw vectors, and parallel to these draw the funicular polygon across Fig. 5; then the position of the resultant is given by the stroke-and-dot arrow drawn parallel to 7—1 through the intersection of the funicular polygon lines across spaces 7 and 1. To find the maximum pressure on the base, the section modulus must be obtained as for a tee-iron, in this case

$$\frac{2 \times 6.2^3 + 7.5 \times 3.3^3 - (7.5 - 2)(3.3 - 2)^3}{\frac{3(6.2)}{476.6 + 269.0 - 12.0} - 18.6} = 39.4$$

Then $\frac{W}{A} \pm \frac{M}{Z} = \frac{27}{30} + \frac{27 \times 3.3}{39.4} = 9 + 2.3 = 11.3$ tons per sq. ft. compression at the point of the buttress and 1.4 tons per sq. ft. tension at the inner edge of the wall.

HENRY ADAMS.

Churches to Measure near Bury St. Edmunds.

BURY ST. EDMUNDS.—B. P. writes: "What churches are worth measuring within easy walking or cycling distance of Bury St. Edmunds, together with their styles?"

At Bury St. Edmunds itself there are two Perpendicular churches of St. Mary and St. James. The latter has a chancel in the Decorated style by Sir Gilbert Scott, built in 1868. The old Abbey gates are Decorated in style. The old Norman tower, the remains of the monastery and abbot's bridge, built

by Robert de Gravel, who died in 1221, are all worth studying. The Abbey is typical of the Franciscan order. Other churches within a few miles of Bury St. Edmunds are the church of Horningsworth, Iksworth, which is chiefly Decorated and partly Perpendicular; Little Laxham, which is Norman and Perpendicular; and Sackford, which is Early English and Decorated. Going further afield there are the churches of St. James, Hadleigh, Lavenham and Stoke-by-Nayland; All Saints', St. Gregory and St. Peter's, Sudbury; and Boxford—all of which are Perpendicular in style. H. Y. M.

Building Estates and Architects.

PERPLEXED writes: "(1) In the conditions of sale usually made for building estates is one 'that the plans, elevations, &c. of any intended building shall be approved by the architect to the vendors.' To what extent can an architect use this power? Can he decline to approve plans the elevations of which are similar to those of adjoining houses on the estate and which are more expensive to erect? (2) A building estate syndicate has wound up and is now in liquidation, and the mortgagees become possessors of certain plots and employ an architect to prepare plans of the plots for purposes of sale, &c. The architect of the (late?) syndicate comes along and says that he is still the architect to the estate and claims the right to approve the plans, &c. of proposed houses, &c. Can he do so?"

(1) The architect to a building owner empowered by conditions of sale to approve of plans and elevations can disapprove entirely or in part with the drawings suggested for any particular plot—but of course he must have reasons for his conduct, and his decision must be a reasonable one. The builder's remedy in case he considers a decision unreasonable is (a) to build the houses notwithstanding—he takes the consequences of an action at law; (b) to apply to the court for a "mandamus" to compel the approval of his plans, but it is much to be preferred that a proper agreement should be come to between the parties. (2) If the mortgagees have acquired the "equity of redemption" and are actually in possession of the estate, I do not think the architect appointed by the former owners can have any "locus standi" in the matter. F. S. I.

Size of Rolled Joist.

LUTON.—SURVEYOR writes: "The accompanying drawing shows part plan and section of a building. Please give method and result of ascertaining the section required for a rolled steel joist for the above opening—(a) if the floor joists are put as shown, (b) if the floor joists bear on front and middle walls. What proportion of attic floor should be considered, and how is the weight of the roof computed in relation to wall?"

If the rolled joist has to carry the wall and share of roof only, the weights will be estimated as follows:—For wall $(14 \times 9 - 3.5 \times 4.75) \times 1.75$ ft. thick $\times 1$ cwt. per ft. cub. = 82 cwt.; for roof $14 \times 12 \times \frac{1}{2} = 84$ cwt.; and $\frac{82 + 84}{20} = 8.3$ tons total load distributed.

The span being 14ft., this will require a

British standard beam (B.S.B. 13) 8ins. by 5ins. by 28 lbs. If the floor joists are placed the other way, so that the rolled joist has to carry the weight of the two floors in addition to above, the extra load will be $14 \times 7.5 \times 1.25 = 131$ cwt. for the first floor; the attic floor, although partly out of use for want of height, will have the weight of partitions instead, so that it may be taken as half the value, and $\frac{131 + 65.5}{20} = \text{say } 10$ tons, making

the total load under the new conditions $8.3 + 10 = 18.3$ tons, which would require a British standard beam (B.S.B. 16) gins. by 7ins. by 58 lbs., or (B.S.B. 18) roins. by 6ins. by 42 lbs., or (B.S.B. 20) 12ins. by 5ins. by 32 lbs., the lighter joists with the greater depths giving about the same strength.

HENRY ADAMS.

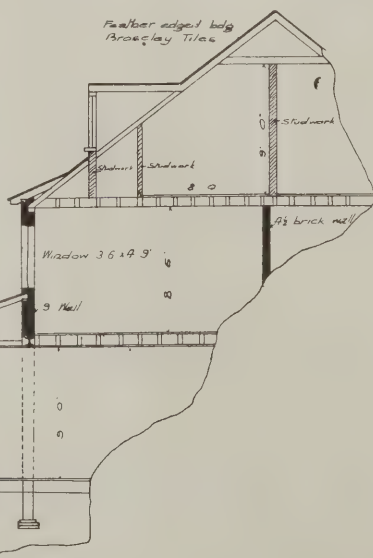
Thickness of Walls for Villas.

X. writes: "What is the required thickness of a flank wall to a villa residence built within the Metropolitan area?" (Sketch of three-storey building sent, not reproduced.)

The answer to your question is to be found in the first clause of the first schedule to the London Building Act of 1894, which provides:—Buildings not public and not of the warehouse class. "External walls shall be of not less thickness than . . . (1) When the wall does not exceed 25ft. in height its thickness shall be as follows: If the wall does not exceed 30ft. in length and does not comprise more than two storeys, it should be 8½ins. thick for its whole height. If the wall exceeds 30ft. in length or comprises more than two storeys it shall be 13ins. thick below the topmost storey, and 8½ins. thick for the rest of its height." Yours is a three-storey building, and therefore must be 13ins. thick below the topmost storey. It should be remembered that an apartment in the roof is a "storey" under the Act (definition 5). F. S. I.

Damage to Roof by Gale.

LEAMINGTON SPA.—BREEZY writes: "In March, 1905, I completed the building of a new house with lodges, &c., and in accordance with the terms of contract the final payment was made in September last. In January, during a severe gale of wind, one of the hips of a lodge, which is rather exposed, was partially stripped of tiles. The owner asked me to replace these, which I did, rendering account in due course. The architect now writes that he thinks I ought to waive the claim, although he admits that the damage was entirely due to the effects of the storm. Do you consider I should do as he asks, or am I entitled to be paid?"



SIZE OF ROLLED STEEL JOIST.

There is no legal obligation whatever upon a builder in such circumstances as these. The contract was completed, and the architect satisfied when the final payment was made. It does not appear even now to be alleged that the work was defective (much less fraudulent), and unless the builder wishes to "throw a sprat to catch a herring" I see no reason why he should accede to the architect's request to waive the cost of the recent repairs. F. S. I.

Right of Light.

MIDLAND.—ASSISTANT writes: "A prospective client of mine has a house, of the usual villa type, with windows overlooking the entrance to a field at the rear. It was understood at the time of building that a road would be cut here—the house being in the corner—but the idea has been abandoned, and the strip of land, and that at the rear, let on a fairly long lease. My client, who bought the land and built the house fourteen years ago, has an idea that he has now a right to the light at the side, and has been told by his solicitor and a former architect that such is the case—twelve years now, instead of twenty, constituting his right. I do not for a moment believe that this right could be equitably claimed, as this side-light is supplementary to the usual windows in this class of property, being lighted at back and front as well. Kindly give your opinion on the matter and say whether a shorter limitation has, or will, come into vogue. This would cause universal complication."

The fact that a road was proposed at the time of sale will not help your client, unless he distinctly bought a corner plot, with a covenant or a contract from the vendor that a road would be made in that position. You should procure a copy of the original sale particulars and building covenants, and I have little doubt that all your questions will be answered. I know of no subsequent Act to that of 2 & 3 Will. iv. c. 71 (an Act for shortening the time of prescription in certain cases); this by section 2 shortens the time in the case of an easement to twenty years (practically nineteen years and a day). Every new Act of Parliament causes complications, and unfortunately our legislators do not always recognize the fact. F. S. I.

Rebate on Purchase-money of House.

W. J. P. writes: "A builders offers to sell for a certain sum to a client a villa residence which the builder proposes to erect similar to one adjoining already built by him and sold to client (same parties in each case). In an enclosed letter with offer, builder confidently tells client that the offer is subject to a rebate of a definite sum, upon which client agrees to purchase, and upon completion (two years ago) pays to builder the purchase-money, but does not deduct the rebate, builder promising to remit the amount to client. Builder has not paid the rebate, notwithstanding repeated promises to do so. Has client any legal remedy; if so, how must she proceed?"

This appears to be a matter which can be decided by a solicitor who has access to all the documents, and can enquire fully into the facts of the case. On the correspondence, of which a copy is submitted, it appears that the rebate is recoverable (though you may be penalized for the absence of a stamp on the second letter); but a county-court judge, before whom such a case will go, will certainly ask for a full explanation of the transaction, and will especially enquire into the reasons (1) why the deduction was not made from the purchase-money at the time, (2) why two years have been allowed to elapse before it is claimed. You should consult a solicitor before doing anything.

F. S. I.

Correspondence.

R.I.B.A. Fellowship Elections.

SIR,—Will you kindly allow me to reply through your columns to the numerous inquiries we have received on the question of demanding a poll for the current list of candidates.

We have no desire to recede from the position we have constantly held, and we find that the resentment against these elections exists as strongly as ever, especially, just now, among the Birmingham men. But in view of the great anxiety expressed in the recent speeches at Conduit Street, and of the appearance in this list of the names of men who will be an acquisition to the Institute, we in Leeds have decided, rather than give the slightest ground for the charge of fractiousness which has been so freely made, not to demand a poll on the present occasion.

We have been actuated throughout solely by a desire to maintain the honour of the Institute, and we drew up a courteous memorial expressing our views which was duly presented to the Election Procedure Committee.

We hoped that in common fairness, and following several recent precedents, this memorial would be placed before members in the Journal as publicly as the statements made by the other side. But as it has not been published, nor even acknowledged, we shall be grateful if you will give it the greater publicity of your columns. I may say it was carefully held back to avoid drawing attention from the Council's proposals on registration.—Yours truly,

FREDERICK MUSTO,

Secretary, Leeds Associates' Meeting.

LEEDS.

The following is the memorial referred to:—

TO THE CHAIRMAN AND MEMBERS OF THE
R.I.B.A. COMMITTEE ON ELECTION
PROCEDURE.

GENTLEMEN,—The undersigned Associates, desiring to approach your committee with respect and in due constitutional form, and being denied the opportunity of taking part in its deliberations, venture to place their views before your committee in the present memorial, submitting—

(a) That the reasons which led to the recent demand for a poll and its result have been misunderstood or wrongly stated by members of the committee.

(b) That any attempt to revise the procedure of elections generally which omitted to enquire into the legitimate grounds of complaint would render the position worse than before.

(c) That the decisive nature of the recent voting indicated a strong feeling of dissatisfaction throughout the country, which deserves the fullest recognition and respect of your committee, and should convince them of the necessity for full investigation.

Your memorialists therefore earnestly request the serious attention of your committee to these facts and to the following observations in relations thereto:—

Firstly, as to the reason for the demand for a poll.

It is an undoubted fact that as a consequence of the second resolution passed on February 29th, 1904, candidates of relatively insignificant professional standing have been nominated by the Council and duly elected to the Fellowship. Protests have been made from time to time, both at meetings of the Institute and in the Press, against this interpretation of the resolution, but they have been unavailing, and the recent demands for a poll were avowedly made with the object of calling the attention of the Council in an emphatic and perfectly regular manner to

the dissatisfaction which exists throughout a large proportion of the membership. The voting papers were perfectly clear in their wording, following the form prescribed in the regulations; and the significance of the voting is unmistakable. The statement that your memorialists desire to exclude, without exception, every candidate who shall not have passed the qualifying examination is incorrect and unfounded. But they respectfully submit that exceptions should be made only in the cases of outstanding prominence and recognized professional distinction, and after a searching investigation of which the result should be voted on by a ballot of all members.

In this way the Fellowship of the Institute would become an honourable distinction conferred by the general assent of brother professionals with full opportunity for the exercise of discrimination.

The committee may confidently rely on the discrimination of members in this matter, as they cordially welcome the candidature of men of distinction. In the case of the recent election of leading architects who had attained eminence in the profession it was generally felt that the Institute was honouring itself as well as the candidates.

But it cannot be established that the election of large groups of candidates recommended by the Council on the sole grounds of the practice qualification and the short time remaining before the closing of the door is likely to add dignity to the Institute or to confer any real distinction on the candidates themselves. The nomination of men who have neglected or failed to qualify as Associates, or of those who have practised mainly as engineers and surveyors with very little architectural capacity, has roused the opposition of members who would otherwise have accepted the situation and waited for the new by-law to come into force.

Secondly, as to remedial measures.

The prevailing feeling among members in regard to election to the Fellowship is undoubtedly correctly reflected in the first resolution passed on February 29th, 1894, and adopted on June 6th as a by-law.

Since the institution of the compulsory examinations the number of men who have thereby qualified as Associates has steadily increased. They have been actuated by a spirit of *esprit de corps*, by a desire for honourable membership of the Institute, and by the encouragement of presidents and leaders of the Institute and the provincial societies; they have felt the educational value to themselves, and have not grudged the expenditure of valuable time and the considerable outlay in preparation, in fees and in subscriptions. But they have not expected to find that others of no greater experience and training, and even some who have failed where they themselves had succeeded, were being elected over their heads to the rank of the Fellowship. Your memorialists humbly submit that without some reform in this direction no mere alteration in the details of polling is likely to relieve the present tension.

If it be urged that the elections which are the subject of this memorial have taken place with the due observance of by-laws and regulations and with the tacit consent of your memorialists themselves, it must be pointed out that more than 50 per cent. of the members reside and practise in provincial towns, and have therefore usually no opportunity of taking part in elections and business meetings. On this account we strongly urge that on all occasions when a vote of the membership is taken the procedure should be by ballot. On our side, however, no opposition would be offered to a proposal to reduce the majority of votes necessary to election. If the entrance were in other respects more rigidly safeguarded, a bare majority would appear sufficient, as in the case of election by show of hands.

Further, it may be said that the interests of the Associates' membership are protected by the presence upon the Council of their four elected representatives. Your memorialists submit that this measure of representation is entirely inadequate, and is further discounted by the fact that, so far as they are aware, no effort has ever been made by an Associate member of the Council to systematically inform himself of the views of the class he is supposed to represent. In these circumstances the representation becomes merely nominal, without weight in the deliberations of the Council. Your memorialists appeal for more adequate and effective representation, and beg to urge that they should be allowed to nominate their own candidates for the Council, instead of the nomination paper requiring a majority of Fellows in favour of the nominee.

For convenience of reference the points submitted in this memorial may be summarized as follows:—

(1) That your committee should give careful consideration to the circumstances which led up to the recent demand for a poll and its results, so that incidental matters may be regarded in their proper light.

(2) That the report of your committee should contain an indication of its views as to the respective status of Fellows and Associates, and matters pertaining thereto which have been referred to in this memorial.

(3) That by some modification of the Special Examination which would attach the same importance to actual architectural work as to abstract knowledge means should be provided and recognized by which candidates may be elected as Associates, who, on account of age and busy practice, are reluctant to sit for the ordinary examination.

(4) That the dignity of the Institute would be augmented if the Fellowship were reserved for distinguished men of high personal achievement, and if the present policy were abandoned.

(5) That all voting on questions of policy and of membership be by a poll of the whole electorate. An inexpensive method would not be difficult to devise, which would make use of a detachable portion of the Journal insets.

(6) That the representation of the Associates' membership upon the Council should be increased and measures taken to make it more truly representative.

In conclusion, your memorialists entirely disclaim the hostility and organized opposition to the Council with which they have been credited; they would if allowed have been glad to be represented before your committee, with the hope of getting due consideration given to their views. Your memorialists are actuated solely by a conscientious desire to remedy the grave dissatisfaction which undoubtedly exists, and to promote a much-needed reform in the procedure connected with the Fellowship of the Institute.

The Institution of Heating and Ventilating Engineers are holding a summer meeting at Bath on Monday, Tuesday and Wednesday next week. A paper on "The Warming of Steamships" will be read by Mr. Charles R. Honiball, M.I.M.E., and another on "The Labour Problem" by Mr. F. S. Russell.

Waring & Gillow's new Premises.—The chief interior feature of Messrs. Waring & Gillow's new premises in Oxford Street is the rotunda, measuring about half the diameter of the dome of St. Paul's Cathedral and 80ft. in height. This novel departure in a business establishment will be used as a reception-room and for the display of furniture and showcases. More than a hundred galleries, averaging 60ft. by 30ft., run through the premises, eighteen elevators giving access to the floors.

Trade and Craft.

Lifts in Modern Offices.

At the fine new block of offices known as Caxton House, Westminster, just completed by Messrs. Holloway Brothers from the designs of Mr. J. S. Gibson, F.R.I.B.A., a noteworthy lift service has been installed. There are three high-speed electric passenger lifts side by side in one large well-hole. The centre one is "Express," not stopping until the fifth floor is reached, while the two at the side serve all floors. In order that there may be no unnecessary delay, an indicator shows the exact position of each lift cage. This is a great convenience, and will be much appreciated by passengers. Each lift is controlled by a small switch fixed in the cage, and the acceleration is very smooth, being entirely free from the unpleasant jumps and jerks so often felt on even slow-running lifts. Should the attendant release his hold on the controlling switch, the lift would automatically stop. When the lift is at rest the lever operating the controlling switch can be withdrawn and taken away, thus preventing access by unauthorised persons. Naturally, the question of safety to passengers has been carefully provided for. The lift cages are each suspended by four steel wire ropes, and an efficient safety apparatus is arranged to stop the cage in the event of any of the ropes stretching or breaking. The lifts are stopped automatically at extremes of travel; should the cage exceed the correct limit of travel by even a few inches all current is cut off. We believe this is the first instance in London of a range of three high-speed electric lifts fixed side by side, although we understand the makers of these lifts—Messrs. Archibald Smith & Stevens, of Battersea—recently erected at some offices at Newcastle-on-Tyne a service of four lifts arranged round a large central entrance hall.

Compoboard.

From time to time many substitutes for plastering have been put on the market. One of the best and most extensively used is "Compoboard," which has now become an ordinary commodity in the building trade. This material consists of strips of wood placed side by side so as to alternate the grain and so resist warping, covered on the outside with sheets of cardboard. The cardboard and wood are held together by a strong and fire-resisting adhesive. In the process of manufacture the materials are subjected to great pressure, and thus become compact and rigid. "Compoboard" can be sawn, nailed, screwed and glued like ordinary boards, and of course it has the additional advantage of being free from warping and shrinking. It is made in large sheets and is cheap. Swedish "Compoboard" is made in sheets 4ft. wide and from 8ft. to 18ft. long, in two thicknesses, namely, $\frac{1}{4}$ in. and $\frac{3}{8}$ in. The surface on both sides being smooth, true and non-absorbent, it can be papered, painted, distempered or otherwise finished immediately after fixing. It is undoubtedly an admirable substitute for plastering, and much superior to matchboarding. As can be well understood, for lining temporary buildings it is excellent. The sole agents for the supply of Swedish "Compoboard" in this country are Messrs. Ltd., of 79 $\frac{1}{2}$, Gracechurch Street, London, E.C.

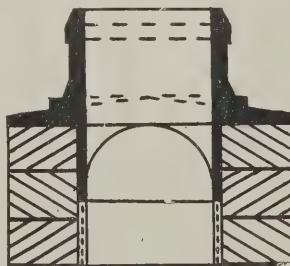
Covering Reinforced Concrete Roofs.

On previous occasions we have referred in these columns to that excellent roofing material "Ruberoid," with the form and substance of which most of our readers are no doubt acquainted. This material is free from any liability to crack, melt or run, and it is claimed to be not only more durable but cheaper than any similar material. For the moment we wish to refer to a recent contract which has been executed in "Ruberoid,"

more especially in respect to its application in connection with reinforced concrete structures. Messrs. R. W. Blackwell & Co., of City Road, E.C., have recently supplied "Ruberoid" for covering the whole of the flat concrete roofs, 58,500 cub. ft. in all, constructed on the Hennebique system, at the new goods warehouse in New Bridge Street, Newcastle-on-Tyne, for the North-Eastern Railway Co. The manner in which the "Ruberoid" was laid should be noted. It was put on the concrete in two thicknesses, so that the jointing of the first layer was thoroughly covered, and the roof thus made completely waterproof. This contract was obtained in competition with asphalt and several similar materials.

A Novelty in Chimney Construction.

The smoky chimney trouble has called forth the ingenuity of innumerable inventors, but notwithstanding the many forms of patent chimney-pots on the market it is apparent from the continued addition of patented or registered designs that the trouble is still with us. No doubt the reason why the difficulties of constructing smokeless chimneys have not been solved long ago is that in the very nature of things troubles must arise which prevent the smoke being carried away by an ordinarily constructed chimney-pot and flue. If, for instance, houses are built surrounded by trees or overtopped by large buildings—and they must occasionally be built in such situations—it is only to be expected that there should be a tendency for downdraught to be caused by high wind. Again, with long chimneys, cold weather and light breezes there will be insufficient draught. Cows, tall-boys, moving pots and other forms are advocated and adopted, but there is no doubt that there are a good many forms in simple stationary chimney-pots which have quite enough efficiency for practical purposes, so that there is considerable variety to choose from. Among the best of the kind we have seen are some ordinary terra-cotta "Notlor" patent chimney-pots made by Messrs. Notley & Taylor, of Finsbury Pavement House, E.C. The special advantages of these are that they are not so disfiguring to the chimney stacks as many of the patented forms, while a good many of them are of distinctly pleasing form. These "Notlor" chimney-pots are made in a form which has very considerable advantages apart from the question of improving the draught. They are made so as to be self-fixing, detachable and interchangeable. They are not seated as ordinarily upon the brickwork and flanching with mortar, but seated upon a small base which can be used if desired as the chimney-pot itself. This base is of the form illustrated on this page.



It will be seen that the sleeve fits into the flue, while the flange covers the top of the chimney so as to throw off the rain without the necessity of flanching with mortar, which, as everyone knows, is disintegrated by the weather after a few years; flanching, too, cannot be done without trouble and the risk of the free passage of the chimney being blocked by the collection of soot at this point, or of putting the chimney out of the upright. These chimney caps form the bases for any number of experiments in the attaching of different forms of wind-guards so as

to ascertain which form is best suited to any particular circumstances. The cost of bedding and pointing these chimney caps is only 2 $\frac{1}{2}$ d. per ft. run, whereas bedding and flanching ordinary dwarf pots in cement, or with tiles and cement, is estimated at from 5 $\frac{1}{2}$ d. to 7 $\frac{1}{2}$ d. respectively. The price of these self-flanching caps is given as 3s. 6d.; consequently their extra cost is more than covered by the saving in the cost of fixing. Messrs. Notley & Taylor are also specialists in the construction of fireplace openings, stoves, &c., flues and stacks, and they have a number of patents which are deserving of careful study by all interested in building construction.

A Novel Catalogue.

We have received a copy of a new catalogue issued by the Clydesdale Iron Foundry Co., of 210, Upper Thames Street, London, E.C. This is of somewhat novel form as regards the binding, which consists of screw-top paper fasteners, which can easily be unscrewed so as to allow sheets to be abstracted and replaced without damaging the book. By this means it is no longer necessary to carry about a cumbersome book for clients to select from; a few pages temporarily removed will answer the purpose. There is also an advantage in the fact that the company can print sheets of any new patterns to exactly correspond with the book, and these can be posted to customers for insertion in the catalogue without the expense of re-printing the whole catalogue. In this way the Clydesdale Co. estimate to be able to keep months ahead of their competitors, and in some cases years. There are fashions in grates and chimneypieces, and firms are constantly adding new designs which there is no doubt architects would like to keep a note of; this new form of catalogue certainly has distinct advantages in affording facilities in this respect. With regard to the designs in this catalogue, there are many which are distinctly superior to the usual kind of fire-grate and mantel, and we are glad to welcome these. Firms, of course, must cater for all classes of the public, and it cannot be expected that the designs should be pleasing to everybody, but we are glad to see this company endeavouring to set a better standard of taste.

A Steel Catalogue.

The latest edition of Messrs. Homan & Rodgers' catalogue of constructional steel-work and fireproof floors is still in the admirable neat pocket-book form that it has taken before, being bound in leather and printed on excellent paper. The increased adoption of steel in buildings renders this book of great service, for not only is it excellent for reference in a business way, but it contains an immense amount of information respecting methods of calculation that can be studied by students with great advantage. One admirable feature of the book is the way in which the standard bases, caps and connections for stanchions are illustrated; also grillage foundations. Some years ago we called attention to the value of the demonstrations in this catalogue, and we now repeat that the formulæ and tables given in it are worthy of most careful study. The form of grillage foundation for columns illustrated is without cast-iron stiffeners; these, however, are used in the best practice. In addition to the tables of strengths and formulæ, &c., at the end of the volume there are some useful tables of the weights, areas and circumferences of steel bars, weights of bolts and nuts and various substances, decimals of fractions of an inch, metric weights and measures and their English equivalents, moments of inertia, squares, cubes, roots, logarithms, reciprocals, sines. Homan's well-known fireproof floors in fireclay brick, and also in steel joists and reinforced concrete, we are glad to see illustrated and described.

Complete List of Contracts Open.

With a few exceptions, news of Contracts Open are not repeated after they have been published once in these columns, so that readers will find particulars in our previous issues of other contracts that still remain open.

Unless expressly stated to the contrary all deposits required for bills of quantities, &c., are returned on receipt of bona-fide tenders.

The words "Fair Wages Clause" inserted in certain paragraphs signify that persons tendering must conform to a fair-wages clause in the contract, which requires them to pay the rates of wages current in the district.

BUILDING.

June 7. Llanfechell.—*Erection of a new Council school at Llanfechell, for the Anglesey Education Committee.* Plans and specifications may be inspected at the offices of the county architect, J. Owen, F.R.I.B.A., at Menai Bridge and Holyhead. Tenders, under seal and endorsed "Llanfechell Council School," to be delivered to R. H. Williams, secretary of Education Education Offices, Llangefni, by not later than 10 a.m. on June 7.

June 7. Oswestry.—*Re-flooring of certain rooms in the Council School.* Plans and specification may be seen at the offices of J. C. Bull, solicitor, Oswestry. Forms of tender will be supplied upon application, and should be returned to J. C. Bull, sealed and endorsed "Tender for Oswestry Council School," not later than noon on June 7.

June 7. Stockport.—*Erection of the first portion of an observation block at Dialstone Lane Hospital.* The plans, drawings and general conditions may be inspected at the office of the architect, G. H. Brady, Borough Chambers, St. Peter'sgate, Stockport, and specifications and quantities will be supplied by him on payment of a deposit of £1 rs. Sealed tenders, endorsed "Hospital Building Contract," addressed to the Chairman of the Health Committee, must be delivered to Robert Hyde, town clerk, Town Clerk's Office, Stockport, not later than noon on June 7. Fair wages clause.

June 7. Huddersfield.—*Supplying and fixing of skylights at the Artizans' Dwellings, for the Corporation.* Plans, specifications and general conditions may be seen, and bills of quantities and forms of tender obtained on application at the offices of the Borough Engineer, 1, Peel Street. Sealed tenders, endorsed "Tender for Skylights," signed in the handwriting of the tenderer or his agent, and addressed "Town Clerk, Town Hall, Huddersfield," must reach him not later than 10 a.m. on June 7.

June 8. Salcombe.—*Erecting two houses and three shops at Salcombe.* Drawings and specification can be seen on application to the "Times" Office, Salcombe, and tenders to be delivered to J. Wills, Bar Lodge, Salcombe, before noon on June 8.

June 8. Carlisle.—*Erection of a caretaker's cottage at the Meeting of the Old and New Waters, Gelsdale, for the Corporation.* Persons desirous of tendering for the above works may inspect the drawings, specification, stipulations and conditions of contract, and obtain a copy of the bill of quantities and form of tender at the office of Henry C. Marks, M.I.C.E., city engineer and surveyor, 36, Fisher Street, Carlisle, on deposit of 10s. 6d. Sealed tenders, endorsed "Tender for Cottage," to be delivered at the City Engineer's Office, not later than 10 a.m. on June 8.

June 8. Eastbourne.—*Internal alterations and repairs for the Guardians, at Avenue House, The Avenue, Eastbourne, according to the plan and specification, &c., prepared by the architect to the Board, F. G. Cooke, 2, Hyde Gardens, Eastbourne.* Copies of the plan and specification can be seen at the office of the Architect. Sealed tenders to be addressed "To the Chairman," and endorsed "Tender for Alterations at Avenue House," to be delivered at the Board-room, Union Workhouse, not later than 2 p.m. on June 8.

June 9. Snodland.—*Building a mortuary at the cemetery, for the Parish Council.* Plans and specification can be seen at the office of S. Hilder, clerk, Pelham House, Snodland, to whom tenders endorsed "Tender for Mortuary" must be returned by June 9.

June 9. Dunblane.—*Mason, iron, joiner, plumber, slater, plaster, painter and glazier work for the erection and completion of the Queen Victoria School and Memorial to Scottish Sailors and Soldiers, houses connected therewith and offices; also for drainage, fencing and laying-out of ground; and for roads, sewers, water and gas supplies, and relative works.* The relative schedules may be had on application to the architect, J. A. Campbell, 124, St. Vincent Street, Glasgow, where the plans and drawings, specifications and measurements will be exhibited and explained. Printed copies of the conditions of contract, specifications and measurements and general conditions will be supplied to intending offerers on a deposit of £2. The schedules shall be priced and extended, but it is intended to accept a lump sum from one offerer for the whole work. No offers for separate works will be entertained by the Executive Council, but contractors will be allowed to sub-contract with the approval of the Building Committee. The schedules and tender must be sent in a sealed envelope, which will be supplied to intending offerers, and addressed to "The Executive Council, Queen Victoria School, care of R. Addison Smith, Esq., honorary treasurer, 19, Heriot Row, Edinburgh," not later than June 9.

June 9. St. Austell.—*Erection of a new gallery and certain other alterations at the Bible Christian Chapel, Bugle.* Plans and specifications may be seen and full particulars obtained at the office of the architect, F. C. Jury, No. 1, Alma Villas, Tregonissey Road, St. Austell. Tenders, sealed and endorsed "Bugle Chapel Tenders," must be sent to the Rev. W. H. Webber, Fernleigh, Bodmin, on or before June 9.

June 9. Leith.—*Terazzo work in connection with the erection of the new porch at Leith, for the Parish Council.* Contractors desirous to tender for the work will, on application to James Miles, clerk, 45, Charlotte Street, Leith, be supplied with specification and schedule of

quantities, on payment of a deposit of £1 rs., not later than June 2. No offer will be considered unless accompanied by the priced schedule, which must be delivered by June 9.

June 9. Morriston.—*"Libanus" new schoolroom.* Persons desirous of tendering for the above can inspect plans and specifications and obtain all particulars at the offices of Charles S. Thomas, architect and surveyor, Wind Street, Swansea. Tenders to be sent to George Rowe, Llanllienw, Morriston, on or before June 9, endorsed "Tender for Libanus Schoolroom."

June 9. Maidenwell.—*Erection of two pairs of cottages at Maidenwell, in the county of Lincoln, for the Corporation of Basingstoke.* Plans may be seen and bills of quantities obtained on application at the office of R. H. Fowler, architect, Louth, to whom tenders are to be sent by June 9.

June 9. Cardiff.—*Erection of a cookhouse at the Cardiff Workhouse, according to plans and specification prepared by the architect, Edwin Seward, F.R.I.B.A., Queen's Chambers, Cardiff, from whom bills of quantities may be obtained on payment of £2 2s. Forms of tender may be obtained from the Architect, and must be returned to Arthur J. Harris, clerk, Union Offices, Queen's Chambers, Cardiff, not later than 10 a.m. on June 9, endorsed "Tender for Cookhouse."*

June 9. Greetland.—*Erection of three houses in Hoult's Lane, Greetland.* Plans and specification may be seen and bills of quantities obtained from F. F. Beaumont, architect and surveyor, Southgate Chambers, Halifax, to whom tenders must be sent by June 9.

June 9. Churchtown.—*Extensive repairs to Kilbride Church, co. Meath, for the Very Rev. T. Casey, P.P., Churchtown, Navan, co. Meath, to whom the tenders are to be sent, endorsed "Tender for Kilbride Church," by June 9.* The plans and specification can be seen at the Presbytery, Churchtown, or at the office of William H. Byrne & Son, architects, 20, Suffolk Street, Dublin.

June 9. Cardiff.—*For the following works, for the Glamorgan Quarter Sessions and County Council—New police-station at Blaengwynfi; new police-station at Llanbradach; building a wall round the land at the rear of Ton Pentre police-station and court. Fair wages clause. Plans and specifications of the respective works may be seen and copies of the bills of quantities obtained at the following places:—Work No. 1, Port Talbot police-station; Work No. 2, Caerphilly police-station; Work No. 3, Ton Pentre police-station; and for all the works at these offices. Sealed tenders are to be delivered to W. E. R. Allen, deputy-clerk of the County Council, Glamorgan County Council Offices, Westgate Street, Cardiff, together with the full names and addresses of two substantial sureties, not later than June 9, marked outside "Tender for Blaengwynfi Police-station," "Tender for Llanbradach Police-station," or "Tender for Wall," as the case may be.*

June 11. Little Heath.—*Erection and completion of a new elementary school and teachers' residence.* Persons desirous of tendering for the work may see the drawings, specification, agreement, &c., at the County Surveyor's Office, Hatfield, on and after May 28 between 10 and 4, except on Saturday, when they will be on view from 10 to 12 noon. A copy of the schedule of works and prices (quantities) and form of tender can be obtained at the County Surveyor's Office upon payment of £2 2s. Sealed tenders, endorsed "Tender for School and Teachers' Residence, Little Heath," must be delivered to Urban A. Smith, county surveyor, County Surveyor's Office, Hatfield, not later than 5 p.m. on June 11.

June 11. Swindon.—*Erection of laundry buildings and disinfecter house, for the Guardians.* Plans and specifications can be seen and particulars obtained on application at the office of the architect, R. J. Beswick, M.S.A., 10, Victoria Road, Swindon. Sealed and endorsed tenders to be delivered to John P. Kirby, clerk to the Guardians, Union Offices, Victoria Road, Swindon, on or before 5 p.m. on June 11.

June 11. Burley.—*Additions to the council school.* Persons desirous of tendering may see plans, specification and conditions of contract, and obtain bills of quantities, at the office of W. J. Taylor, county surveyor, The Castle, Winchester, between 9 a.m. and 5 p.m. (Saturdays 9 a.m. to 1 p.m.) on payment of £2 2s. Deposits must be made by cheque payable to Hants County Council and crossed Bank of England, or particulars will not be sent. Tenders, endorsed "Proposed Additions, Burley Council School," are to be delivered to H. Barber, clerk of the County Council, The Castle, Winchester, on or before 10 a.m. on June 11.

June 11. Blantyre and Larkhall.—*Bricklayer, mason, joiner, slater and plaster, plumber, iron and painter works of public slaughterhouses, to be erected at Blantyre and Larkhall.* Schedules may be obtained from Gavin Paterson, architect, Hamilton, on payment of 10s. 6d. Tenders must be lodged with W. E. Whyte, district clerk, Hamilton, on or before June 11.

June 12. Halifax.—*Erecting three blocks of cottage homes in Upper Washer Lane, Halifax, for R. D. Ward, J.P.* Plans and specifications may be seen and bills of quantities obtained from Longbottom & Culpin, architects and surveyors, George Street, Halifax, to whom tenders, marked "Cottage Homes," are to be delivered by June 12.

June 12. Bristol.—*Additions and alterations to the Club-house, Fairland, for the Bristol and Clifton Golf Club.* Persons desirous of tendering can see the plans and specifications, and obtain bills of quantities, at the offices of Bernard & Son, 4, St. Stephen's Chambers, Baldwin Street, Bristol, on and after May 31. Tenders to be delivered by June 12.

June 12. Rugby.—*Proposed new wing to the hospital of St. Cross.* Bills of quantities and forms of tender may be obtained at the offices of the architect, J. D. Hoper, Albert Street, Rugby, on payment of £1 rs. Fair wages clause. Sealed tenders, on forms supplied, must be delivered before noon on June 12, addressed to the Chairman of Children Wards' Committee, and endorsed "Tender for New Wing."

June 12. London, S.W.—*Erection of a storehouse for boats at Battersea Park, S.W., for the London County Council.* Persons desiring to submit tenders may inspect the drawings, and obtain the specification, bills of quantities, form of tender, and other particulars at the Architect's Department, 75, Pall Mall East, S.W., upon payment to the Cashier of the Council, at the County Hall, Spring Gardens, of £1. Tenders must be upon the official forms, and the printed instructions contained therein must be strictly complied with. Fair wages clause. Each tender is to be delivered at the County Hall, in a sealed cover, addressed to the Clerk of the London County Council, Spring Gardens, S.W., and marked "Tender for the erection of a Boat-house at Battersea Park." No tender will be received after 10 a.m. on June 12. Any tender which does not comply with the printed instructions for tender may be rejected.

June 12. Cheltenham.—*Construction of an engine-shed at Cheltenham.* Plans and specification may be seen and forms of tender and bills of quantities obtained at the office of the Engineer at Gloucester Station between 10 a.m. and 4 p.m. Tenders, marked outside "Tender for Engine-Shed, Cheltenham," will be received by G. K. Mills, secty., Paddington Station, London, by June 12.

June 12. Rhymney.—*Alterations and additions to Zion Congregational Chapel, in accordance with plans and specification prepared by James & Morgan, F.R.I.B.A., architects, Cardiff.* Plans and specification may be seen and further particulars obtained either at the Architects' Office, or on applying to Elias Jones, "Cyclops," Rhymney. Tenders, sealed and endorsed "Tender for Zion Chapel," to be in the hands of Elias Jones not later than June 12.

June 12. Llanfair Caereinion.—*Repairs and alterations to Penarth Congregational Church.* Plans and specifications to be seen with J. P. Jones, Glôg, Llanfair Caereinion, to whom sealed and endorsed tenders should be sent on or before June 12.

June 13. Portland.—*Erection of the Wesleyan Methodist Church, Easton Square.* Bills of quantities may be obtained from the architects, La Trobe & Weston, F.R.I.B.A., 44, Corn Street, Bristol, or from R. Pearce, 3, Easton Square, Portland, on payment of a deposit of a £2 2s. Tenders to be sent in before June 13.

June 13. London, S.W.—*Erection of two additional ward blocks, recreation hall, and staff quarters at Tooting Bec Asylum, Tooting, S.W., for the Metropolitan Asylums Board, in accordance with drawings and specification prepared by W. T. Hatch, M.I.C.E., M.I.M.E., engineer-in-chief. Drawings, specification, bills of quantities, conditions of contract and form of tender may be inspected at the Office of the Board, Embankment, E.C., and bills of quantities and form of tender obtained upon payment of a deposit of £5. Tenders, addressed as noted on the form, must be delivered at the Office of the Board not later than 10 a.m. on June 13.*

June 13. Halifax.—*Erection of two dwelling-houses in Middle Dean Street and Green Lane, West Vale, and alteration to adjoining premises.* Plans may be seen and bills of quantities obtained upon application to T. Kershaw, A.R.I.B.A., architect, L. and Y. Bank Chambers, Halifax, to whom sealed tenders are to be delivered not later than June 13.

June 13. Treharris.—*Carrying-out alterations at Commercial Street, Nelson, Glam., for the Treharris Co-operative Society, Cardiff Road, Treharris.* Plans and specification may be seen at the office of W. Dowdswell, architect, Treharris. Sealed endorsed tenders to be sent to the Secretary on or before June 13.

June 14. Penrith.—*Heightening the Presbyterian Church of England, Penrith, lengthening nave and erecting chancel, organ-chamber, minister's and deacons' vestries, class-rooms, &c.* Plans can be inspected and all information obtained at the office of Stephen Shaw, F.R.I.B.A., architect, Kendal, where quantities and specifications can be had till June 14, upon which day endorsed tenders are to be sent in. A duplicate set of plans can be seen in the Church Hall from 10 till 4.

June 15. Grimsby.—*Erection of proposed new hall, Garibaldi Street, for the Ancient Order of Foresters.* Plans, specifications, form of tender, and all particulars may be obtained at the office of the architect, Herbert Heap, A.M.I.C.E., architect and surveyor, Osborne Chambers, between 9 a.m. and 6 p.m. Sealed tenders, which must be endorsed "Tender for Proposed New Hall," and addressed to T. Steel, secty., must be delivered at No. 164, Oxford Street, Grimsby, not later than June 15.

June 15. Gorseinon.—Erection of a new Co-operative Stores at High Street, Gorseinon. Plans and specifications may be seen with William Williams, architect, Frondeg, Pontardulais. Sealed and endorsed tenders to be sent to the Secretary, Pontardulais and Gorseinon Industrial Co-operative Society, Ltd., Pontardulais, on or before June 15.

June 15. Beckington.—Restoring the tower of St. Gregory's Church, Beckington, Bath. Plans and specifications may be inspected on application to W. J. Hole, Beckington, where sealed tenders are to be sent by June 15.

June 15. Wakefield.—For the builders', joiners', slaters', plumbers', plasterers', painters', &c., work at following schools, for West Riding Education Committee:—New school at Robin Hood, Rothwell; Lepton provided school, additions, &c.; Bolton-on-Darney provided school, additions, &c.; Swinton; Kilnhurst provided school, alterations and repairs; Swinton Bridge provided school, alterations and repairs; Bawtry provided school, alterations and repairs; Thornton-in-Craven; Earby provided school, additions, &c.; Hoyland Common provided school, new bathroom, &c., in teacher's house. For quantities and further particulars apply to the County Architect's office. A deposit of £1 is required for each of the above schools. Cheques, &c., to be sent to the West Riding Treasurer. Sealed tenders, properly endorsed, to be sent to J. Vickers-Edwards, county architect, County Hall, Wakefield, not later than 10.30 a.m. on June 15.

June 15. London, N.—Erection of a bandstand, composed of brick, wood and tiles, at Finsbury Park, N., for the London County Council. Persons desiring to submit tenders may inspect the drawings and obtain the specifications, bills of quantities, form of tender and other particulars at the Architect's Department, 15, Pall Mall East, S.W., upon payment to the cashier of the Council, at the County Hall, Spring Gardens, S.W., of the sum of 10s. Tenders must be upon the official forms, and the printed instructions contained therein must be strictly complied with. Fair wages clause. Each tender is to be delivered at the County Hall, in a sealed cover, addressed to the Clerk of the London County Council, Spring Gardens, S.W., and marked "Tender for Bandstand at Finsbury Park." No tender will be received after 10 a.m. on June 15.

June 16. Knock.—Erection of one detached and two semi-detached villas at Kensington Road, Knock. Plans and specifications may be had at the office of Thomas Houston, architect and civil engineer, Kingscourt, Wellington Place, Belfast, with whom sealed and endorsed tenders are to be lodged by June 16.

June 16. Manchester.—Extension of the existing laboratory at the Davey Hulme Sewage Works, near Urmston. Drawings may be inspected and bills of quantities and tender forms may be obtained on application to the Secretary of the Rivers Department, Town Hall, Manchester. Tenders must be enclosed in the official envelope provided expressly for the purpose (otherwise the tender will not be considered), and delivered at the above office not later than 10 a.m. on June 16.

June 16. Falmouth.—Proposed girls' school at Clare Terrace. Tenders are invited for the erection and completion of the above, according to plans and specifications, which may be seen by appointment at the Municipal Offices, Falmouth, or at the office of the Architect, Sampson Hill, Green Lane, Redruth, from whom all particulars relating to the work may be obtained. Forms, upon which all tenders must be made, may be obtained from the Secretary or the Architect. Sealed tenders, endorsed "Tenders for Clare Terrace School," are to be sent to E. E. Armitage, secy., Municipal Offices, Falmouth, on or before June 16.

June 18. Exeter.—Alteration and extension of the existing buildings at the College Hostel, Castle Street, in accordance with drawings and specifications which may be seen at the offices of James Jerman, F.R.I.B.A., architect and surveyor, Bedford Circus, Exeter. Bills of quantities may be obtained on payment of the sum of £1 1s. Tenders, endorsed "College Hostel," to be sent to H. Lloyd Parry, town clerk, Exeter, on or before June 18.

June 18. Wimbledon.—Erection of seven cottages for Corporation's workmen, to be erected in the Durnsford Road, Wimbledon. Plans and specifications may be inspected and bills of quantities obtained at the Borough Surveyor's Office, Town Hall, Wimbledon, upon payment to the Borough Treasurer of a deposit of £2 2s. Sealed Tenders, addressed to the Chairman of the Electric Lighting Committee, and endorsed "Tender for Workmen's Dwellings, Durnsford Road, Wimbledon," must be delivered on or before noon on June 18.

June 18. Talgarth.—Repair of Llandefalle Church, Talgarth. Plans and specifications can be seen at Llandefalle Rectory on and after June 4. Tenders to be sent to Ernest V. Collier, M.S.A., architect, 4, Quay Street, Carmarthen, not later than June 18.

June 19. Brighton.—Erection of two pairs of farm labourers' cottages on land adjoining the Warren Farm schools, in the parish of Rottingdean. Copy of specification and form of tender, together with any further information, can be obtained on application to E. Wright, architect for the Guardians, at the Parochial Offices, where the plans may also be inspected. Sealed tenders, endorsed "Tender for Cottages," are to be addressed to B. Burfield, clerk to the Guardians, Parochial Offices, Prince's Street, Brighton, and delivered by 10 a.m. on June 19.

June 19. London, W.—Alterations and additions to the Paddington District Post Office, W. Drawings, specification and a copy of the conditions and form of contract may be seen on application to J. Wager, H.M. Office of Works, Westminster, S.W. Bills of quantities and forms of tender may be obtained at the same address on payment of £1 1s. Tenders must be delivered before noon on June 19, addressed to the Secretary, H.M. Office of Works, &c., Storey's Gate, London, S.W., and endorsed "Tenders for Paddington District Post Office Enlargement."

June 20. St. Andrews.—Erection of a new post-office at St. Andrews. Drawings, specification, and a copy of the conditions and form of contract may be seen on application to the Postmaster. Bills of quantities and forms of tender may be obtained from W. T. Oldrieve, H.M. Office of Works, Parliament Square, Edinburgh, on payment of £1 1s. Tenders must be delivered on or before June 20, addressed to the Secretary, H.M. Office of Works, &c., Storey's Gate, London, S.W., and endorsed, "Tender for St. Andrews Post-office."

June 20. Watford.—Erection of addition to and alterations of the Council Offices. The plans and specifications can be seen and bills of quantities obtained on application to D. Waterhouse, surveyor to the Council, 14, High Street, Watford. The sum of £1 1s. will be charged for the quantities. Sealed tenders, endorsed "Tender for Office Extensions," to be delivered to H. Morten Turner, clerk to the Council, 14, High Street, Watford, by noon on June 20.

June 20. Cheltenham.—Erection of new school buildings, to accommodate 1,100 children for the Gloucester Road district of Cheltenham, in accordance with plans, specifications and conditions of contract to be seen at the offices of Charters & Smithson, architects, 17, Regent Street, Cheltenham. Early application is requested for bills of quantities, which will be supplied by the architects upon receipt of a deposit of £2 2s. Tenders, sealed and endorsed, must be delivered to William Preston, secy., Education Offices, Rodney Road, Cheltenham, by noon on June 20.

June 21. Fishguard.—Building a new chapel. Plans and specification may be seen on application to the architects, George Morgan & Sons, F.R.I.B.A., A.R.I.B.A., 24, King Street, Carmarthen, or to D. B. Phillips, surveyor, High Street, Fishguard, to whom sealed tenders are to be sent on or before June 21.

June 22. Lower Sandhurst.—Building a new school for 250 scholars at Lower Sandhurst, Berks. Builders desirous of tendering are required to send in their names on or before June 12, together with a deposit of £3 3s. for bills of quantities, which will be supplied by post. Plans, specifications and form of contract will be open for inspection at the Education Secretary's office. Tenders must be delivered at the office of the Education Secretary, The Forbury, Reading, on the form and in the envelope provided, not later than the first post on June 22.

June 23. Brentwood.—Remodelling one of the blocks of buildings at the Essex County Asylum so as to form attendants' quarters. Drawings and specifications and form of contract may be inspected at the office of the county architect, Frank Whitmore, Duke Street, Chelmsford, between 10 a.m. and 4 p.m. on any working day except Saturdays. Persons desirous of tendering must send in their names and addresses to the County Architect not later than noon on June 4. Sealed tenders, on the form supplied, endorsed "Tender for Female Attendants' Block," should be delivered to W. P. Gepp, clerk to the Committee of Visitors, Chelmsford, not later than 10 a.m. on June 23.

June 25. Redruth.—Erection and completion of the West Cornwall Miners' and Women's Hospital, comprising an operating theatre, with adjoining rooms and corridors, according to plans and specifications which may be seen by appointment at the office of Sampson Hill, architect, Green Lane, Redruth. Sealed tenders, endorsed "Tender for Operating Theatre," to be sent to C. Tweedy, hon. secy., Capital and Counties Bank, Redruth, not later than 10 a.m. on June 25.

June 27. London, S.W.—Erection of new boardroom and offices, &c., and an extension of the workhouse in Vallis's Yard, Buckingham Palace Road, S.W., for the Guardians. The plans and specifications may be inspected and bills of quantities obtained on application at the office of the architect, Francis J. Smith, F.R.I.B.A., Parliament Mansions, Victoria Street, Westminster, between 10 a.m. and 4 p.m. from June 6 to 11. Tenders on the form supplied are to be addressed and delivered to Thomas Worlock, clerk to the Guardians, Guardians' Office, St. George's (Hanover Square) Hall, Mount Street, W., at or before 10 a.m. on June 27.

No date. Dulwich.—Completion of St. Barnabas' Church. Contractors having experience of church building and desirous of tendering are requested to send their names to Oliver, Leeson & Wood, architects, Milburn House, Newcastle-on-Tyne. From the list submitted a limited number will be invited to compete.

ENGINEERING.

June 7. Handsworth.—Construction of a storage tank in Hennebique's patent ferro-concrete at the Public Baths, Grove Lane, Handsworth. Plan, specification and conditions of contract and form of tender may be obtained at the offices of the architect, J. P. Osborne, F.R.I.B.A., of 95, Colmore Row, Birmingham, on depositing with him the sum of £2 2s. Fair wages clause. Tenders, on the prescribed form, enclosed in sealed envelopes, endorsed "Tender for Storage Tank," must be delivered to H. Ward, clerk, the Council House, Handsworth, near Birmingham, not later than noon on June 7.

June 8. Melrose.—Repair of two bridges on the main road, near Buckholm, the work consisting of stripping arches and haunches, covering them with coat of concrete 24 ins. thick, building tie walls, &c., for the Roxburghshire County Council. Plans and specifications may be seen and schedules obtained at the office of C. Monteath, C.E., Newton St. Boswells. Sealed tenders, marked "Tender for Buckholm Bridges Repairs," to be lodged with A. Murison Small, W.S., district clerk, Melrose, not later June 8.

June 9. Paignton.—Supply, delivery and laying of a 7 in. cast-iron water-main, together with the requisite meter, sluice valves, air valves, washouts and other fittings, meter-house and store, and other works in connection with Paignton water supply in the parishes of Marldon and Paignton, from Churchcombe Cross to the Paignton and Churston Ferra's parish boundary. Drawings may be seen and copies of specification, bills of quantities, and forms of tender obtained at the office of the

engineer, Frederick W. Vanstone, Palace Chambers, Paignton, on payment of £5. Sealed tenders, upon the form provided, endorsed "Paignton Waterworks," are to be addressed to James R. Mill, clerk to the Council, Town Hall, Paignton, on or before June 9.

June 9. Hull.—Construction of a covered concrete service reservoir at Keldgate, to hold about ten million gallons. Drawings may be seen and copy of specification and form of tender may be obtained at the City Water and Gas Engineer's Office on payment of £2. Cheques and postal orders to be made payable to T. G. Milner, city treasurer, Hull. Tenders, endorsed "Tender for Covered Service Reservoir," are to be addressed to the Chairman of the Water and Gas Committee, and delivered at the Town Clerk's Office not later than June 9.

June 9. Great Harwood.—Labour (only) required in taking down and rebuilding the small bridge at Dean, for the U.D.C. Drawings and specifications may be seen between 9 and 10 a.m. on application to A. H. Dunkin, surveyor to the Council, to whom tenders, sealed and endorsed "Dean Bridge," are to be delivered not later than June 9.

June 11. London, E.—Supply and delivery at the sewage outfall works, East Ham, of the necessary steam, exhaust and other piping required in connection with the new pumping plant being laid down there. Particulars, form of tender and specification may be obtained upon application to A. H. Campbell, M.I.C.E., borough engineer, Town Hall, East Ham. Fair wages clause. Tenders to be delivered, addressed to the "Chairman of the Public Health Committee, Town Hall, East Ham, E.," and endorsed "Steam Piping," not later than noon on June 11.

June 11. Portsmouth.—Supply of tramway feeder cables. The specification, with general conditions and form of tender, can be obtained on application to the Town Clerk, Town Hall, Portsmouth, but a deposit of £5 5s. must accompany the application. Drawings may be seen at the office of V. G. Lironi, M.I.M.E., A.M.I.E.E., tramways engineer, Vivash Road, Fratton, Portsmouth. Fair wages clause. Tenders must be delivered to the Town Clerk, Town Hall, Portsmouth, not later than 10 a.m. on June 5.

June 11. London, N.—Supply and erection of one cold water-softening plant, capacity about 2,000 gallons per hour continuous working. Plans may be seen, and conditions, specification and form of tender obtained at the office of the electrical engineer to the Council, E. Calverly, Electricity Works, Squires Lane, Finchley, N. A Winchester quart sample of the water will be sent to firms desiring to tender on receipt of 5s. (not returnable) to cover expenses of sending same. Sealed tenders, marked on the outside "Electricity Works, Section XXVII," to reach E. H. Lister, clerk to the Council, Council Offices, Finchley, before 5 p.m. on June 11.

June 12. Nuneaton.—Supply, delivery and erection of one 200-hp. steam dynamo, for the U.D.C. Copies of the general conditions, specification and form of tender may be obtained on payment of £2 2s. Additional copies of the specification may be had on payment of 10s. per copy, which amount will not be returned. Sealed tenders, endorsed "Tender for Steam Dynamo," and addressed to the Chairman of the Electric Light Committee, Electricity Works, Nuneaton, will be received up to noon on June 12.

June 12. Kempston.—Water-supply. A.—The provision, delivery, laying, and jointing in the rural district of Bedford of about 550 tons of cast-iron pipes (principally 7 in. and 8 in.) and for the construction of certain ancillary works; and B.—The supply, delivery, laying and jointing of about 5 miles 325 yds. of 7 in., 6 in., 4 in. and 3 in. cast-iron socket pipes, with appendages, including all necessary sluice and air valves, hydrants, and other works, for the water-supply of the urban district of Kempston. Plans, specifications and conditions may be seen as regards contract A at the offices of the engineer, George F. Deacon, 16, Great George Street, Westminster, S.W., and as regards contract B at the offices of the engineers, Beesley, Son & Nichols, 11, Victoria Street, Westminster, from whom respectively specifications, bills of quantities and forms of tender can be obtained on payment of £5 for each contract. Sealed tenders, endorsed "Tender for Waterworks Contract A" (or B), to be addressed to William Payne, clerk of the Council, and sent to the U.D.C. Offices, Bedford Road, New Town, Kempston, at or before noon on June 12.

June 14. Battle.—Supply, delivery and laying of about 1,620 yds. of 4 in. water main, and the necessary valves in connection with the same, from the town of Battle to the Battle Union Workhouse. Sealed tenders, endorsed "Tender for Mains, &c.," and addressed to Charles Sheppard, clerk to the U.D.C., Battle, to be sent in not later than noon on June 14. Plan, specification, and general conditions may be inspected at the offices of the Clerk, at Battle.

June 14. Wellingborough.—Supply and erection of a steel building with corrugated sheeting, 60 ft. by 25 ft. by 22 ft. 6 ins. high. Drawings and specification may be had by application to the Northamptonshire Direct Castings Co., Ltd., Wellingborough. Tenders will not be considered after June 14.

June 16. Birkenhead.—Excavating and making culverts for steam mains at the Union Workhouse, Tranmere, for the Guardians. Also tenders for supplying and fixing steam mains at the Union Workhouse. Persons desirous of tendering may obtain copies of quantities upon payment of a deposit of £2 2s. Such copies of quantities may be obtained between 10 and 5 upon application to the Guardians' Liverpool, Edmund Kirby, F.R.I.B.A., 5, Cook Street, Liverpool. Sealed tenders, signed and endorsed "Tenders for Excavating and Making Culverts for Steam Mains" or "Tender for Supplying and Fixing Steam Mains," as the case may be, to be delivered to John Carter, clerk, Poor Law Offices, Conway Street, Birkenhead, on or before 10 a.m. on June 16.

June 16. Johannesburg.—Watering cars and spare parts. Supply and delivery, after erection for inspection at makers' works, of three electric watering cars for use on the Council's tramway system, together with

various spare parts for the cars. Tenders are to be made for delivery f.o.b. at any port suitable for shipment to South Africa, but separate prices must also be given for (a) delivery of the cars and spare parts at the car sheds, Johannesburg, (b) the erection of the cars complete in Johannesburg. Tenders are to be addressed to the Town Clerk, Municipal Offices, Johannesburg, and must reach him not later than June 16. The general conditions, specification, and form of tender may be seen on and after May 10 at the offices of the Council's consulting engineers, Mordey & Dawbarn, 82, Victoria Street, S.W., and may be obtained from them on payment of £5 5s. Further copies of the general conditions, specification and forms of tender may be obtained from the Consulting Engineers on payment of 10s., which will not be returned.

July 17. Saltash.—Construction of a steam ferry bridge, to run on chains across the River Tamar at Saltash Passage. Plans and specification of the bridge may be obtained from the Town Clerk. The bridge is to be delivered on chains at Saltash within twelve months of the acceptance of a tender. Sealed and marked tenders to be sent to Fred. Et. Claverton, town clerk, Saltash, not later than July 17.

June 18. Middlezoy.—Supplying and fixing a steel flooring bridge at Greylake's Fosse, Middlezoy, Somerset, in part substitution for the existing bridge and for other alterations of the approach thereto, for the Kings Sedgemoor and Cary Valley District Drainage Board. Specifications and plans may be seen and blue prints of the plans and tender forms may be obtained on application to Walter J. R. Poole, clerk, 9, Dampier Street, Bridgwater, to whom sealed tenders must be sent not later than noon on June 18, marked "Tenders for Greylake's Fosse Bridge."

June 18. Banbridge.—Construction and erection of a steel umbrella roof, 35ft. by 22ft., at Banbridge, for the Great Northern Railway Co. (Ireland). Parties wishing to tender may see the drawing and specification at the office of W. H. Mills, engineer-in-chief, Amiens Street, Dublin; or copies of them at the Offices of the District Engineer, Belfast; and can obtain at the said offices lithographed copies of the drawing, specification and form of tender on payment of 10s. (not returnable) per set. Tenders, made out on the forms supplied by the Company, and endorsed "Tender for Umbrella Roof," should be delivered to T. Morrison, secy., Secretary's Office, Amiens Street Terminus, Dublin, not later than 10 a.m. on June 18.

June 23. Guildford.—Construction of a reservoir in ferro-concrete on the Hennebique system, the supply and erection of windmill and gas plant for pumping purposes, and the erection of certain brick and tile buildings on the site of the high service reservoirs situated 360ft. above Ordnance datum. Plans and sections may be seen and copies of the specification, bills of quantities, and form of tender obtained on application to C. G. Mason, A.M.I.C.E., borough engineer and surveyor, upon payment of £3 3s. Sealed tenders, endorsed "Tender for Works of Water Supply, Higher Levels," are to be sent to F. S. Miller, town clerk, Town Clerk's Office, Bridge Street, Guildford, on or before noon on June 23.

June 25. Hornsea.—Construction of a concrete sea-wall, promenade and groynes upon or adjacent to the foreshore at Hornsea, in the county of York, for the U.D.C. Contract drawing, terms and conditions of contract and specification may be seen on application at the office of the Clerk at Hornsea, or to the Consulting Engineer to the Council, W. T. Douglass, 15, Victoria Street, Westminster, London, S.W., on and after June 11. Copies of the form of tender, conditions of contract, and bills of quantities may be obtained upon application to the Consulting Engineer upon payment of a deposit of £2 2s. Copies of the drawings may be obtained from the Consulting Engineer on payment of 10s. 6d., which sum is non-returnable. Sealed tenders, which will only be received upon the forms supplied, endorsed "Tender for Sea Defence Works," to be delivered to T. Hornsey, at the Public Rooms, Hornsea, at or before noon on June 25.

June 30. Leicester.—Construction and erection of a steel bridge over the River Trent, together with the cast-iron cylinders and all dredging, excavating, bricklaying, and masons' work in the abutments and hauling path belonging thereto, in connection with Section No. 2 of the main for bringing the Derwent supply to Leicester. The bridge will be in one span of the bowstring type, supported on four cast-iron cylinders, and having a clear opening of about 220ft. between the cylinders and a width between the centres of the main arches of 10ft., and is estimated to weigh about 393 tons, including the cast-iron and steel work in the cylinders and hauling path. The drawings may be inspected at the offices of the engineers, Everard, Son & Pick, 6, Millstone Lane, Leicester, and conditions of contract, specification, quantities and form of tender obtained from them upon payment of £5. Sealed tenders, upon the form supplied, addressed to the Chairman of the Water Committee, Town Hall, Leicester, are to be delivered not later than 10 a.m. on June 30, endorsed "Tender for Trent Bridge—Derwent Main."

June 30. Mansfield.—Sinking a well near Waterfield Farm, in the parish of Clipstone, 3½ miles from Mansfield. The well is to be 150ft. deep and 12ft. in diameter in the new red sandstone, and is to be lined in part with cast-iron tubing. The contractor is to provide temporary pumping plant, capable of raising 70,000 gallons of water per hour 150ft. high, or 1,680,000 gallons in 24 hours. In addition to the well-sinking, the contract will also include driving certain headings and putting down boreholes. The drawings and specification may be seen at the office of the engineers, G. & F. W. Hodson, Bank Chambers, Loughborough, and copy of the schedule of quantities and form of tender obtained on deposit of a cheque for £5 5s. Sealed tenders, endorsed "Tender for Clipstone Well," to be sent to J. Harrop White, town clerk, Mansfield, not later than June 30.

June 30. Cairo.—Supplies and works in connection with the water supply of Menouf, including engine-houses, pumping machinery, motors, conduits, and steel water tower and reservoir. Specifications, plans, &c., may be seen at the Ministry of the Interior, Cairo. Tenders will be received by the European Secretary of the Ministry of the Interior, Cairo, up to June 30.

Oct. 1. Bangkok (Siam).—Construction of a bridge, 260 metres long, over the Meram River. For particulars apply to the Siamese State Railways, Bangkok. Tenders to be in by Oct. 1.

IRON AND STEEL.

June 9. Guildford.—Supplying and erecting about 700ft. lineal of barbed wire fencing with iron standards on the Poyle Charity estate. All particulars can be obtained from William G. Lower, surveyor to the Estate Trustees, 12A, High Street, Guildford, to whom tenders are to be sent on or before June 9.

June 11. Rotterdam.—Supply of 300 cast-iron strut syphons for the municipality. Particulars of the contract may be obtained from the Burgomaster of Rotterdam. A copy of the conditions (in Dutch), together with drawings, may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall Street, London, E.C. Tenders to be sent into the municipality by June 11.

July 16. Johannesburg.—Supply of enamelled iron and brass licence plates and badges required by the Council for the year 1907. Sealed tenders, endorsed "Tender for Licence Plates and Badges 1907," will be received by the Town Clerk, Municipal Offices, Plein Square, Johannesburg, Transvaal, South Africa, not later than noon on July 16. Forms of tender, specifications, and blue prints may be obtained on application to the Council's agents in London, E. W. Carling & Co., St. Dunstan's Buildings, St. Dunstan's Hill.

PAINTING AND PLUMBING.

June 7. Carmarthen.—Painting, colouring, &c., at the following Council schools:—Llwynhendy, Philadelphia, St. Clears, Trelech Village, Bettws, Capel Isaac, Velingw, Five Roads. Specifications may be seen and full particulars obtained on application at the above-mentioned schools, or at the office of W. D. Jenkins, M.S.A., M.R.S.I., county education architect, Shire Hall, Carmarthen. Tenders, sealed and endorsed, to be delivered to J. W. Nicholas, County Education Offices, Carmarthen, on or before June 7.

June 8. Hull.—Painting required at Drypool bridge and North bridge. Forms of tender and other particulars may be obtained at the City Engineer's office. Tenders, endorsed "Tender for Painting Bridge," are to be addressed to the Chairman of the Bridges Committee, and delivered at the Town Clerk's office before 10 a.m. on June 8.

June 8. London.—General repairs and painting to the artisans' dwellings, Stoney Lane, for the Corporation, according to specification and other particulars to be seen at the office of the Engineer to the Corporation, Guildhall, where forms of tender may be obtained. Tenders, on the before-mentioned forms, must be addressed, Town Clerk, Public Health Department, Guildhall, E.C., endorsed "Artizans' Dwellings," and delivered at the office of the Hallkeeper, Guildhall, between 1 and 2 p.m. on June 8.

June 9. Aberdeen.—Lime-washing of courts and closes, of which a specification and list lie at the Sanitary Inspector's Office, 4½, Union Street, and which will be given out for perusal of intending offerers on application any day at 10 a.m. Tenders addressed to the Council, and endorsed "Tender for Lime-washing," to be lodged with the Sanitary Inspector on or before June 9. The work to be commenced on June 18, and finished by July 21.

June 9. Nottingham.—Outside painting proposed to be done to the gates and the lodges at the Waverley Street and Sherwood Street entrances to the Arboretum. Specifications, forms of tender, and bills of quantities may be obtained on application at the City Architect's Office on payment of a deposit of 10s. Tenders, endorsed "Tender for Painting Lodges, &c., Arboretum," to be addressed to Samuel G. Johnson, town clerk, and delivered at his office, the Guildhall, before noon on June 9. Fair wages clause.

June 12. London, W.—Cleaning, painting and distempering, &c., the interior of the infirmary buildings at Isleworth, for the Guardians of Brentford Union, in accordance with specification, which can be seen at the Union Offices, Isleworth, W. Tenders, endorsed "Painting Infirmary," must be delivered to William Stephens, clerk to the Guardians, not later than 4 p.m. on June 12.

June 12. London, W.C.—Preparing and painting the whole of the external ironwork, and for cleaning out and repairing all the gutters and stack pipes at the Receiving House for Children and Nurses' Home in Broad Street, W.C., for the Guardians of St. Giles-in-the-Fields, and St. George, Bloomsbury, in accordance with a specification to be obtained at the Guardians' Offices, 57, Broad Street, Bloomsbury, W.C., where tenders must be delivered on or before 10 a.m. on June 12.

June 12. London, S.E.—Repairing and painting the footbridge over the London, Brighton and South Coast Railway at Sydenham Park. Specifications may be seen and forms of tender obtained at the Town Hall (Surveyor's Department). The tenders must be on forms issued by the Council, enclosed in an envelope, sealed and endorsed, "Tender for Painting and Repairing Footbridge," and must be delivered by 4 p.m. on June 12, at the Town Hall, and placed in the box there provided for the purpose. The works must be proceeded with immediately on acceptance of tender and execution of contract, and the contractor must employ local labour as far as practicable in carrying out the work. Fair wages clause.

June 12. Dumfries.—Painters' work proposed to be executed at the County Buildings, Buccleuch Street. The specification of the work may be seen at the office of James Barbour & Bowie, architects. Tenders must be lodged with John Robson, county clerk, County Buildings, Dumfries, on or before June 12.

June 13. London, S.E.—Repairs and cleaning and painting works at the Park Fever Hospital, Hither Green, S.E., for the Metropolitan Asylums Board, in accordance with specification prepared by W. T. Hatch, M.I.C.E., M.I.M.E., engineer-in-chief. Specification, conditions of contract, bill of quantities and form of tender may be inspected at the office of the Board, Embankment, E.C.,

and bill of quantities and form of tender can be obtained upon payment of a deposit of £1. Tenders, addressed as noted on the form, must be delivered at the office of the Board not later than 10 a.m. on June 13.

June 13. Dartford.—Cleaning and painting works at Darent Asylum, Dartford, Kent, for the Metropolitan Asylums Board, in accordance with specification prepared by W. T. Hatch, M.I.C.E., M.I.M.E., engineer-in-chief. Specifications, conditions of contract and form of tender may be inspected at the office of the Board, Embankment, E.C., and can be obtained upon payment of a deposit of £1. Tenders, addressed as noted on the form, must be delivered at the office of the Board not later than 10 a.m. on June 13.

June 16. Southwam.—Painting and decorating the interior of the Wesleyan chapel, and for re-varnishing all the pews and other woodwork. Particulars may be had from J. Wadsworth, South View, Southwam. Sealed tenders to be sent to the Rev. E. Wright Adcock, 1, Savile Row, Halifax, on or before June 16.

June 18. Darlington.—Painting, distempering and whitewashing of the elementary schools during the midsummer holidays. Specifications and particulars may be obtained on application at the Education Offices, North Lodge. Tenders to be delivered at the Education Offices, marked "Tender," not later than 4 p.m. on June 18.

June 18. Portsmouth.—Painting and cleaning certain schools, in accordance with a specification prepared by the Surveyor. Form of tender and all information may be obtained from the surveyor, Mr. A. H. Bone, at his offices, Cambridge Junction, Portsmouth. Fair wages clause. Tenders should be delivered at the Education Committee's offices, Town Hall, Portsmouth, not later than 10 a.m. on June 18.

June 23. Dunham.—Painting Dunham Bridge above and below the roadway, together with the gatehouse and outbuildings, gates, fences, &c. The specification may be seen and a form of tender obtained upon application to Scorer and Gamble, Bank Street Chambers, Lincoln, to whom tenders are to be delivered not later than 10 a.m. on June 23.

No date. Gateshead.—Cleaning and painting of various schools during the summer vacation (August). Specification and other particulars may be had on application at the Education Offices.

ROADS AND CARTAGE.

June 9. Forres.—Laying concrete pavements and kerbs and granite crossings in High Street and Cumming Street. Specifications and schedules of quantities may be obtained from John Rankine, burgh surveyor, and offers lodged with R. Urquhart, junior, town clerk, Forres, on or before June 9.

June 9. Morriston.—Widening of Llanllienwen Road, near Ynisforgan, Morriston, for the Swansea R.D.C. Plans and specifications may be inspected on application to G. Powell Thomas, highway surveyor, Fforestfach, from whom any further particulars may be obtained. All tenders to be sent to Edward Harris clerk, District Council Offices, Alexandra Road, Swansea by June 9.

June 9. Leeds.—Paving and flagging of the following streets:—Argie Road, Barnborough Street, Raincliffe Grove, Raincliffe Street, Everleigh Street, Temple View Terrace, Everleigh Place, Everleigh Grove, Chantrell Grove and Chantrell Place. Plans and specifications may be seen at the City Engineer's Office, Municipal Buildings, Leeds. Tenders, on printed forms to be obtained at the Highways Office, must be sent to the Town Clerk's Office, on or before June 9, addressed to the Highways Committee, and endorsed "Tender for Private Street Work."

June 12. Hetton.—Road materials. Supply of 300 tons of rough slag, 1,200 of 2½in. machine-broken slag, 100 tons of 1in. machine-broken slag and 100 tons of ¾in. slag gravel, for the U.D.C. Further particulars, together with form of tender, which alone must be used, may be obtained from the Surveyor of the Council, John Harding, Hetton-le-Hole, R.S.O., to whom samples of slag proposed to be supplied are to be sent on or before 10 a.m. on June 12. Sealed tenders, endorsed "Tenders for Road Material," to be sent not later than 10 a.m. on June 12, to John George Baty, clerk to the Council, Houghton-le-Spring, R.S.O.

June 12. London, N.—Paving with wood blocks portions of the carriageways of High Street and Upper Street, Islington, N., and for removing the granite sets from portions of High Street and Upper Street and paving other roads, at present macadamized, with such sets. Conditions and specification may be seen and forms of tender and bills of quantities obtained upon application to the borough engineer, J. Batten Barber, at the Town Hall, Upper Street, N., on payment of £2 2s. Sealed tenders, endorsed "Tender for Wood and Granite Paving," must be received by W. F. Dewey, town clerk, Upper Street, Islington, N., not later than 4 p.m. on June 12.

June 12. Southampton.—Supplying a steam road-roller in accordance with specification and particulars which may be obtained upon application to J. A. Crowther, borough engineer. Tenders, endorsed "Tender for Road-roller," must be delivered at the Town Clerk's Office before 2 p.m. on June 12.

June 12. Tottenham.—Repair of the tar and asphalt paving throughout the U.D.C.'s district. Specifications and forms of tender can be obtained on application to W. H. Prescott, A.M.I.C.E., engineer to the Council, Council Buildings, The Green, Tottenham, any day during office hours. Persons tendering will be required to deposit with the treasurer, when handing in their tenders in a Bank of England note, or cash, the sum of £5 which will be forfeited by the person whose tender is accepted if the contract be not executed within seven days from the date he is informed it is ready for signature, otherwise it will be repaid. Fair wages clause. Sealed tenders on the form supplied, endorsed "Tender for Tar and Asphalt Paving Repairs," to be delivered to Edward Crowne, clerk of the Council, Tottenham, by noon on June 12.

June 12. Baildon.—Supply of 500 tons of 2½in. broken limestone, to be delivered at Baildon Station, for the U.D.C. Tenders, endorsed "Limestone," to be sent to J. Bentley, clerk to the Council, Baildon, on or before June 12.

June 13. Northfleet.—Supply of stone, &c., from July 1, 1906, to June 30, 1907, both inclusive, for the U.D.C., as follows:—Guernsey granite: Supply of 700 tons of Guernsey granite as per Guernsey State weighbridge certificate weight, broken to gauges of ½ins. and ¾ins., for metalling roads, to be delivered free of all canal, river and other dues and charges (except wharfage) on to such wharf within the district at such times and in such quantities as may be directed by the Surveyor, each consignment to be delivered as aforesaid within twenty-eight days after notice from the Surveyor. Cement: Supply of such quantity of cement at per ton from time to time as may be required by the Council, such cement to be delivered at such places within the populous portion of the district as may be directed by the Surveyor. Surface flints: Supply of 1,600 yds. of surface-picked flints for metalling roads, to be delivered at such places in the district and at such times as may be directed by the Surveyor, at per cub. yd. Thames ballast: Supply within five days after notice free of all canal, river and other dues and charges (except wharfage) on to such wharf within the district as may be directed barge freights of clean Thames ballast, at per cub. yd., the measurement being settled by the Surveyor. Kentish ragstone: Supply at per ton within five days after notice free of all charges except carriage to a railway station on the South Eastern and Chatham Railway to be named by the Surveyor, or alongside some wharf within the district of Northfleet, free of all canal, river and other dues and charges as may be directed, such quantity or quantities of selected best quality hard blue finely-crushed (½in. gauge) Kentish ragstone, as per sample, and good quality Kentish ragstone, broken to a 2½in. gauge, for metalling the roads as follows: when the stone is delivered by railway it shall be in consignments not exceeding 32 tons, and when such stone is delivered by river each consignment shall be not less than 60 tons or more than 110 tons. For every such consignment five days' notice will be given. Granite setts: Supply of 60 tons of granite setts, 4ins. by 4ins. by 6ins. to 10ins. long, delivered free of all canal, river, and other dues and charges (except wharfage) on to such wharf within the district within twenty-eight days after notice from the said Surveyor. Tenderers are to state in their tenders the name and locality of the quarries from which the setts are to be supplied, and to deposit a sample sett at the Surveyor's Office. Road-roller and scarifier: Supply and letting within seven days after notice of a 12½-ton steam-roller with scarifier, and, if required, a 10-ton steam-roller with scarifier, including in every case fuel, drivers' attendance, oil, tools, tines, and everything except water necessary for working the engines, including a capable person to manipulate the scarifier. The price shall be at the rate per day of nine hours during the time a 12½-ton roller is at work rolling, and at the rate per day of nine hours during the time a 10-ton roller is at work rolling, and at the rate per square yard for scarifying old Macadam roads. No forms of tender or contract can be supplied. The rate of wages paid by contractors and the conditions of labour observed by them will be taken into consideration. Tenders are to be sent to the Council Offices, The Hill, Northfleet, not later than 4 p.m., on June 13, marked "Tender for —."

June 13. Croydon.—Works of kerbing and paving in the parishes of Addington, Beddington, Coulsdon, Merton and Mitcham, and the Hamlet of Wallington, comprising about 9,900 lineal ft. of granite kerbing, 16,500 super yds. of concrete paving, and 21,500 super yds. of tar paving for the R.D.C. Plans may be inspected and forms of tender and a copy of the specification may be obtained from J. S. Killick, highway surveyor, Town Hall, Croydon, on payment of a deposit of £5. Tenders, on forms provided, to be delivered to E. J. Gowen, clerk to the Council, Town Hall, Croydon, on or before June 13.

June 18. Ely.—Broken granite. Supply and delivery at Ely railway station of 400 tons (more or less) of 1½in. Clea Hill, blue Guernsey, or Leicestershire granite (separate prices for machine and hand-broken to be quoted) and 100 tons (more or less) of best Clea Hill, blue Guernsey, or Leicestershire granite in clean screenings; 20 tons of 1½in. similar granite to Black Bank Railway Station, G.E.R.; also 190 tons of 1½in. similar granite (separate prices for machine and hand broken to be quoted) to be delivered by water and unloaded on the river bank in heaps at the under-mentioned places for the U.D.C.:—80 tons to Adelaide Bridge; 60 tons to Prickwillow Bridge; 10 tons to Burnt Fen Bank, between Prickwillow Bridge and Mr. John Sindall's house; 40 tons for Mile End Drive, to be delivered on Burnt Fen Bank and tipped into carts near Mr. John Sindall's house. All the above to be delivered at such times and in such quantities as the Council by their surveyor may from time to time appoint. Samples of each should be sent to William McKilvie at the City Surveyor's Office in Ely (carriage paid) previous to delivery of tender. Sealed tenders, endorsed "Tenders for Granite," to be delivered or sent by post so as to reach G. Martin Hall, clerk, Market Square, Ely, by June 18.

June 19. Brentford.—Supply of 150 yds of blue Guernsey granite hand broken to a gauge of 2in. Forms of tender (on which alone tenders will be received), together with specification and conditions, may be obtained on application, personally, to Nowell Parr, surveyor, at his office, Clifton House, Boston Road, Brentford, between 10 and 5. Tenders to be delivered (sealed) at the Clerk's Office, New Brentford, on or before June 19, not later than noon, marked "Tender for Granite."

June 27. Uxbridge.—Drainage, construction of manholes, levelling, kerbing, channelling, retaining walls, metalling, and other appurtenant works in the following roads, all situated in the parish of Yiewsley, Middlesex, close to West Drayton G.W.R. Station, for the U.D.C.:—Tavistock Road, Wimpole Road, Winnock Road, Dock Road, Padcroft Road, Fairfield Road. Drawings may be seen and specifications, bills of quantities, and forms of tender obtained at the office of the surveyor on a deposit of £5. Sealed tenders, endorsed "Yiewsley Works," must be delivered at the office of J. Freebairn Stow, engineer and surveyor, Surveyor's Office, Corn Exchange, Uxbridge, not later than 4 p.m. on June 27.

No date. Forehoe.—Supply of materials and team labour for the roads, for the R.D.C. Particulars and forms of tender may be obtained from W. Partridge Smith, clerk, Vicar Street, Wymondham.

SANITARY.

June 7. Cheadle.—Construction of about 400 lineal yds. of gin. and 317 lineal yds. 12in. earthenware pipe sewers, with manholes, &c., at Grove Lane, Cheadle Hulme, for the R.D.C. Plans and drawings may be seen, and copies of the specifications and bill of quantities obtained on application to E. Sykes, C.E., between 10 and 12 daily until the 31st May (Saturdays excepted), on deposit of £1 rs. Tenders, duly sealed, and endorsed "Tender for Sewers," may be addressed to Arthur Briggs, clerk to Cheadle and Gatley U.D.C., Council Offices, Cheadle, near Manchester, on or before June 7.

June 7. Blything.—Drainage works for the Guardians. Works required to be done in taking up the old drains, &c., and laying new system and other works in connection therewith at the Workhouse at Bulcamp, near Halesworth, according to plan and specification prepared by Henry J. Wright, M.S.A., architect and surveyor, Ipswich. Copies, plan and specifications may be seen at Clerk's Office, Bulcamp, any week-day except Saturdays between 10 and 4, and on Saturdays between 10 and 2. Tenders, sealed and endorsed "Tenders for Drainage," to be delivered at the Clerk's Office, Union Workhouse, Bulcamp, Halesworth, not later than 5 p.m. on June 7.

June 7. Blaydon.—Scavenging, &c., for the U.D.C. Removal and disposal of scuttle ashes, contents of ashpits, house refuse, &c., at Blackhall Mill and New Chopwell. Specifications, form of tender, and full particulars may be obtained from Robert Biggins, sanitary inspector, at the offices of the Council, Blaydon-on-Tyne, between 9 and 10 a.m. Sealed tenders, endorsed "Tenders for Scavenging Contract," are to be delivered to Henry Dalton, clerk, Blaydon-on-Tyne, on or before noon on June 7.

June 9. Bolton-le-Sands.—Construction of a gin. iron and earthenware pipe sewer at Bolton-le-Sands, for the Lancaster R.D.C. Plans and specification may be seen and forms of tender obtained on application to W. Dixon, surveyor, 5, Dalton Square, Lancaster. Tenders to be delivered to W. D. Ball, clerk to the Council, 5, Dalton Square, Lancaster, not later than 10 a.m. on June 9.

June 12. Birmingham.—Reconstruction of the Washwood Heath and Salfley Outfall Sewers across the Birmingham Tame and Rea District Drainage Board's lands at Salfley, including alterations to the culverts under the Midland Railway and a crossing over the River Rea. The plans and specifications may be seen, and quantities and forms of tender obtained, on deposit of a sum of £2. Fair wages clause. Tenders, sealed and endorsed "Salfley Outfall Sewers," and addressed to the Chairman of the Public Works Committee, must be delivered at the office of T. Arnall, acting city surveyor, the Council House, Birmingham, on or before June 12.

June 13. London, S.E.—Construction of an underground convenience for women in Arnside Street, Walworth. Plans may be seen, and specification, conditions, and forms of tender and further particulars obtained between 10 a.m. and 5 p.m. on application to A. Harrison, M.I.C.E., borough engineer, Town Hall, Walworth Road, upon payment of a deposit of £1 rs. Fair wages clause. Tenders, which must be on the prescribed form, sealed and endorsed "Tender for Construction of Underground Convenience" must be sent to J. A. Johnson, town clerk, Town Hall, Walworth Road, S.E., not later than noon on June 13.

June 15. Uckfield.—Construction of the following works, for the R.D.C. About 19 miles of stoneware and iron sewers, ranging from 8ins. to 15ins. in diameter, with the necessary manholes, flushing tanks, &c.; purification works, consisting of covered settling tanks, double contact bacteria beds, storm-water beds, &c., and other works, in accordance with the specification and plans prepared by John Taylor, Sons, and Santo Crimp, civil engineers. Copies of the specification and quantities, with forms of tender, may be obtained from and the drawings inspected at, the offices of the Engineers, at Caxton House, Westminster, upon payment of £5 (cheque only). Tenders, endorsed "Crowborough Drainage—Contract No. 1," are to be delivered to Frederick Holman, clerk, 85, High Street, Lewes, on or before 10 a.m. on June 15.

June 19. London, E.—Cleansing and whitewashing the latrines and urinals at the various schools, for the East Ham Borough Council, as described in the form of tender. Specification and form of tender may be obtained at the Education Office, East Ham. The work must be done during the summer vacation. Each contractor must deposit £5 with his tender. Fair wages clause. Tenders, on the printed form, must be endorsed "Tender for Cleansing and Whitewashing," and delivered to H. C. Padgett, secty., Education Office, East Ham, E., not later than 4 p.m. on June 19.

No date. Long Eaton.—Forming, making sewerage, kerbing, channelling, &c., extensions of Breendon Street, Curzon Street, and Canal Street, on the estate of the Mutual Land Society according to the plans, specifications, and bills of quantities prepared for the above society by J. F. Dodd, surveyor, Long Eaton. Contractors desirous of tendering are requested to make application to Herbert W. Sunman, secty., "Ellerslie," Cleveland Avenue, Long Eaton, for copies of the said bills of quantities. Such application to be accompanied by a deposit of the sum of £2 2s.

TIMBER.

June 7. Penrhinwceiber.—Supply of the following timber for twelve months, for the Penrhinwceiber Navigation Colliery Co.:—Pitch-pine deals, red pine (best quality), American birch boards and deals, poplar and elm combs, elm, G. & T. match and flooring boards. Form of tender may be obtained on application to the Secretary. Tenders to be in by June 7.

June 12. London, W.—Supply of 100 fathoms of best Baltic board ends to be delivered cartage free at the Workhouse, Isleworth. Tenders, upon forms which may be obtained from William Stephens, clerk to the Guardians, Union Offices, Isleworth, W., must reach him before 4 p.m. on June 12.

June 12. Eton.—65 fathoms of best Swedish yellow deals and batten ends, for the Guardians. Price to include delivery early in the month of July next at the Workhouse at Slough, within one mile from the Grand Junction Canal and Great Western Railway Station. Tenders must be sent, endorsed "Tender for Timber," to R. H. Barrett, clerk to the Guardians, Slough, Bucks, before 10 a.m. on June 12.

MISCELLANEOUS.

June 7. Mallow.—Improvement of workhouse sewerage, painting of workhouse R.C. church, repairs to windows, and washing utensils in laundry, for the Guardians. Works to be carried out in accordance with specification of Clerk of Works. All tenders to be lodged with Maurio Regan, clerk, before noon on June 7.

June 8. Ashford.—Supply of the following articles for the schools for 12 months:—Ironmongery, electric-light fittings, brushes, &c., builders' materials, oilman's goods (paints, oils, &c.). Samples can be seen on applying to the Superintendent at the schools, between 10 a.m. and 4 p.m., and should be inspected. Tenders must be made upon forms which will be sent by F. G. Beeching, clerk to the managers, Ashford, Middlesex, on receipt of a stamped addressed foolscap envelope, and must be sent in by 11 a.m. on June 8.

June 9. Bilston.—Provision of furniture for Stonefield school. Forms of tender, specification, and schedule may be obtained from the architects, Baily & McConnell, Bridge Street, Walsall, on payment of a deposit of £1. All tenders must be endorsed "Tender for Stonefield Council School Furniture," and forwarded to F. M. Cooper, secty., Education Office, Town Hall, Bilston, not later than noon on June 9.

June 13, 14 and 15. Italy.—Supply of the following stores for the Italian Navy:—(1) varnishes to the estimated value of 29,700 lire (about £1,188); (2) colours (paint) to the estimated value of 25,800 lire (about £1,032); and (3) maple, walnut, elm, and other woods to the estimated value of 39,820 lire (about £1,593), delivery in each case to be at the Royal Arsenal at Spezia, Naples, Venice, and Taranto, as required. Deposits of 2,970 lire (£119), 2,580 lire (£103), and 3,980 lire (£159), respectively, will be required to qualify any tender. Tenders will be opened at 11 a.m. on the 13th, 15th and 16th, June for (1), (2) and (3) respectively. These competitions are on the "single auction" system. Sealed tenders for each of the above should be made out on Government stamped paper of one lira, which may be obtained from the Italian Consulate-General in London, 44, Finsbury Square, E.C. Local representation is necessary.

June 14. Oswestry.—Supply of the following stores for the Cambrian Railway Co., to be delivered in such quantities and at such times as may be required during the twelve months ending 30th June, 1907:—Brushes; bricks, drain pipes and lime; galvanised wire; iron tubes and fittings; fencing—wood; files, springs, spring steel, and buffer plungers; glass; iron and steel—bar and sheet pig iron; cement; bolts, nuts and chair spikes; lead (white and red); lead (sheet and piping); nails and crane chains; paints, turpentine, &c.; varnish and gold leaf; screws and washers; timber (English); timber (foreign); timber (foreign supplementary). The directors reserve the right of accepting any portion of a tender. Specifications and forms of tender may be obtained at the Stores Office, Cambrian Works, Oswestry, and specimens, patterns and samples may be seen there daily, except on Saturdays, from 9 to 4. Sealed tenders should be sent so as to reach C. S. Dennis, secty., Oswestry, not later than 9 a.m. on June 14, marked "Tender for —, No. —."

June 18. London, W.—Supply of the following stores for the Great Western Railway from July 2, 1906, to June 29, 1907:—Laminated springs; spiral and volute springs; tyres; straight axles; steel crankaxles and forgings for built-up cranks; iron bars; steel plates and sheets; steel bars and blooms; steel castings; iron forgings; chain and special iron for chain manufacture; tubes and fittings; cast-iron socket pipes; tool steel. Specifications and forms of tender (upon which alone tenders will be received) may be obtained on application to the Secretary, or to the Stores Superintendent at Swindon. Tenders addressed to G. K. Mills, secty., Paddington Station, London, and marked outside "Tender for Stores," will be received on or before June 18.

June 19. Dartford.—Supply and delivery of the undermentioned goods during the year ending June 30, 1907, for the U.D.C.:—Disinfectants; broken granite; electric meters; house cut-outs; house service cable, jointing material, and accessories for electric lighting department; general stores for electric lighting department. Particulars and forms of tenders will be sent to any applicant on receipt of a stamped addressed foolscap envelope, or may be obtained on application to the Clerk. No tender will be considered unless it be upon the prescribed form. Sealed tenders, in envelopes addressed "The Clerk, Urban District Council of Dartford, Council Offices, Dartford," and endorsed "Tender for —," as the case may be, must be sent in not later than 4 p.m. on June 19.

June 21. London, N.—Annual contracts for eight months from August 1, 1906 (except as regards item No. 10), which will be for eight months, one year and eight months, or two years and eight months, at the option of the Council:—(1) Providing and supplying horses, harness, and men for vans and watering roads of the borough (the Council supplying vans and water); (2) cartage and horse hire; (3) masons' and paviors' work; (4) supply of broken blue Guernsey, Enderby, Quenast and other granites, and granite chippings; (5) supply of ballast, crushed shingle, hoggins, hard core and flints; (6) supply of timber, &c.; (7) supply of wheels and tyres; (8) supply of manhole and other covers, gully grates, guard posts, castings, and other ironwork; (9) supply of iron, steel and tools; (10) works in connection with the construction and repairs of sewers and drains (the average amount of work executed under the contract during the last three years has been about £6,700 per annum). Form of tender and contract to be obtained on deposit of £5. Fair wages clause. Forms of tender and contract, and other particulars, may be obtained on application at the Town Hall, Upper Street, N., between 9 a.m. and 5 p.m. (except Saturdays). Tenders (properly endorsed) must be received not later than noon on June 21.

Current Market Prices

FORAGE.

	£ s. d.	£ s. d.
Beans ... per qr.	1 15 0	1 16 0
Clover, best ... per load	4 0 0	4 7 6
Hay, good ... do.	3 12 0	3 17 6
Sainfoin mixture ... do.	3 13 0	4 0 0
Straw ... do.	1 8 0	1 14 0

MISCELLANEOUS.

Bricks Stocks, d/d to job	per 1,000	1 14 0	—
Do. Flettons on rail ...	do.	1 4 0	—
Do. Pressed Wire Cuts, d/d to job	do.	1 16 0	—
Do. Blue brindled wire cuts ...	do.	1 1 0	—
Do. do. wire cuts ...	do.	1 5 0	—
Do. do. pressed facings ...	do.	1 17 6	—
Coke Breeze, into carts at gasworks	per load	0 2 0	—
Do. d/d to job ...	do.	0 4 0	—
Sand ... per yard	0 7 6	—	—
Ballast ... do.	0 6 6	—	—
Granite Chippings ... do.	0 10 6	—	—
Do. do. ½ in.	0 11 6	—	—
Cement ... per ton	1 11 6	—	—
Lime ... do.	1 4 0	—	—
Castor Oil, French ... per cwt.	1 1 10	1 2 0	—
Colza Oil, English ... do.	1 5 9	—	—
Copperas ... per ton	2 0 0	—	—
Lard Oil ... per cwt.	2 15 0	2 17 0	—
Lead, white, ground, carbonate	per ton	16 0 0	—
Do. red ... do.	15 0 0	0 19 0	—
Linseed Oil, barrels	per cwt.	1 1 3	—
Petroleum, American	per gal.	0 0 6½	0 0 6½
Do. Russian ... do.	0 0 5½	0 0 6	—
Pitch ... per barrel	0 8 0	—	—
Shellac, orange ... per cwt.	9 10 0	—	—
Soda, crystals ... per ton	3 2 6	3 4 0	—
Tallow, Town ... per cwt.	1 7 6	1 8 3	—
Tar, Stockholm ... per barrel	1 5 0	—	—
Turpentine ... per cwt.	2 9 0	—	—

METALS.

Standard Copper	per ton	85 5 0	85 10 0
Do. Strong sheets...	do.	99 0 0	99 10 0
Lead, Soft Foreign	do.	16 10 0	16 15 0
Do. English ...	do.	17 0 0	17 5 0
Do. pipes ...	do.	19 15 0	19 17 6
Do. sheets ...	do.	19 15 0	19 10 0
Galvanised Corrugated sheets	do.	12 7 6	12 10 0
Spelter G.M. ...	do.	27 5 0	27 10 0
Angles, Scotland...	do.	6 15 0	7 0 0
Bars ...	do.	7 17 6	7 19 0
Marked bars, Staffs	do.	9 0 0	—
Common bars do.	do.	6 17 6	7 0 0
Angles, M'boro.	do.	6 10 0	6 12 6
Joists do.	do.	6 2 6	6 5 0
Angles, Midlands	do.	6 7 6	6 10 0
Joists do.	do.	6 12 6	6 15 0
Girders plates, Midlands	do.	7 10 0	7 12 6
Angles, Foreign, c.i.f. Thames	do.	6 10 0	6 11 6
Tees do. do. do.	do.	6 12 6	6 15 0
Joists do. do. do.	do.	6 0 0	6 2 6
Channels do. do. do.	do.	6 12 6	6 15 0
Plates do. do. do.	do.	7 0 0	7 5 0
Tin, Foreign ...	do.	190 0 0	190 10 0
Do. English ingots	do.	189 0 0	190 0 0
Zinc, sheets, Silesian	do.	30 0 0	30 10 0
Do. do. Vieille Montaigne	do.	30 0 0	—

TIMBER.

SOFT WOODS.

Fir, Dantzic and Memel	per load	2 10 0	5 0 0
Pine, Quebec, Yellow ...	do.	4 0 0	7 0 0
Do. Pitch, American	do.	2 16 0	5 0 0
Laths, log, Dantzic	per cu. fath.	4 0 0	6 0 0
Deals, Tornea, Yellow, 1st & 2nd, 4x9	per std.	10 10 0	—
Do. Nederkalix, Yellow, low, 1st, 3x7	do.	10 0 0	—
Do. do. 2nd, 4x7	do.	9 0 0	—
Do. do. 2nd, 2x9	do.	9 10 0	—
Do. Ljusne, Yellow, 4th, 3x11	do.	9 5 0	—
Do. Galatz, White, 2nd, 3x11	do.	9 15 0	—
Do. Mesane, Yellow, 4th, 3x8	do.	9 15 0	—
Do. Söderhamn, Yellow, low, 5th, 3x9	do.	10 5 0	—
Do. Quebec, Bright Pine, 1st, 3x9 & 10	do.	23 15 0	—
Do. do. 1st, 3x8	do.	21 10 0	—
Do. do. 1st, 3x7 & 8	do.	22 5 0	—
Do. do. Spruce, Unsorted, 3x9	do.	9 5 0	—
Do. Archangel, White, 1st, 3x9	do.	11 15 0	12 0 0

HARD WOODS.

Ash, Quebec	per load	4 2 6	7 5 0
Birch, New Brunswick...	do.	2 0 0	5 0 0
Do. Quebec	do.	3 0 0	5 5 0
Box, Turkey	per ton	6 0 0	20 0 0
Cedar, Cuba	per ft. sup.	0 0 4½	0 0 5½
Do. Honduras	do.	0 0 5½	—
Do. Tobasco	do.	0 0 5½	—
Do. Brazilian	do.	0 0 4½	—
Elm, Quebec	per load	4 2 6	8 10 0
Jarrah, plank	per ft. cu.	0 2 6	0 3 0
Mahogany, Average Price for Cargo, Honduras...	per ft. sup.	0 0 5	—
Do. Tobasco	do.	0 0 4	0 0 5½
Do. Cuba	do.	0 0 4	0 0 5
Do. African	do.	0 0 3½	—

Tenders.

Addressed postcards on which lists of tenders may be stated will be sent post free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Fetter Lane, F.C. Information from accredited sources should be sent to 'The Editor' at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Alderley Edge.—For the erection of a new lodge, boundary walls, fencing and other work at their new cemetery on the Chelford Road, Alderley Edge, for the U.D.C. Mr. Harold Sheldon, surveyor:—

W. White, Alderley Edge	£2,356
I. Massey & Sons, Alderley Edge	2,025
J. K. Coates, Wilmslow	1,991
L. Brown & Sons,* Wilmslow	1,925

* Accepted.

Barnstaple.—For the erection of new lavatory buildings and general alterations, and for plumbing work in connection therewith, at the North Devon Infirmary, Barnstaple. Mr. J. C. Southcombe, architect, Barnstaple:—

G. Hancock	£3,796 0 0
H. Burgess	3,785 0 0
E. Karslake	3,760 0 0
Bryant & Thorne	3,511 12 3
Ridge & Bryant	3,524 13 0
J. Cater & Son	3,450 0 0
W. Sleaf	3,300 0 0

Water-supply.
H. R. Williams & Co.* 226 11 0

Sanitary fittings.
F. Phillips* 424 10 0

* Accepted. [All of Barnstaple.]

Bramcote (near Nuneaton).—For the erection of a small-pox hospital at Bramcote, near Nuneaton, for the Nuneaton and District Joint Hospital Committee. Mr. F. C. Cook, surveyor, Nuneaton:—

J. Dallow & Sons, Blackheath	£5,775 0 0
Kelley & Sons, Foleshill, Coventry	5,162 0 0
J. Parnell & Sons, Rugby	4,830 0 0
W. Hopkins, Birmingham	4,701 0 0
W. Higgins, Northampton	4,692 0 0
G. Smith, Nuneaton	4,561 5 2
W. Moss & Sons, Loughborough	4,550 7 0
W. H. Gibbs, King's Heath	4,531 0 0
J. Dickinson, Derby	4,455 0 0
T. Wincott, Nuneaton	4,432 0 0
Farnon & Sons, Bulkington, Nuneaton	4,415 9 4
T. Smith,* Cotton Road, Nuneaton	4,403 7 0
C. Wright, Leicester	4,295 0 0
J. & J. Warner, Mickleover, Derby	4,192 1 6

* Accepted.

Caerleon (Mon).—For extensions and alterations of Williams' Endowed Schools. Messrs. Lansdowne & Griggs, architects, Metropolitan Bank Chambers, Newport, Monmouthshire:—

J. B. Jenkin	£5,910 0 0
J. Browncombe & Son	4,749 0 0
J. Jenkins, Ltd.	4,456 0 0
C. H. Reed	4,340 0 0
J. H. Leadbeter	4,300 0 0

Jerrett & Fisher	£4,192 0 0
R. W. Moon	4,250 0 0
J. Charles	4,150 0 0
Bailey Brothers	4,150 0 0
J. Dean & Son	3,952 9 0
E. C. Jordan & Son,* Newport	3,950 0 0

* Recommended for acceptance.

Cardiff.—For the erection of a pumping-station and chimney-stack at Penarth Road, for western district sewer (Contract No. 7), for the Corporation. Mr. W. Harpur, M.I.C.E., city engineer:—

S. Wood, Dinas, Powis	£20,577 17 1
E. T. Bevan, Penarth	18,800 0 0
D. Davies & Sons	18,400 0 0
J. Allan	18,321 19 9
D. W. Davies	17,827 13 0
Knox & Wells	17,500 0 0
C. C. Dunn	16,964 8 3
F. Ashley	16,906 16 11
W. T. Morgan	16,802 3 8
E. Turner & Sons	16,391 8 11
C. Davies	16,087 14 2
W. Symonds & Co.,* Rectory Road	15,990 14 9

[City engineer's estimate, £16,182 13s. 6d.]

* Recommended for acceptance. [Rest of Cardiff.]

Cliffe.—For the erection of a new Council school, to accommodate 128 children, at Cliffe, Cooling Street, near Rochester, for Kent Education Committee. Mr. Wilfrid H. Robinson, architect to the Committee:—

Butler & Co.	£1,982 0 0
A. E. Tong	1,897 0 0
Beale & Hubbard	1,798 0 0
W. Reeves	1,700 0 0
Gann & Co.	1,649 0 0
L. Seager	1,641 10 0
Woollaston Brothers	1,640 0 0
C. E. Skinner	1,558 0 0
G. Gates	1,530 0 0
G. E. Wallis & Sons	1,486 0 0
West Brothers,* Rochester	1,424 0 0

* Accepted.

Eynsford.—For the erection of a new Council school, to accommodate 230 children, at Eynsford, Crockenhill, Kent, for the Kent Education Committee. Mr. Wilfrid H. Robinson, architect:—

W. H. Smith	£3,697 1 6
E. P. Bulled & Co.	3,153 0 0
Melton & Wallis	3,095 0 0
T. Knight	3,089 0 0
Martin, Wells & Co.	3,029 0 0
Strange & Sons	2,991 0 0
W. F. Blay	2,980 0 0
J. Ellingham & Sons	2,895 0 0
J. Barker & Co.	2,851 0 0
Woollaston Brothers	2,850 0 0
West Brothers	2,743 0 0
J. Lonsdale	2,724 0 0
C. Skinner	2,724 0 0
J. A. Davison	2,612 0 0
Friday & Ling	2,612 0 0
G. E. Wallis & Sons	2,586 0 0
Gann & Co.,* Whitstable, Kent	2,525 0 0

* Accepted.

Tydweiliog.—Accepted for the erection of a new Council school. Mr. R. Lloyd Jones, county architect, 7, New Street, Pwllheli:—

W. & R. Jones, Pwllheli	£2,250 10 0
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(Continued on p. xxiv.)

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TENDERS cont. from p. xxiii.

Cambridge.—Accepted for the erection of Wisbech House, for Mr. G. F. Glenney. Messrs. George Baines & Son, architects, 5, Clements' Inn, Strand, London, W.C. :-

Kerridge & Shaw, Sturton Street,
Cambridge £1,651 5 8

North Persie (Scotland).—Accepted for the works required in the erection of a mansion house at North Persie, near Blairgowrie. Mr. Lake Falconer, architect, Blairgowrie :-

Carpenter and joiner—Leslie & Hay,
Fraser Road, Aberdeen £1,609 0 0
Mason and brickwork—J. Gray & Son,
Newtyle, near Coupar Angus 1,569 0 0
Plumber and drainage—MacLeish,
Morrison & Co., Mill Street, Perth 405 0 0
Slater—W. Brand & Son, Dishland-
town Street, Arbroath 266 3 5
Plaster and cement works—W. Sidey,
Cairnleith Street, Alyth 371 4 7
Water-supply—MacLeish, Morrison
& Co. 239 9 0

Southend-on-Sea.—Accepted for the new school, Bournemouth Park Road, for the Education Committee. Messrs. Greenhalgh & Brockbank, architects, Bank Chambers, Southend. Quantities by Mr. G. T. G. Wright
Rookwood, 54, York Road, Southend-on-Sea :-

J. S. Hammond & Son, Romford £11,175

Southampton.—For the erection of a villa residence at Westwood, Southampton. Mr. A. A. Burnett, F.S.I., architect, 2, High Street, Southampton :-

A. Wright & Son £1,590
Dyer & Sons 1,568
A. Doggrell & Son 1,560
H. Cawte 1,550
J. Nichol 1,549
J. Kimber 1,544
H. Stevens & Co. 1,537
Golding & Ansell 1,500
F. Osman* 1,499

* Accepted subject to amendments.

[All of Southampton.]

Coming Events.

Wednesday, June 6.

BUILDERS' FOREMEN AND CLERKS OF WORKS' INSTITUTION.—Ordinary meeting at 8 p.m.

ROYAL ARCHAEOLOGICAL INSTITUTION.—Notes on the early architectural history of the Parish Church of Worth, Sussex. Notes on the architecture of Denham Church, Bucks, by Mr. W. P. D. Stebbing, at 4 p.m.

Thursday, June 7.

JUNIOR INSTITUTION OF ENGINEERS.—Mr. R. P. Howgrave Graham, on "Electric Oscillations and Wireless Telegraphy," at 7 p.m.

CHEMICAL SOCIETY.—Meeting at 8.30 p.m.

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Saturday, June 9.

JUNIOR INSTITUTION OF ENGINEERS.—Visit to Messrs. James Brown's brickworks at Upminster. Train leaves Fenchurch Street at 1.48 p.m.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Visit to Halton House, Kirkcubright.

Thursday, June 14.

L.C.C. SCHOOL OF BUILDING, Ferndale Road, Brixton. Prof. Beresford Pite on the domes of the Invalides and the Pantheon, Paris, at 8 p.m.

Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Ad.—Adjudication.]

C. BROWN, joiner, Grimsby. R.O. May 21st.
H. BURKE & Co., steel contractor, Chorlton-on-Medlock. R.O. May 23rd.

J. E. HODSON, builder and contractor, St. Helen's (late Rainford). Adj., May 21st.

J. BLUNT, builder, Hardingstone. P.E., County Hall, Southampton, June 12th, at 12.

F. W. REEVE, builder, Whitfield. P.E., Banbury Town Hall, June 6th, at 10.

A. W. BOBY, painter and decorator, Swansea. Adj., May 25th.

H. JONES, builder, Everton. Liabilities, £1,457; assets, 10s. 7d.

G. ARCHER, builder, St. Albans. Liabilities expected to rank £458; assets £117.

C. H. DODD, builder and decorator, Halstead. R.O. May 25th.

T. S. FRANCE, painter and decorator, Northwich. First meeting, O.R.'s, Newcastle, June 6th, at 3. P.E., Crewe C.C., June 29th, at 11.15.

G. COTCHING, builder, Walthamstow and Epping. First meeting, London Bankruptcy Court, June 8th, at 1 P.E., same, June 4th, at 11.30.

J. L. TINEMAN & SON, builders, Chatham. First meeting 115, High Street, Rochester, June 11th, at 11.30. P.E., Rochester C.C., June 11th, at 2.30.

J. GALLANT, carpenter and builder, Great Yarmouth. First meeting, O.R.'s, Norwich, June 6th, at 12. P.E., Great Yarmouth Town Hall, June 12th, at 11.

P. E. MILLER, builder, Balham. First meeting, 132, York Road, S.E., June 7th, at 12.30. P.E., Wandsworth C.C., June 21st, at 12.

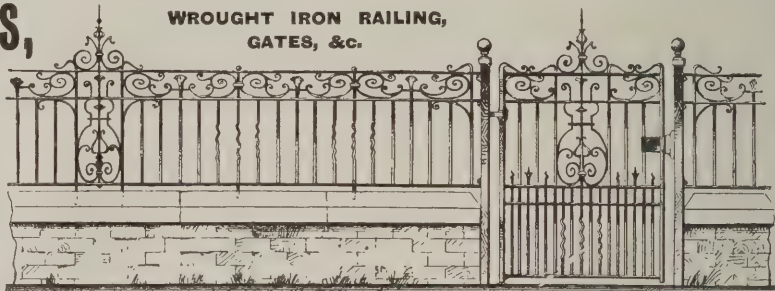
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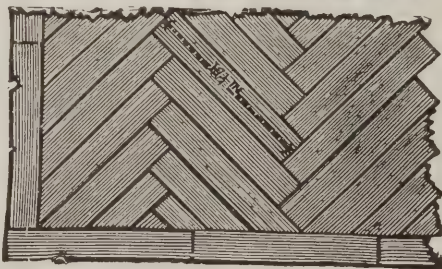
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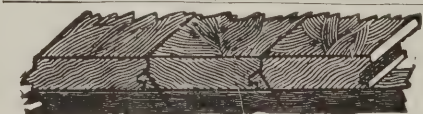
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17½ x 3 x 2	8 3	7 9	
17½ x 3 x 1½	6 9	6 3	



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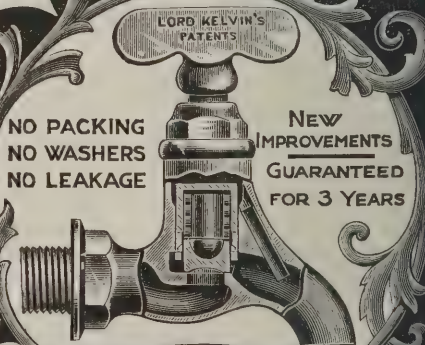
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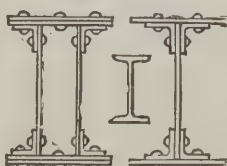
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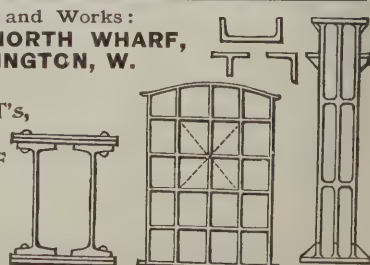
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THE BUILDERS' JOURNAL

AND ARCHITECTURAL ENGINEER.

June 6th, 1906.

FIRE SUPPLEMENT (MONTHLY).

THE MILAN FIRE CONGRESS.

THE sequence of Congresses conducted under the auspices of the International Fire Service Council was continued last week at Milan, where there was a representative international gathering.

The city of Milan was selected on account of the International Exhibition which is being held at that city. The British Fire Prevention Committee took the opportunity of this Congress to again arrange for one of its special Commissions to visit the leading cities of the country in which the Congress was held, in order that a report may be issued as to the local fire-preventive arrangements. The Commission visited Rome, Florence and Venice prior to Milan. At the Congress the Commission was joined by other members of the Committee and a large party of fire-brigade officers under Colonel Fox.

The Congress meeting took place in the assembly room of the Permanent Art Exhibition, and was attended by about 500 delegates from all the European countries, many Government departments and municipalities being represented. There were four meetings, followed by the special meeting of the International Fire Service Council.

Among the papers read was one on "International Relations in the Fire Preventive and Fire Brigade Services," by Mr. Edwin O. Sachs, F.R.S.Ed.; one on "The Protection of Vertical Openings," by Mr. Ellis Marsland, district surveyor; one on "Reinforced Concrete as a Fire-resistant," by Mr. James Sheppard, A.I.E.E.; and one on "Fire Risks due to New Industries, and the Motor Industry in particular," by Mr. Percy Collins. We publish Mr. Marsland's paper in this issue.

Resolutions on Reinforced Concrete.

The subject of reinforced concrete is one to which the Congress accorded special attention, and the following resolution was unanimously carried and confirmed at the final meeting as one of the resolutions to be circularized among various Government departments concerned:—

"That the Congress considers that no reinforced concrete construction should be permissible in building intended to be fire-resisting unless the aggregate be most carefully selected and applied in such a manner as to give substantial protection to all metal parts.

"That it is advisable where reinforced concrete is intended to be fire-resisting that every portion of the metal rods or bars contained therein be covered by not less than zins. (5 c.m.) of concrete, the aggregate of which must be able to pass through a sieve of not more than rin. (2.5 c.m.) diameter, and that Portland cement of great fineness only be used.

"That where feasible all external angles should be rounded.

"That any angle iron needed for mechanical protection should be held in position independently of the concrete."

Whilst in Rome, the Special Commission of the British Fire Prevention Committee were received by the King of Italy; who accorded the members an audience of about half an hour, discussing various questions as to fire-protection with them. It may be remembered that in 1903 the Italian Government struck a special gold medal in recognition of the Committee's services, which medal was presented to the Committee as a token to be kept in its corporate capacity.

THE DIFFERENT SYSTEMS OF FIRE-RESISTING SHUTTERS, &c., IN USE TO PROTECT DOORS AND WINDOWS.*

By Ellis Marsland,
District Surveyor.

HOWEVER fire-resisting a building may be internally, unless it can resist fire from the outside it is as vulnerable as the most combustible building.

The protection of window openings to prevent the ingress of fire has not hitherto received the attention which the importance of the subject deserves, and your president has kindly asked me to contribute to this Congress a short paper dealing with the methods at present employed to attain this end; and although I cannot claim to demonstrate anything particularly new, yet I may be able to contribute the results of some valuable tests conducted by the British Fire Prevention Committee, and thus enable you to have a basis of fact upon which further improvements may result.

The fire service of the world learned a great number of lessons from the Baltimore fire, but none was so apparent as the necessity for this exterior protection.

The following are the methods usually employed in the protection of window openings:—

- I. By wrought-iron shutters.
- II. By tin-lined wooden shutters or shutters of flameproof wood.
- III. By steel revolving shutters.
- IV. By asbestos cloth blinds.
- V. By wired glass or Luxfer prisms fixed in hardwood or iron frames.

I. Wrought-iron Shutters.

These are usually hung folding on the outer face of the window opening to angle iron frames; they are folded back against the wall similar to sun shutter when not in use. The thickness of the shutters varies according to the size, but it should not be less than ¼ in. (.0063 m.) in the panel, with styles and rails of the same thickness. The disadvantage of this form of protection is their weight and the difficulty of readily closing them on an emergency; added to this is their appearance from an architectural point of view; otherwise, if their services are once brought into play, they make an efficient fire-stop.

II. Tin-lined Wooden Shutters or Shutters of Flameproof Wood.

These, as in the former instance, are usually hung folding on hook and eye strap hinges and overlap the opening some 3 ins. (.076 m.). They are usually 1½ ins. to 2 ins. (.038 m. to .051 m.) thick, of pine in two or three thicknesses nailed or screwed together and overlaid on both sides and edges with tin plates, the joints being lap welded. There has been an improvement upon this construction by the introduction of flameproof wood in the interior and by sheets of asbestos board or Uralite being placed between the thicknesses. This gives increased protection and staying power to the shutter, but this class of shutter is open to the same objection as the iron

* Presented at the International Fire Service Congress at Milan.

shutter, viz., the difficulty of readily closing them on an emergency. There is also the architectural disfigurement of the building, and another disadvantage in a long sustained fire, the gases generated by the combustion of the wooden interior of the shutters escaping through the joints of the tin encasement and becoming ignited, eventually accelerating what it was designed to retard. My own opinion is that shutters of this character are equally effective constructed of flameproof wood alone without any tin-lining, as they would resist the spread of fire equally well, but their thickness should not be less than zins. (.05 m.).

III. Steel Revolving Shutters.

This is a type of window-protection usually used as a means of protection apart from fire, but it may be used in a dual capacity and is efficient in many respects provided the laths or strips are of the interlocking or hinged principle, with special provision to allow of expansion and contraction at all points. It is not open to all the objections of the two former systems, yet it has its disadvantages. The heat soon radiates through the thin steel, and unless the water from the fire hose is available for keeping it cool the radiated heat soon carbonizes the adjacent woodwork and cracks the window glass.

The shutters require a fairly deep steel groove or runner with slotted holes to take the fixing bolts; the revolving gear can be fixed within the depth of the opening and be made no more objectionable from an architectural point of view than an ordinary sun blind. They are not open to the objection of difficulty in manipulation, as it is possible to lower them from the inside, or they may be made to work automatically. Their cost is somewhat heavy, but if this is no impediment the steel revolving shutter is perhaps a fairly satisfactory means of protecting an opening.

IV. The Asbestos Cloth Blind.

This means of protection has all the advantages of the steel revolving shutter without its disadvantages. It can be rolled up as an ordinary sun blind on a spring roller and can be manipulated from the inside by means of a steel or copper cord. The blind requires a flexible incombustible cord bound to the edges, and small steel or copper rods extended across the blind and fixed thereto about every 7 ins. (.2 m.) to prevent the blind bellying inwards or outwards, and it must also travel in a runner at least 1½ ins. (.04 m.) deep. A somewhat heavy steel or copper lath is required to be secured to the bottom of the blind so that it may sit closely on the window sill to prevent flame lapping beneath.

The material is, however, somewhat fragile and liable to damage by falling materials and the force of the water jet, and the radiation of heat through the material, although not so great as in the case of steel shutters, is considerable.

V. Wired Glass and Electro-glazing.

One of the chief objections from a fireman's point of view to all the foregoing systems is that when the shutters are closed,

and thus fulfilling their purpose, a fire may assume considerable proportions within a building without being observed.

This objection cannot be raised to wired glass and electro-glazing, and they have the following advantages:—They are always in their place ready for duty; they form part of the building, and are no architectural disfigurement, and their cost is not prohibitive.

I am of opinion we have in these materials two of great promise, but the great point is how are they to be fixed.

My own view is that wired glass must not be in substitution for the ordinary window glass (except it is used as the outer casement where double casements are required) but in addition thereto, as there is considerable radiation of heat through it, and it should be glazed into metal frames, and each square of glass should not exceed 100 sq. ins. (.065 m.). Putty should not be used, but it should be secured into the frames by a metal fillet, and a strip of some soft incombustible material such as slag wool or asbestos placed around to act as a cushion to allow for expansion and contraction.

This system is of course only available up to the melting point of glass, but in actual practice it is only in exceptional cases this point is exceeded on the outside of a building, and as the material will allow water to be poured upon it without disintegrating it is a fairly reliable material for window-protection.

The electro system of glazing is akin to the above, and has the additional advantage that it does not obstruct the vision as does the wired glass, as the squares are each 16 sq. ins. (.01 m.) in area, and it offers the same resistance to the passage of flame as does the wired glass.

Doors.

Coming now to the protection of door-openings. The British Fire Prevention Committee has made an extensive series of tests with wooden doors, both hard and soft, including deal, pitch-pine, poplar, mahogany, walnut, oak, teak, jarrah and karri, with a view to discover their actual and relative fire-resistance.

The doors were made of a uniform size, 3ft. 6ins. by 7ft. (1'067 m. by 2'133 m.). The thickness of the doors was 2ins. (.05 m.), and they were framed together with four solid panels and hung to solid frames of the respective materials of which the doors were constructed.

These doors were only intended to give temporary protection, and those made from oak, teak, jarrah and karri gave the best results and endured for about sixty minutes. It was found that their resistance to fire depended largely on the care with which they were fitted, as any space between the door and frame through which a draught was created was followed by smoke and eventually by flame and the door was destroyed.

Doors of this character are suitable for the outer door of tenement buildings on to main staircases; they would not be of much service as a fire-stop in warehouses, but would be useful in retarding a fire and allowing employees to escape.

Tin-lined Wooden Doors.

Wooden doors made of three thicknesses of pine lined on both sides and edges with tin are often used to close openings in warehouse walls. These are usually made without frames, and overlap the openings 3ins. (.077 m.) at the sides and top, and are made either to slide or hung with strap hinges, but in a fire lasting any considerable time the wood carbonizes, the gases escaping from between the joints of the tin ignite and the door eventually collapses.

Greater staying power is obtained if the wood interior is made non-flammable and the thicknesses are divided by asbestos board or Uralite, but this adds materially to their cost.

They give at best only partial protection, and cannot be trusted in an extensive conflagration.

The British Fire Prevention Committee has made from time to time a series of tests with doors of this character variously constructed, but an hour and a half for a single door is about the limit of their fire-resistance.

Iron Doors.

To reduce the danger from fire in warehouses, buildings of this character are required by the London Building Act to be divided by walls into compartments of 250,000 cub. ft. (7,200 m.c.). Openings may be made in the division walls not larger than 7ft. wide and 8ft. high (2'13 m. by 2'44 m.). These doors are required to be of iron, and either hung with hinges to iron rebated frames or made to slide on runners. The doors that are made to hang on hinges are, if exceeding 3ft. 6ins. (1 m.), usually hung in two leaves. The thickness of metal required is $\frac{1}{4}$ in. (.006 m.) in the panel, with styles and rails of the same thickness.

It has been found in practice that unless these doors have at least three hinges and bolts at the top bottom and middle, they buckle and twist and let the fire through. Two doors are required to each opening, with the full thickness of the wall between, without woodwork of any kind.

It has been found in practice that this arrangement answers fairly well where the doors are only 3ft. 6ins. wide, but they require to be proportionately thicker as the size is increased.

Revolving Steel Shutters.

This class of shutter is also available for closing openings in warehouse buildings, but their substance being comparatively thin, there should be two to each opening with as wide a space between them as possible, and the runners or grooves in which they slide should be formed of angle iron at least 2ins. (.05 m.) in depth and slotted for contraction and expansion. The laths forming the shutters should be of the interlocking principle, at least $\frac{1}{8}$ in. thick (.0015 m.). The British Fire Prevention Committee have tested shutters of this description with satisfactory results so far as keeping back flame and retaining their position, but there was a great deal of radiated heat through the shutters, which defect might be minimized by arranging a series of sprinkler heads between the doors or on one side, but there is no question that doors of this description are capable of remaining in position and preventing the spread of flame and also withstanding the water jet at considerable pressure. The projection of the hood, however, is liable to be damaged by falling materials, which may render them inefficient at a critical moment.

Composite Doors of Concrete and Steel.

All descriptions of iron doors are open to objection by reason of the radiation of heat through them, but the door constructed of iron and concrete is one of which I have hopes of a satisfactory result. The British Fire Prevention Committee have not had any doors coming under this description under test, but at a large fire in Glasgow doors of this character came well out of the ordeal. They were constructed of T-iron frames with flat bar bracing fixed to the web of the T-iron, and wirework netting was affixed thereto. The whole space between the T-iron was filled with fine concrete composed of either clinker or coke-breeze.

Doors of this character would be useful in warehouses, as the radiation of heat would not be so great as with iron doors. I am, however, of opinion that if the T could be constructed with aluminium it would be an advantage both from the point of weight and expansion.

These, I think, exhaust the materials at present at our disposal.

CONCRETE.

The Effect of Heat upon its Crushing Strength and Elastic Properties.

By Prof. IRA H. WOOLSON.

IT is well known that concrete in building construction will withstand the attack of a fierce conflagration for some hours and retain its stability of form and strength. This has been proved by actual fires in buildings and repeated severe fire tests upon full-sized floor units and partitions. It is also well known that concrete constructions have occasionally failed during conflagration and during official fire tests being made to determine the efficiency of some particular method of reinforcement. The causes of these failures were not always well defined. Usually they have been directly traceable to defective metal protection, unwise design of structural parts, or to the fact that the concrete was too green when subjected to the test. In some cases, however, the cause of failure was not entirely clear, and much speculation has been rife as to just what degree of heat a concrete would stand before its strength and elasticity would be affected.

Objects of Fire Tests.

The fire tests of reinforced concrete, such as have been conducted by the British Fire Prevention Committee in London and by the writer in co-operation with the Bureau of Buildings in New York City and elsewhere, have for their purpose the determination of three properties: first, effect of a continuous fire at 1,700 degs. or 2,000 degs. Fahr. for three or four hours; second, effect of the application of a long stream of water at short range while the material is still at a high temperature; third, amount of deflection due to a load during the fire, and subsequent increased loading to 600 lbs. per sq. ft. after the structure has cooled. The methods of construction and character of test are regulated by municipal specifications in this country, and by the standards of the British Fire Prevention Committee in England.

Concretes Used.

The concretes used have included trap, limestone and cinder,* and were usually 1-2-4 or 1-2-5 mixtures. The reports of numerous tests of this character were examined, and in most instances the concrete stood the heat and subsequent loading well, but the results were general and referred to the quality or resistance of a particular construction rather than to specific data regarding the concrete itself. Large numbers of tests of compressive strength and elastic properties have been made upon concrete of various composition and after different preliminary treatments, but no records were found in which the concrete was heated prior to testing.

U.S. Arsenal Tests.

The report of the U.S. Arsenal at Watertown, Mass., for 1902 contains data of tests of neat cement cubes of several brands which were heated before crushing. A synopsis and discussion of these is given by James E. Howard in the May, 1905, issue of "Cement," and some of his conclusions are given, since it is fair to assume that the action of neat cement under heat should be at least a slight criterion of that of concrete. Table I. is a summary of the results reported by Mr. Howard.

Since all the factors which enter the concrete problem are variables, it is extremely difficult to arrive at even a partial solution under any one set of conditions. There is, first, variation in the quality of the cement;

* [The definition of cinder used in the United States would be desirable. We assume the equivalent is clinker.—Ed. B.J.]

second, difference in size, sharpness and cleanliness of the sand; third, size and quality of the stone, gravel, slag or cinders used; fourth, variations in the proportions of the three solid ingredients and the amount of water used; and, fifth, method of mixing and treatment after moulding, including age

heated; then three cubes and two prisms of each composition were tested at each temperature.

Method of Heating.

The heating to 1,750 degs. Fahr. was done in an oven type of gas furnace. The furnace had a capacity of twelve cubes or two prisms,

applied faster than the concrete will adjust itself to the new stresses, or a fictitious strength will be recorded and instrument readings will alter until an equilibrium has been established. Compressions were measured at loads of 0 lbs., 25 lbs., 50 lbs. and 100 lbs. per sq. in., and then by increments of 200 lbs. per sq. in., until indications of failure forced the removal of the instrument. Sets were measured one minute after the removal of each load, this interval being found sufficient to allow the specimen to assume a stable condition.

It was originally intended to have the concrete at least sixty days old before testing, but owing to an unavoidable delay in securing part of the material it became necessary to test the specimens when a little over a month old. This was much to the disadvantage of the concrete in the fire tests, and it also accounts for the rather low values obtained in the tests of unheated specimens.

Results.

Table II. gives the ultimate crushing strength of the 4in. trap cubes which were heated to various temperatures and crushed after cooling. No appreciable effect upon the strength can be noted until a temperature of 750 degs. is reached. This gave slightly lower average strengths. Beyond 750 degs. the decrease was marked, though there were two or three exceptions to the rule notable at 1,500 degs., where two of the specimens gave remarkably high results. Why these cubes should have withstood the heat so much better than the others is not known. With the above exception, the surface of all specimens heated over 750 degs. was covered with minute cracks. At 2,250 degs. Fahr. the cubes were slightly fused, due to the fact that firebrick protection was displaced in removing previous specimens, and the remainder were more or less exposed to direct contact with the flames.

Table III. gives similar data for the limestone cubes. The three unheated cubes show an average strength only slightly inferior to that of the trap mixture. Heating to 500 degs., however, gave a great loss in strength. There were no evidences in the appearance of the cubes indicating this

TABLE I.—EFFECT OF PREVIOUS HEATING ON CRUSHING STRENGTH OF NEAT CEMENT AND 1:1 SAND MORTAR. (Watertown Arsenal, 1902. J. E. Howard.)

Composition.		Not heated.	Ultimate crushing strength in lbs. per sq. in. after heating.							
Cement.	Sand.									
Temperature Fahr.			200°	300°	400°	500°	600°	700°	800°	900°
Alpha*	—	—	9167	8830	7920	9190	9400	9333	8217	8060
Alpha†	—	—	12480	14447	13767	13910	12787	12130	9985	—
Dyckerhoff*	—	—	5017	—	—	—	4333	3483	4280	—
Mankato*	—	—	1867	1657	1876	1966	1633	1453	1406	1185
Mankato†	—	—	3873	4043	3523	3810	4133	3957	3900	2990
Mankato*	—	—	538	491	432	—	471	381	—	317
Mankato†	—	—	2170	2067	1953	—	2063	2240	—	1767

* Cubes set in air.

† Cubes set in water.

It was desired to ascertain the effect of elevation of temperature alone without introducing internal strains incident to a state of unequal temperatures in different parts of the specimen. The test pieces were 4in. cubes cast slightly more than a year previous. Tests were at intervals of from four days to four months after heating. The cubes were gradually raised to the recorded temperatures. The heating took one hour, the maximum temperature was held one hour, and the specimens were then allowed to cool slowly in dry sawdust or powdered asbestos. During the heating the specimens developed fine cracks; these were hardly visible immediately after cooling, nor were they one day later. Four days after heating they were generally developed and at eleven days they were nearly at a maximum. The effect upon the crushing strength was not serious when the cracks were fine, as the parts fitted together under pressure.

Table I. shows the variation in ultimate crushing strength of the cubes. Each result is an average of three tests. This indicates that there is no decrease in strength up to a temperature of 600 degs. Fahr., but for higher temperatures the strength diminishes quite rapidly.

before testing. This latter is quite important, for it is well known that the strength of concrete increases rapidly for a period of six to twelve months after casting, and continues to increase slightly up to two or more years.

It was decided to make the concrete a 1-2-4 mixture of cement, sand and 3/4 in. broken stone, this being a common mixture used in constructing reinforced concrete floors. The cement consisted of a mixture of different brands of the best grades of Portland. The sand was taken from a quantity being used in the erection of a new building on the University grounds. It was of medium size (90 per cent. passing a 12-mesh sieve), fair quality, and not especially clean. Two varieties of stone were employed—Hudson River blue limestone and Hudson River trap-rock. Two sets of specimens were prepared, which were duplicates in every respect except that one contained limestone and the other trap-rock. A moderately wet mixture was used, tamping in the moulds being continued until the surface of the concrete became flushed with water.

Heat Employed.

The investigation had three primary objects: first, to ascertain at what temperature the concrete began to lose crushing strength due to heat treatment; second, the rate at which strength decreased as a result of increase of heat; and last, but not least, the effect of varying temperatures upon the elastic properties of the concrete: the purpose being to determine if the elasticity began to diminish prior to the strength or concurrently with it. It was decided to make 500 degs. Fahr. the initial heat, and then to increase the temperature by intervals of 250 degs. Fahr. to 2,250 degs. Fahr., testing specimens at each temperature. The upper temperature limit was well above the average of a burning building, which is conservatively estimated by most experts as from 1,500 degs. Fahr. to 2,000 degs. Fahr.

The determinations of crushing strengths were made upon 4in. cubes; for the elastic properties prisms 6ins. by 6ins. by 14ins. were used, the height being sufficient to allow the measuring of compression on a length of 12ins., and the cross-section being large enough to avoid the necessity of considering the specimen as a column.

To establish the quality of the concrete three cubes and three prisms of each composition were first tested without being

and also allowed room for protecting them from the flames with firebricks placed around the sides and top. The specimens were kept from contact with the floor by being supported on iron rods. Above 1,750 degs. Fahr. the heating was done in a large gas crucible furnace. To ensure equal heating throughout the specimen, the rate of heating was arbitrarily fixed at forty-five minutes to reach the first 500 degs., and thirty minutes for each successive 250 degs., the maximum heat being held ten minutes before removing the specimen. This method subjected the prisms to a shorter period of heating than the cubes for every temperature except 500 degs., because the former were brought to the required temperature, held there and then removed. The latter were charged into the furnace twelve at a time, brought to the proper heat, held there ten minutes and three cubes removed; then the temperature was raised 250 degs., and held again. This being continued until the last cubes were removed. Good results were obtained for the cubes for all temperatures, but it is doubtful if the prisms were uniformly heated at temperatures under 1,250 degs., as will be explained later.

Temperatures were measured continuously by a Le Chatelier pyrometer. The thermocouple was located about 4ins. above the floor of the furnace and closely surrounded by the specimens.

After heating, the specimens were immediately removed from the furnace and allowed to cool in the air. The testing was done at intervals up to three weeks subsequent to the heating.

Method of Testing.

The tests were made upon a Riehle testing machine of 100,000 lbs. capacity. The cubes were faced on the upper surface with plaster-of-Paris, the lower face being in all cases smooth enough to require only a few sheets of blotting paper to ensure a firm bearing. The pressure was applied to the top and bottom faces as determined by their position in the mould. The pressure was applied very slowly and steadily until the specimen failed.

The prisms were faced on both ends with plaster and compressions measured on a gauged length of 12ins. by an electric contact extensometer adjusted to the specimen as shown in Fig. 1. The load was applied at the same rate as for the cubes. It is important that the load should not be

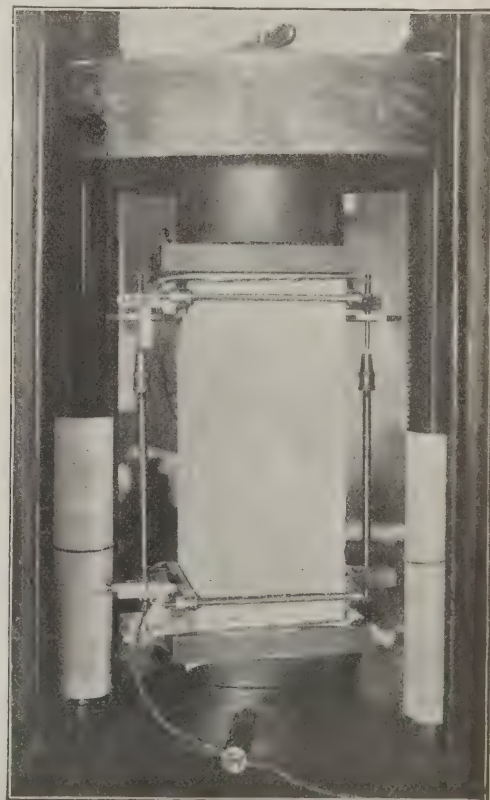


FIG. 1.

TABLE IV.—COMPRESSIVE STRENGTH AND MODULUS OF ELASTICITY OF TRAP-ROCK CONCRETE PRISMS.

Specimen No.	Age in days.		Ultimate strength in lbs. per sq. in.	E at 200 lbs. per sq. in.	E at 600 lbs. per sq. in.	E at 1,000 lbs. per sq. in.	Condition after heating.
	Before heating.	Between heating and testing.					
2	33	—	1560	3,450,000	2,140,000	1,700,000	Specimen in good condition.
3	33	—	180	3,180,000	3,000,000	2,440,000	Same.
4	34	—	1725	3,340,000	2,070,000	1,610,000	Same.
10 A	48	6	1404	715,000	902,000	863,000	Same.
11 A	48	6	500	834,000	950,000	1,040,000	Same.
12 B	49	3	1883	450,000	526,000	472,000	Very minute cracks apparent.
13 B	49	3	750	400,000	451,000	—	Appeared sound, but brittle.
16 C	50	5	835	128,000	171,500	—	Same; had a metallic ring when struck.
17 C	50	5	735	160,000	122,000	—	Same.
20 D	54	3	1250	89,000	125,000	—	Surface covered with small cracks.
21 D	54	3	1250	85,000	—	—	Same.
24 E	56	9	1500	19,400	—	—	Very bad specimen; sides warped and shattered.
25 E	56	9	—	—	—	—	Worse than 24 E.

TABLE V.—COMPRESSIVE STRENGTH AND MODULUS OF ELASTICITY OF LIMESTONE CONCRETE PRISMS.

Specimen No.	Age in days.		Ultimate strength in lbs. per sq. in.	E at 200 lbs. per sq. in.	E at 600 lbs. per sq. in.	E at 1,000 lbs. per sq. in.	Condition after heating.
	Before heating.	Between heating and testing.					
5	30	—	1427	3,000,000	1,715,000	1,028,000	Specimen in good condition.
6	30	—	1452	3,340,000	2,330,000	2,080,000	Same.
7	30	—	1246	2,500,000	1,715,000	1,390,000	Not smooth on sides.
8 A	44	4	1568	700,000	352,000	476,000	Good condition.
9 A	44	4	1207	1,330,000	1,176,000	972,000	Stone on edge slightly calcined.
14 B	45	7	1110	500,000	333,000	344,000	Same.
15 B	45	7	750	222,000	284,000	286,000	Stone entirely calcined to depth of 2 in.
18 C	51	4	1000	157,000	200,000	—	Same.
19 C	51	4	1145	172,000	285,000	—	Stone entirely calcined to depth of 2 in.
22 D	57	3	840	92,500	13,650	—	Same.
23 D	57	3	1250	59,000	10,000	—	Stone entirely calcined, sides warped and shattered.
24 E	57	19	1500	—	—	—	Same as 24 E to lesser degree.
25 E	57	19	810	83,300	133,000	—	—

TABLE II.—COMPRESSIVE STRENGTH OF 4IN. TRAP-ROCK CONCRETE CUBES.

Specimen No.	Age in days.		Ultimate strength lbs. per sq. in.	Condition after heating.
	Before heating.	Between heating and testing.		
1	32	—	1093	Slight cracks.
2	32	—	1803	Brittle and full of minute cracks.
3	32	—	1898	Same.
4	36	2	2100	Brittle and had several small cracks.
5	36	2	1883	Same.
6	36	2	1690	Same.
7	36	2	1690	Few cracks; appears sound.
8	36	2	1390	Sound; no cracks.
9	36	2	1377	Full of cracks.
10	36	2	1247	Same; one crack extending entirely around.
11	36	2	1418	Full of cracks.
12	36	2	1110	Full of cracks; one extending around three sides.
13	36	2	1163	Full of cracks; surface was pitted.
14	36	2	1453	Same.
15	36	2	1263	Slightly fused on one edge; few cracks.
16	50	10	1802	Very much fused on bottom.
17	50	10	1602	Full of cracks; slightly fused on one edge.
18	50	10	644	—
19	50	10	1220	—
20	50	10	904	—
21	50	10	680	—
22	44	9	1072	—
23	44	9	790	—
24	44	9	458	—
25	44	9	626	—
26	44	9	420	—
27	44	9	—	—

TABLE III.—COMPRESSIVE STRENGTH OF 4IN. LIMESTONE CONCRETE CUBES.

Specimen No.	Age in days.		Ultimate strength lbs. per sq. in.	Condition after heating.
	Before heating.	Between heating and testing.		
1	34	—	1968	Unheated.
2	34	—	1843	—
3	34	—	1640	—
4	38	—	1227	—
5	38	3	1290	Somewhat brittle.
6	38	3	1184	Same.
7	38	3	1122	Brittle, and gave metallic sound if struck.
8	38	3	1440	Same.
9	38	3	1170	Same.
10	38	3	923	Stone slightly calcined.
11	38	3	991	Same.
12	38	3	1214	Same.
13	38	3	988	Calcination throughout.
14	38	3	1038	Same, but appeared sound.
15	38	3	903	Same; surface discoloured.
16	44	3	680	Same; edges chipped.
17	44	3	778	Same; full of small cracks.
18	44	3	838	Same; crumbles easily.
19	44	3	832	Same, and discoloured.
20	44	3	684	Very fragile.
21	44	3	922	Crumbled on cooling.
22	44	3	—	Same.
23	44	3	—	Same.
24	44	3	—	Same.
25	44	3	—	Same.
26	44	3	—	Same.
27	44	3	—	Same.

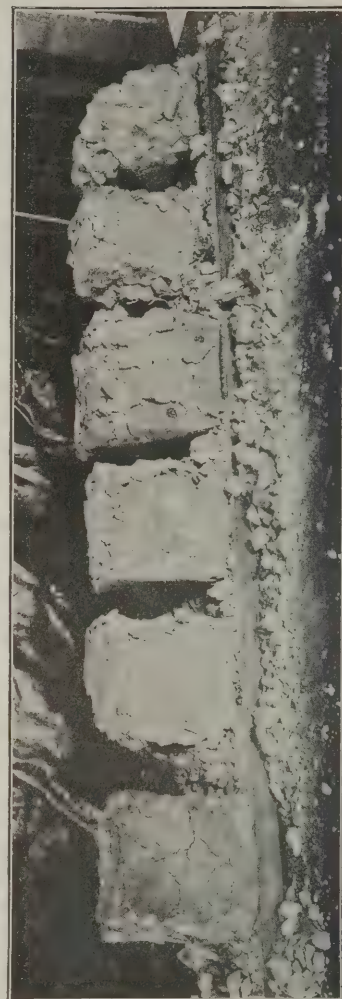


FIG. 2.—APPEARANCE OF 4-IN. CUBES OF LIMESTONE CONCRETE THREE DAYS AFTER HEATING TO TEMPERATURE OF 2,000—2,250 DEGS. FAHR.

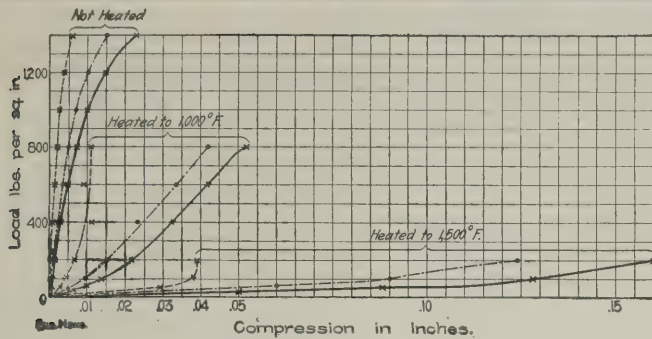


FIG. 3.—TYPICAL CURVES OF TRAP CONCRETE.

deterioration. No further weakness resulted at a temperature of 750 degs., but beyond this the loss of strength continued. After heating to 2,000 degs. and 2,250 degs. the cubes appeared strong and in good condition while hot, but when cold they began to disintegrate, and at the end of three days their appearance was as shown in Fig. 2. No attempt was made to test these specimens.

Table IV. contains the results of the test upon the elastic properties of trap-rock prisms. Three curves were also plotted for each specimen: (1) total deformation, (2) set, and (3) true elastic. The latter was obtained by Professor Bach's method, viz., by subtracting from each total deformation reading the corresponding set reading. Modulus of elasticity (E) was figured for three points of the true elastic curve.

Taking the age into consideration, the values for the unheated specimens compare favourably with the results of other investigators. As is usual, the value of E diminishes with increase of pressure. With the heated specimens this is not so marked; in fact, it is often the reverse, particularly with the intermediate loading. There is, however, a very marked decrease in the value of E due to the heating. This change becomes very apparent even with a temperature of 500 degs. and the value gradually decreases with the increase of heat. There were some erratic results, but later investigation makes it quite certain they were due to imperfect heating.

After the elastic measurements on the prisms were completed the extensometer was removed and the specimen loaded to failure. The ultimate crushing strengths which were thus obtained are given.

Table V. gives the same data for limestone prisms. The moduli for the unheated specimens are about the same as those obtained by the writer on a series of similar tests recorded in "Engineering News" of June 1st, 1905, the average value of E obtained there being approximately 3,600,000 for a sand-limestone concrete fifty-five to fifty-eight days old, and the average here found being 3,300,000 for prisms twenty days younger of like composition.

The value of E falls rapidly with increase of heat applied, the same as for the trap-rock mixture.

The surfaces of the prisms of both mixtures were covered with minute cracks after being subjected to over 750 degs. and then cooled. These cracks increased in number and size as the heat became higher, and at 1,500 degs. the prisms began to warp and disintegrate on cooling. This deterioration increased with time, and at the end of nine days one prism of each mixture was so badly crumbled that it was unfit for test. The others were very much weakened. This disintegrating effect is probably due to the swelling of the cement as a result of recalcination.

The curves of all the heated specimens

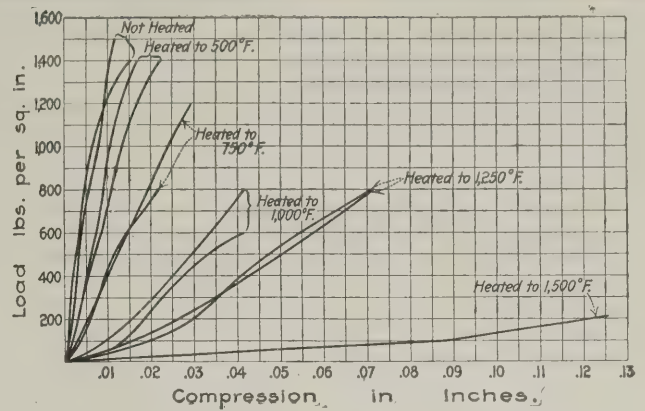


FIG. 5.—ELASTIC CURVES OF ALL PRISMS OF TRAP CONCRETE.

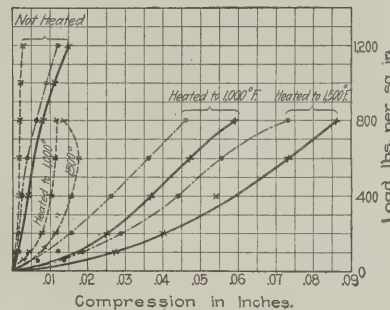


FIG. 4.—TYPICAL CURVES OF LIMESTONE CONCRETE.

Figs. 3 and 4: Typical Stress-strain Curves of Normal Concrete and Concrete previously exposed to temperatures of 1,000 degs. Fahr. and 1,500 degs. Fahr.

[Full lines give total deformation. Dotted lines give sets. Dot-and-dash lines give true elastic deformation = total deformation minus set.]

General Note to Figs. 3, 4, 5 and 6:—Test pieces 6ins. by 6ins. by 14ins. high, of 1:2:4 concrete. Compressions measured on 12in. length. Test pieces heated at ages of thirty-three to fifty-seven days, then cooled slow and tested three to nineteen days later.

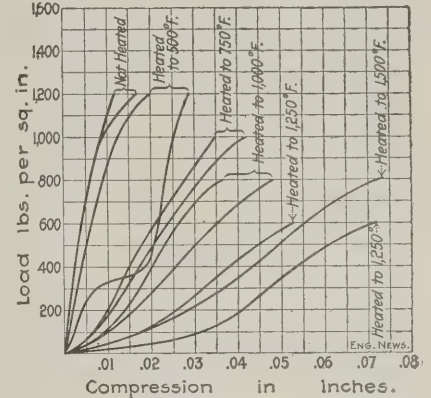


FIG. 6.—ELASTIC CURVES OF ALL PRISMS OF LIMESTONE CONCRETE.

Figs. 5 and 6: Elastic Curves of Normal Concrete and Concrete previously exposed to various temperatures from 500 degs. Fahr. to 1,500 degs. Fahr.

[Two specimens tested for each temperature. All curves give true elastic deformation = total deformation minus set.]

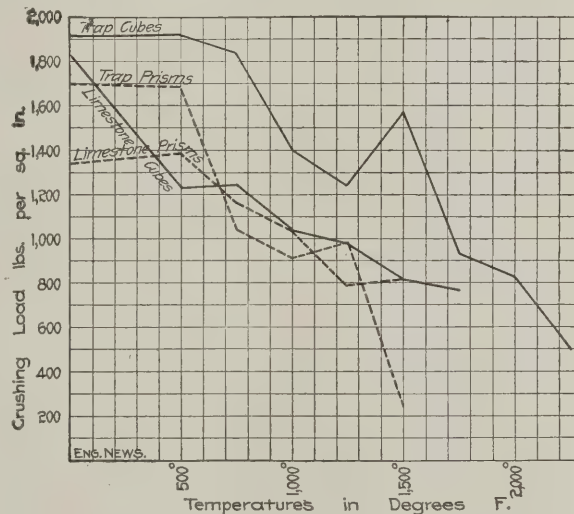


FIG. 7.—CURVE OF CRUSHING STRENGTH.

Figs. 7 and 8: Variation of Crushing Strength and Elasticity of Concrete with temperature of previous heat exposure. [Test pieces 4in. cubes, 6ins. by 6ins. by 14ins. prisms.] Curves of Elasticity give the modulus at limit stress of 200 lbs. per sq. in.]

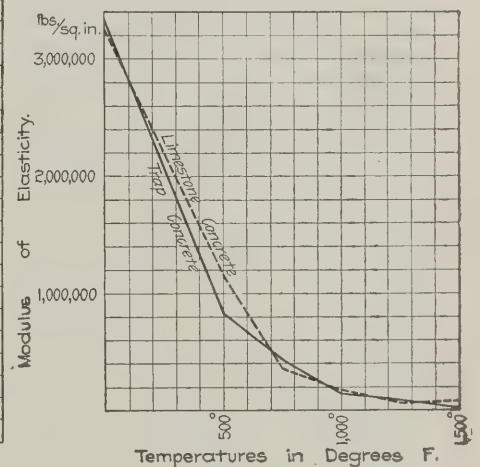


FIG. 8.—CURVE OF MODULUS OF ELASTICITY.

show a large deformation in the early part of the test when the loads were comparatively light. This gradually lessens as the loads increase and the middle portion of each curve approaches a straight line and then falls off again when ultimate failure begins. The large deformation at first is doubtless due to the closing up of the numerous fire cracks previously mentioned.

A peculiar characteristic of many set curves for both mixtures is the tendency they have to reverse direction and go back towards the axis. A conspicuous example appears in Fig. 4. No satisfactory explanation for this behaviour has been suggested.

It will be noted that the elasticity of the specimens decreased rapidly with the increase of heat. This is clearly shown in Figs. 3 and 4, where all three curves for each test of three typical specimens of each mixture are plotted to the same scale, showing the character of the total deformation, set and elastic curves without heating, and the corresponding curves for specimens which had been heated to 1,000 degs. and 1,500 degs. Fahr. respectively.

The "true elastic" curves of all the prisms tested are grouped in Figs. 5 and 6, which indicate very plainly the gradual decrease of elasticity due to heating of the concrete.

The gradual decrease in strength of both cubes and prisms due to heat treatment is shown by the curves in Fig. 7. In general, the trap-rock mixtures were the stronger. There were some irregularities, which undoubtedly resulted from defective heating. Fig. 8 shows graphically the drop in the value of E for both mixtures due to heating.

As stated, the length of time a specimen should remain in the furnace to bring it to a certain heat was fixed beforehand, and with the 4in. cubes the rate of heating employed appeared to give them uniform treatment throughout.

It was supposed that the prisms would heat uniformly also in the time allowed, but subsequent results raised doubts regarding this. However, owing to the delays previously mentioned it was too late in the season to duplicate the specimens and get them tested this spring, so the tests were completed and this report is rendered upon data obtained.

Table VI. gives the actual times of heating for each class of specimen. It is known now that the time allowed for the prisms was not nearly sufficient to ensure uniform temperature throughout. This is particularly true for the low temperatures. With the high temperatures the variation was probably not so great.

TABLE VI.—PERIOD OF HEATING THE TEST SPECIMENS.

Specimen	Heated to degrees Fahr.	Time.	
		hours	mins.
4in. cubes	500		55
"	750	1	35
"	1000	2	15
"	1250	2	55
"	1500	2	55
"	1750	3	35
"	2000	3	55
"	2250	4	35
Prisms	500		55
"	750	1	55
"	1000	1	55
"	1250	2	25
"	1500	2	55

A test was recently made of the conductivity of the concrete in the prisms under the conditions of heating employed in the tests, and it was found that by allowing 1 hour 15 minutes to bring the furnace temperature up to 750 degs. Fahr., and then holding that temperature constant, it required 2 hours 40 minutes more for the interior of two different prisms to attain the same temperature. Then rising the furnace temperature to 1,000 degs. in 30 minutes, it required 1 hour 10 minutes more for the prisms to become uniformly heated throughout. The tests were made by embedding thermo-couples in the middle of the prisms, and connecting them by switch to the same galvanometer on which the couple in the furnace was recording. The concrete on which this test was made was twenty-eight days old. In this instance it required 5 hours 35 minutes to obtain a temperature of 1,000 degs. Fahr. through 3ins. of concrete where the specimen was surrounded by heat on all sides, with no radiation possible.

1. The Advantage of Low Conductivity.

This last experiment proved that the concrete had a very low conductivity and made certain the fact that the prisms tested had not been heated throughout to the temperature with which they are credited. At the same time, the writer believes, it explains the apparent discrepancy which exists between the results of these tests and some very satisfactory fire tests which have been made upon full-sized floor constructions. In a test of the latter character the fire is applied to one side only, and, although a heat of 1,700 to 2,000 degs. is maintained for four hours, the concrete is such a poor conductor of heat that only a small portion of it ever reaches a temperature which would cause it to deteriorate to any great extent.

UNIFORM BY-LAWS.

Recommendations of the National Board of Fire Underwriters for the Construction of Fireproof Buildings.

(Concluded from p. 32, No. 583.)

Encasing Exposed Sides and Bottom and Top Plates and Flanges of Girders and Beams.

The exposed sides of wrought-iron or rolled steel girders supporting walls, iron or steel floor beams, or supporting floor arches or floors, shall be entirely encased with hard-burned clay, porous terra-cotta, concrete or other fireproof material not less than 4ins. in thickness, and the bottom and top plates and flanges of such girders shall have not less than 2ins. in thickness of such insulating material.

The bottom and top plates and flanges of all wrought-iron or rolled steel floor and roof beams, and all exposed portions of such beams below the abutments of floor arches or filling between the floor beams, shall be entirely encased with hard-burned clay, porous terra-cotta, concrete or other fireproof material, such encasing material to be not less than 2ins. in thickness.

All encasing material to be securely attached to the girders and beams.

The shells and webs of hollow tile blocks shall be not less than 1in. in thickness, and shall be laid up with Portland-cement mortar, and the said blocks be suitably tied or anchored together.

Encasing Interior Columns and Girders in Non-Fireproof Buildings.

In all non-fireproof buildings where iron or steel structural members are incorporated in the construction of the building, said iron or steel columns, girders, beams and other structural metal members shall be encased as before described in this section, except that the thickness of such insulating material may be not less than 2ins.

Skeleton-Constructed Buildings.

Where columns are used to support iron or steel girders carrying enclosure walls, the said columns shall be of cast-iron, wrought-iron or rolled steel, and on their exposed surfaces be constructed to resist fire by having a casing of brickwork not less than 8ins. in thickness on the outside surfaces nor less than 4ins. in thickness on the inside surfaces, and all bonded into the brickwork of the enclosure walls.

The exposed sides of the wrought-iron or steel girders shall be similarly covered in with brickwork not less than 4ins. in thickness on the outer surfaces, and tied and bonded, but the extreme outer edge of the flanges of beams or plates or angles connected to the beams may project to within 2ins. of the outside surface of the brick casing.

The inside surfaces of girders may be similarly covered with brickwork, or if projecting inside of the wall they shall be protected by terra-cotta, concrete or other fireproof material not less than 4ins. in thickness.

Girders for the support of the enclosure walls shall be placed at the floor line of each storey.

The skeleton steel frame of a building shall be independent from that of an adjoining building, and the frame of one building shall not be bolted or riveted in any manner to the frame of any other building.

Reinforced Concrete or Concrete-Sleeve Constructed Buildings.

The term "reinforced concrete" or "concrete-steel" in this section shall be understood to mean an approved concrete mixture reinforced by steel of any shape so combined that the steel will take up the tensional stresses and assist in the resistance to shear.

Reinforced-concrete construction may be accepted for fireproof buildings if designed as hereinafter prescribed; provided that the aggregate for such concrete shall be hard-

burned broken bricks or terra-cotta, clean furnace clinkers entirely free of combustible matter, clean broken stone or furnace slag, or clean gravel, together with clean siliceous sand if sand is required to produce a close and dense mixture; and provided, further, that the minimum thickness of concrete surrounding and reinforcing members $\frac{1}{4}$ in. or less in diameter shall be 1in.; and for members heavier than $\frac{1}{4}$ in. the minimum thickness of protecting concrete shall be four diameters, taking that diameter, in the event of bars of other than circular cross-section, which lies in the direction in which the thickness of the concrete is measured; but no protecting concrete need be more than 4ins. thick for bars of any size; and provided, further, that all columns and girders of reinforced concrete shall have at least 1in. of material on all exposed surfaces over and above that required for structural purposes; and all beams and floor slabs shall have at least $\frac{3}{4}$ in. of such surplus material for fire-resisting purposes; but this shall not be construed as increasing the total thickness of protecting concrete as herein specified.

All the requirements herein specified for protection of steel and for fire-resisting purposes shall apply to reinforced concrete filling between rolled steel beams as well as to reinforced concrete beams and to entire structures in reinforced concrete. Any concrete structure or the floor filling in same reinforced or otherwise, which may be erected on a permanent centering of sheet-metal, of metal lathing and curved bars or a metal centering of any other form, must be strong enough to carry its loads without assistance from the centering, unless the concrete is so applied as to protect the centering as herein specified for metal reinforcement.

Exposed metal centering or exposed metal of any kind will not be considered a factor in the strength of any part of any concrete structure, and a plaster finish applied over the metal shall not be deemed sufficient protection.

Machine-mixing Necessary.

All concrete for reinforced concrete construction whenever used in such buildings must be mixed in a machine which mixes one complete batch at a time and entirely discharges it before another is introduced. At least 25 complete revolutions must be made at such a rate as to turn the concrete over at least once in each revolution for each batch.

Before permission to erect any concrete-steel structure is issued, complete drawings and specifications shall be filed with the Commissioner of Buildings showing all details of the construction, the size and position of all reinforcing rods, stirrups, &c., and giving the composition of the concrete.

The execution of work shall be performed by workmen under the direct supervision of a competent foreman or superintendent.

The concrete shall be mixed in the proportions of 1 of cement, 2 of sand and 4 of other aggregates as before provided; or the proportions may be such that the resistance of the concrete to crushing shall not be less than 2,000 lbs. per sq. in. after hardening for twenty-eight days, but for reinforced or plain concrete columns the mixture shall not be leaner than 1 part of cement, 2 of sand and 5 of the coarser aggregate in any case. The tests to determine this value must be made under the direction of the Commissioner of Buildings. The concrete used in concrete-steel construction must be what is usually known as a "wet" mixture.

Only high-grade Portland cements shall be permitted in reinforced concrete or concrete-steel constructed buildings. Such cements, when tested neat, shall, after one day in air, develop a tensile strength of at least 300 lbs. per sq. in.; and after one day in air and six days in water shall develop

a tensile strength of at least 500 lbs. per sq. in.; and after one day in air and twenty-seven days in water shall develop a tensile strength of at least 600 lbs. per sq. in. Other tests, as to fitness, constancy or volume, &c., made in accordance with the standard method prescribed by the American Society of Civil Engineers, may, from time to time, be prescribed by the Commissioners of Buildings.

The sand to be used must be clean, sharp grit sand, free from loam or dirt, and shall not be finer than the standard sample kept in the Department of Buildings.

The stone used in the concrete shall be a clean, broken stone, of a size that will pass through a $\frac{1}{2}$ in. ring, or good gravel may be used in the same proportion as broken stone, or broken hard bricks, or terra-cotta, or furnace slag, or hard clean clinkers may be used.

The steel shall meet the requirements of this code.

Concrete steel shall be designed in accordance with the following assumptions and requirements:—

(1) The adhesion between the concrete and the steel is sufficient to make the two materials act together; the unit value of the adhesion is at least equal to the unit shearing strength of concrete.

(2) The design shall be based on the assumption of a load four times as great as the total working load (ordinary dead load plus ordinary live loads) producing a stress in the steel equal to the elastic limit and a stress in the concrete equal to 2,000 lbs. per square inch.

(3) The modulus of elasticity of concrete at 2,000 lbs. per square inch is equal to one-eighteenth of the modulus of elasticity of steel.

(4) The steel takes all the tensile stress.

(5) The stress strain curve of concrete in compression, when the stress in the extreme fibre is 2,000 lbs. per square inch, may be assumed—

(a) As a straight line;

(b) As a parabola with its axis vertical and its vertex on the neutral axis of the beam, girder or slab; or

(c) As an empirical curve with an area one-quarter greater than if it were a straight line, and with its centre of gravity at the same height as that of the parabolic area assumed in (b).

(6) The assumption belonging to the common theory of flexure where not modified by any of the foregoing will apply.

Design of T-beams.

In the design of structures involving reinforced concrete girders and beams, as well as slabs, the girders and beams shall be treated as T-beams, with a portion of the slab acting as flange, in each case. The portion of the slab so acting shall be determined by assuming that in any horizontal plane section of the flange, the stresses are distributed as the ordinates of a parabola, with its vertex in the stress strain curve and with its axis in a longitudinal vertical plane through the centre of the rib of the T.

The shearing strength of concrete, corresponding to a compressive strength of 2,000 lbs. per square inch, shall be assumed at 200 lbs. per square inch.

All reinforced concrete T-beams must be reinforced against the shearing stress along the plane of junction of the rib and the flange. Where reinforced concrete girders carry reinforced concrete beams, the portion of the floor slab acting as flange to the girder must be reinforced with bars near the top, at right angles to the girder, to enable it to transmit local loads directly to the girder and not through the beams, thus avoiding an integration of compressive stresses due to simultaneous action as floor slab and girder flange.

Concrete in direct compression shall not be stressed, under the working load, more than 350 lbs. per square inch. Reinforced compression members shall be designed on the assumption that this stress in the concrete will be simultaneous with one of 6,000 lbs. per square inch in the steel. Should the use of hooped concrete be proposed, the working stresses will be a subject for special consideration by the Commissioner of Buildings.

In the execution of work in the field work must be so carried on that the ribs of all girders and beams shall be monolithic with the floor slab.

In all reinforced concrete structures special care must be taken with the design of joints to provide against local stresses and secondary stresses due to the continuity of the structure.

In the determination of the bending moments due to the external forces beams and girders shall be considered as simply supported at the ends, no allowance being made for continuous construction over supports. Floor-plates, when constructed continuous and when provided with reinforcement at top of plate over the supports, may be treated as continuous beams, the bending moment for uniformly distributed loads being taken at not less than $\frac{WL}{10}$; the

bending moment may be taken a $\frac{WL}{20}$ in the case of square floor plates which are reinforced in both directions and supported on all sides.

When the shearing stresses developed in any part of a reinforced concrete or concrete-steel constructed building exceed under the multiplied loads the shearing strength as fixed in this section, a sufficient amount of steel shall be introduced in such a position that the deficiency in the resistance to shear is overcome.

When the safe limit of adhesion between the concrete and steel is exceeded, provision must be made for transmitting the strength of the steel to the concrete.

Concrete-steel may be used for columns in which the ratio of length to least side of diameter does not exceed twelve. The reinforcing rods must be tied together at intervals of not more than the least side or diameter of the column.

The contractor must be prepared to make load tests on any portion of a reinforced concrete or concrete-steel constructed building within a reasonable time after erection as often as may be required by the Commissioner of Buildings. The test must show that the construction will sustain a load with a factor of safety for floors and structural members as required by this code.

Correspondence.

Flameproof Wood.

To the Editor of THE BUILDERS' JOURNAL.

SIR,—As a practical worker in the art of flameproofing wood I have read with much interest your remarks on p. 25 of the Fire Supplement to your issue for April 11th on Professor Lewes's endorsement of the use of flameproof wood as being one of the best methods of fire-protection possible to employ. It is one of the most surprising facts in the whole range of building construction that architects do not make use of this wonderful means of protection against fire, the merits of which they seem to be so densely ignorant about.

Nothing is simpler, both in theory and practice, than making wood so resistant to fire that it is practically impossible with any of the ordinary means which produce conflagration to set it alight, and the cost of doing so, owing to improvements in the last few years, is now quite reasonable.

Every engineer knows the old-established

process of impregnating wood with creosote for the purpose of preserving it. Now, flameproofing wood is simply impregnating it, not with creosote, which is a highly inflammable product, but with an anti-pyrene or flameproof chemical, many of which are known to all scientific men. The degree of fire-resistance obtained from wood impregnated with suitable anti-pyrene chemicals is simply enormous. For instance, a shovelful of live coals may be thrown upon naked floor boards which have been impregnated without setting the wood alight; a powerful Bunsen burner may be left blazing for hours in contact with a door made of impregnated wood with perfect safety. A short-circuit may occur in casings made of treated wood. Only local charring results in any of these cases. The treatment is permanent, wood which has been treated remaining flameproof for all time.

How then can it be explained, if these great advantages exist, that architects when they are instructed to design a fireproof building ignore this wonderful means of protection? I have followed the art of flameproofing wood from its inception in this country some eight years ago down to the present day, and I can conscientiously say that I have never heard a single objection to the use of flameproof wood that was worthy of the name. By this I do not mean to say that wood impregnated with any antipyrine chemical is necessarily satisfactory. Far from it. Many cheap antipyrines, such as sulphate of alumina, sulphate of soda, chloride of ammonia, tungstate of soda, &c., when impregnated into wood will afford some protection against fire, but such protection is entirely negated by the attendant disadvantages which they possess of absorbing moisture from the atmosphere, corroding metal fastenings, and causing the paint to peel off. I can assert, with absolute positiveness from years of experience, that if wood is impregnated with an aqueous solution of phosphate of ammonia and boracic acid to the extent of 4 lbs. per cub. ft. of the solids being dispersed throughout the wood, that such wood will be free from all such disadvantages and will be rendered flameproof for all time. Such wood cannot be distinguished from ordinary wood either in working or painting, or in any other respect except in the one feature that it will not spread flame.

The reason why properly treated wood does not spread flame is as simple as that of the making of it flameproof. It is not due, as some people suppose, to incombustible gas being generated under heat, for no gas is generated. On the contrary, the protection is due to the crystals of the antipyrine chemicals forming under fire a coating around the fibres of the wood, which coating protects the fibres from the oxygen of the air having access to the same, and as everyone knows, oxygen is necessary to produce flame from heated wood.

If any of your readers desire to prove for themselves the fact that the protection is due to such coating, let them drop a pinch of phosphate of ammonia on a red hot shovel and they will see a glassy coating instantly forming on the shovel, through which air will not penetrate.

Now the above facts are known to such men as Professor Lewes and every other advanced scientist, hence they strongly advocate its use, but their advocacy does not avail until the working architect gets the fact through his head, and until then there is no hope for the public. Their client's property must go on burning in the usual way, simply because the architect is either too indolent to find out for himself that the above are truths or too indifferent to apply the same and protect the clients buildings against danger from fire.—Yours faithfully,

LONDON. A. W. BAXTER, A.M.I.N.A.

FIRE TESTS.

A Concrete Floor with Expanded Metal Lathing.

IN continuation of a series of reports by the British Fire Prevention Committee on reinforced concrete floors, Report No. 109 describes a fire test where the concrete is reinforced by expanded metal lathing. Here we have a floor across a testing chamber measuring 10ft. by 22ft., supported by ordinary joists. One of the joists (joist B) was encased with expanded metal lathing and about 2ins. of concrete, there being an air-space between the flange of the girder and the casing whilst the other joist (joist A) was solidly encased without an air-space.

The nett result of this test was eminently satisfactory, as will be seen from the official summary given below, classification as "fully protective" (class B.) on a four hours test, followed by five minutes of water, having been obtained, the temperatures exceeding 1,800 degs. Fahr.—in fact, touching 2,200 degs. Fahr.—the load being the usual $2\frac{1}{2}$ cwt. per ft. super.

We present a photograph of the floor under test, and besides reproducing the summary we give the note by Mr. Max Clarke, drawing attention to the fact that the hard and dense materials which are best adapted to give

strength to the concrete are probably the worst in the event of a fire, but also draws attention to the necessity of making all allowances for faulty and careless construction. The concrete aggregate used in this test was a broken-brick concrete aggregate in the proportions of 1 of cement to 4 of aggregate, there being broken brick 2'66, sand 1'33, to "Ferrocrete" Portland cement 1.

Summary of Effect.

On the gas being lighted the setting coat of plaster fell off in large quantities.

In 20 mins. portions of the concrete were exposed, the coats of plaster having fallen.

In 50 mins. more than half the concrete of each bay was bare, the plaster having fallen.

In about 60 mins. a portion of the concrete casing fell from joist A, no metal visible.

In 65 mins. a good deal of the two outer coats of plaster fell from joist B, which had a plaster casing, not solid.

In $2\frac{1}{4}$ hours there were cracks in the upper surface of the floor.

At the conclusion of the test joist A had deflected $\frac{1}{4}$ in. and joist B $1\frac{1}{4}$ in.; the fire did not pass through the floor.

On examination after the test it was found there were some cracks across the top of the bays of concrete near the beams and a few other small ones, but the cracks were not wide, none exceeding $\frac{1}{32}$ in.

On the underside there was one crack in the centre of the S bay, composed of fire-brick, about $\frac{1}{4}$ in. wide, and two very slight cracks in the N bay composed of stock brick.

No damage was done to the underside of the concrete of either the centre or N bays by fire or water.

Classification was obtained.

Note by Mr. Max Clarke.

"I suppose this might be called a test of 'reinforced concrete,' and as such the point which strikes me most as worthy of attention is the extreme difficulty in placing the reinforcing material in exactly the place in which it will prove most effective.

"This form of construction is engaging the attention of scientific men in many parts of the world, and it appears to me that large allowances will have to be made for faulty or careless construction in addition to the usual margin of safety.

"Another matter which will require investigation is that hard and dense materials which are best adapted for giving strength to concrete construction are probably the worst which could be used in the event of fire.

"Only the practical results given by time and accident will answer these questions fully, but they should not be overlooked by those who advocate a new departure in this direction."



FLOOR SLABS OF BROKEN-BRICK CONCRETE REINFORCED WITH EXPANDED METAL, AFTER THE FOUR HOURS' FIRE TEST.

THE BUILDERS' JOURNAL

AND ARCHITECTURAL ENGINEER.

June 13, 1906. Vol. 23, No. 592.

6, Great New Street, Fetter Lane, E.C.

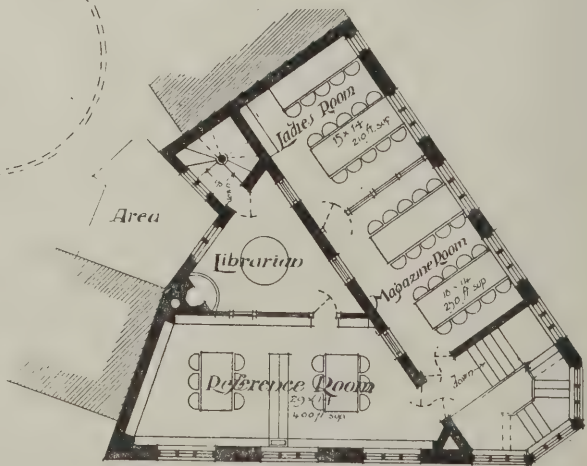
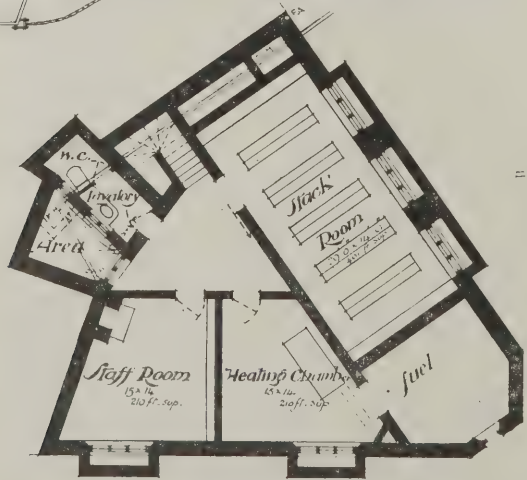
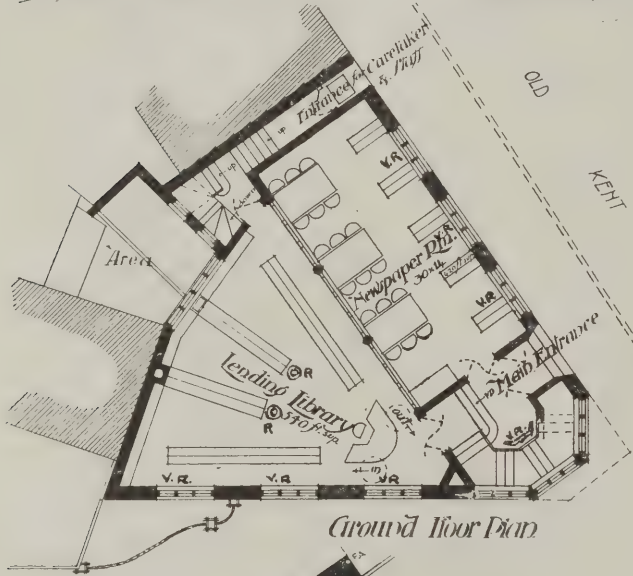
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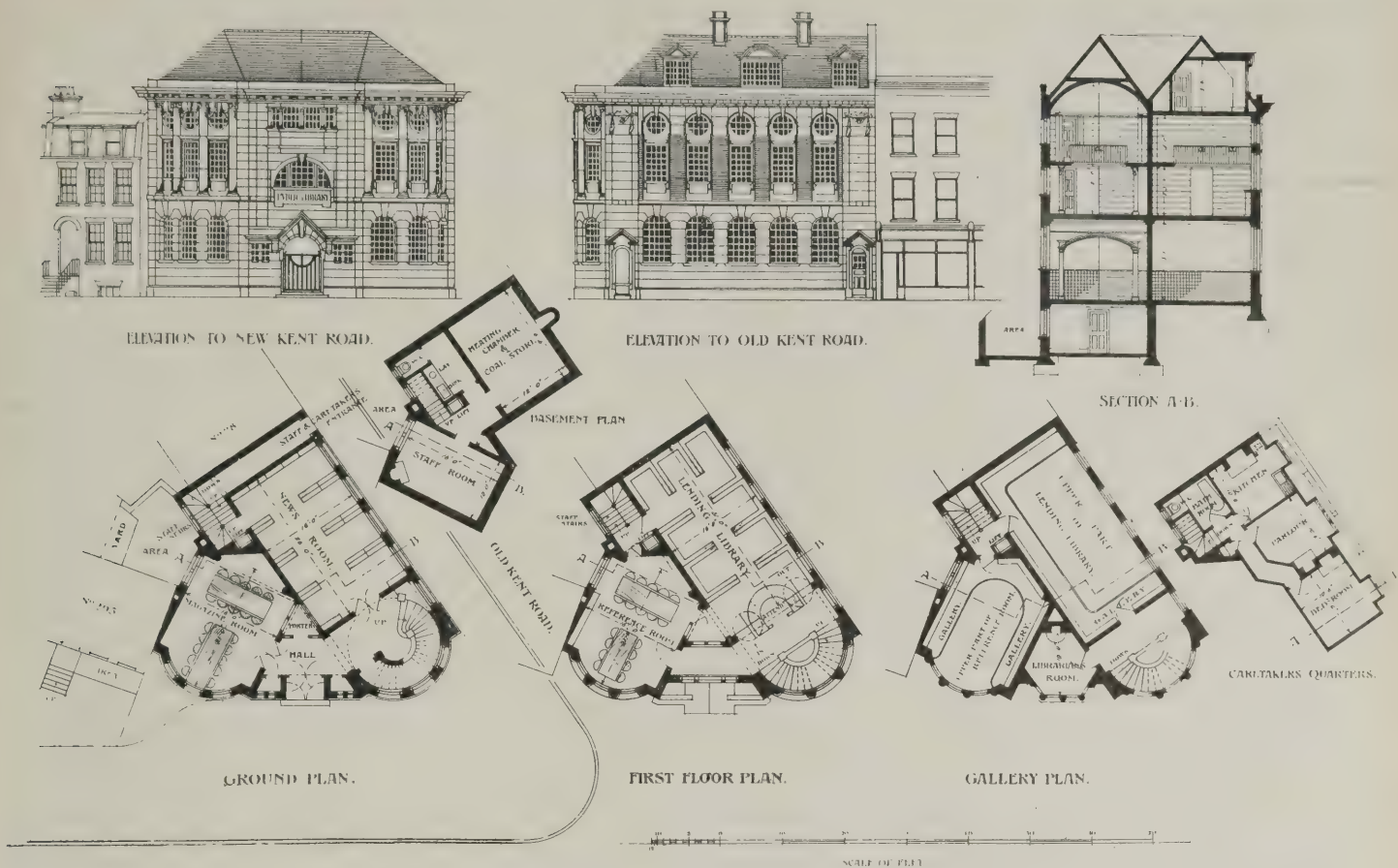
A City in the Making. THE Press had an opportunity last Saturday of seeing what progress had been made in the construction of the first garden city—Letchworth. This experiment is indeed of considerable importance; it holds out bright prospects for the future; and we are now glad to be able to state that the scheme promises to be a great success. After about two years' work, a wonderful change has come over the scene, although the end is by no means in sight. Water and gas works and factories have been erected and are in full swing, and a number of picturesque cottages have been built. The object of the promoters is to create a town of about 30,000 inhabitants on an area of 3,818 acres, of which the company possesses the freehold. About 1,300 acres will be used for the erection of the town, and the remaining 2,500 acres retained for agricultural purposes. The company will let the land on lease at a ground rent. Dividends to shareholders will be limited to a cumulative dividend of 5 per cent. per annum, the remaining profit being used for the benefit of the town. The control from the commencement obviously offers an unparalleled opportunity for providing wide and ample thoroughfares, sites for public buildings, open spaces and allotments, land being cheap. The following

is a summary of the development:—Over $4\frac{1}{2}$ miles of new roads have been made; $14\frac{1}{2}$ miles of water mains, 8 miles of gas mains, and 8 miles of sewers have been laid. Waterworks and gasworks have been constructed. Extensive railway sidings have been made. Sites for the erection of 520 houses, 25 shops, seven factories, a church, a chapel, a public hall, schools, &c., &c., have been let or selected. The rates on the estate are from 2s. 8d. to 3s. 2d. in the £. In September, 1903, the population was about 400; the population is now over 1,600, including 400 artisans and labourers. There are also 600 men working on the estate who do not live upon it, and of these about 300 desire houses at Letchworth. The First Garden City, Ltd., has a capital of £300,000, and about £134,000 of this has been allotted, and the balance is about to be offered for public subscription. The extra capital will be devoted, among other things, to the building of houses. Up to the present the provision of housing accommodation has been left to the private speculator, but it is realized that the inadequacy of the supply may inconvenience manufacturers. It is obvious that when firms decide upon building factories they will lose no time in their construction. The result will be that there will be a great demand for labour which will need housing accommodation, and unless the company take the matter in hand there is little doubt that there will be shortage in this direction. A large number of the cottages erected up to the present have been built by the Garden City Tenants, Ltd., a society which has for its object the co-operative ownership of the houses of its members. This company has erected or is erecting about 100 houses. It is not the promoters' idea to build a model city, which might easily be done by philanthropy, but to show how a city may be built on normal lines. Dependence is placed, therefore, upon private speculators. The company merely provide the opportunity for others to use their capital in the promotion of a town on better lines than existing towns have grown. Up to the present the company have been developing what might be called the outskirts of the town rather than the centre, the idea being that when the estate has partially developed the central sites will become of greater value. The natural growth of towns has always been from the centre outwards, and at the present moment there is no main street to give a nucleus to the town, and the houses seem somewhat dotted about in the wilderness, and if the company propose to encourage speculators to aid in the rapid development of their estate they should hold out special inducements and give some chance for the speculators to reap a portion of the reward. The character of the buildings being put up is good, and it seems probable that the Garden City, if not ideal, will be a considerable advance on any other existing provincial town of similar size.

Mr. Shaw and Regent Street. MR. NORMAN SHAW's fine scheme for the rebuilding of Regent Street Quadrant, exhibited at this year's Royal Academy exhibition, has met with opposition from the lessees and occupiers of the premises to which it is proposed to add a new façade. They are petitioning the Commissioners of Woods and Forests about the matter. They find no fault with Mr. Shaw's architecture. Their complaint is that the proposed new frontages would be quite unsuitable from a trading point of view, or to put it in their own words, "much too elaborate, and such as to be financially beyond the reach of the ordinary lessee, who has to consider the letting value of them when erected." Their objection is that the heavy columns proposed for the ground floor would not only take up a great portion of the shop-window space, but would entirely break the continuity of the window line, rendering it almost impossible for any one occupier to have a succession of shops. The windows would be set back so as to be hidden from the view of persons walking up and down the street, except the actual window they happened to be opposite. All the advantages which they now enjoy in the display of their goods would, it is contended, disappear, and Regent Street would be entirely ruined as a shopping centre. Regent Street is owned by the Crown, who will not rebuild the premises when the leases of the shops expire in the course of the next twelve years; so that the obligation to build in accordance with Mr. Shaw's design will rest apparently on the present traders, who have the ground on building lease. We cannot, however, admit the contention of the shopkeepers. Their arguments are the old ones, arguments which have made impossible all architectural feeling, by reason of the insistence that there shall be a base of plate glass to the building. Yet it is obviously impossible for a shopkeeper to show the whole of his wares in the window, which becomes therefore his means of exhibiting such goods as will attract customers inside the shop, where there is space for the adequate display of all the goods for sale. As a contrast to these ideas of the English shopkeeper we have only to turn to the shops of Paris. These consist of large "magasins," where the goods are arranged artistically inside the shop and with plenty of circulating space, so that possible customers are attracted into the shop and can walk round and view goods without feeling that they will be pestered to make purchases. The same system is followed in towns abroad and in America. Blocks of shops under one proprietorship with as heavy supports as proposed are to be found as financially successful as any in Regent Street, and there seems no reason why the same treatment should not apply there. We hope the Commissioners will not be frightened by the assumption of the shopkeepers of a vested interest to which they have no right.



Basement Plan:
SOUTHWARK PUBLIC LIBRARY: FIRST-PREMIATED DESIGN. W. CLAUDE BATLEY, A.R.I.B.A., ARCHITECT.
(On the "open access" system.)



SOUTHWARK PUBLIC LIBRARY: SECOND-PREMIATED DESIGN. SPENCER W. GRANT, A.R.I.B.A. AND JAMES A. BOWDEN, ARCHITECTS.

SOUTHWARK LIBRARY COMPETITION.

AS announced in our last issue, the competition for the proposed public library to be built at the corner of the Old and New Kent Roads, London, S.E., has been decided in favour of Mr. W. Claude Batley, A.R.I.B.A., of Kettering, and 115, Gower Street, W.C., his design (No. 46) having been placed first by the assessor, Mr. A. W. S. Cross, F.R.I.B.A.

We reproduce herewith Mr. Batley's design, together with the second-premiated design (No. 60), by Mr. Spencer W. Grant, A.R.I.B.A., and Mr. James A. Bowden, of Moorgate Station Buildings, Finsbury Pavement, E.C. The third-premiated design (No. 8) is by Messrs. W. T. Springall & Simpson Taylor, of 86, Rosemeath Road, Urmston, Manchester.

Ninety-nine designs were submitted in this competition, but eight were disqualified by reason of their non-compliance with one of the conditions as set forth in the committee's reply to question 22, a copy of which was sent to each competitor.

Mr. Cross in making his award has followed the admirable practice of giving a short critical note on every design submitted. It is pointed out that owing to the restricted nature of the site an ideally perfect grouping of the departments is impossible, because any combination of public rooms arranged, as required, on the ground and first floors only is open to one or another reasonable objection. This being the case, the assessor endeavoured to show no undue preference to any particular system of grouping, but regarded the provision of spacious, well-lighted and well-shaped rooms as being of primary importance.

Mr. Cross makes the following notes on the three premiated designs:—

No. 46.—The plan is exceedingly well arranged and compact, and the design is illustrated by good drawings.

No. 60.—This is a cleverly arranged and well-balanced plan, marred however by the position assigned to the librarian's office, which is also too small for the purposes of a committee-room. The lending library is on the first floor, but it is an exceedingly well-lighted room, and the departmental arrangement chosen has the advantage of bringing the reference library in close connection with the lending library, which is advantageous to the economical administration of a small library establishment. If the pedimental hood of the principal entrance were redesigned, and the orders of the wing projections continued to form an open loggia over the doorway, the design would be much improved.

No. 8.—A carefully thought-out plan with a good reference library. There is a loss of space in the entrance hall. Unfortunately the design is not accompanied by a good elevation.

First-premiated Design.

The author of the first-premiated design, in the notes accompanying his drawings, observes that every room is symmetrical, while full advantage has been taken of the quiet character of the New Kent Road frontage. The keynote is the ease of superintending all departments with a small staff: two persons, in fact, could well control the whole library—one at the desk in the lending library, from which the whole of the newsroom can be seen, and the other in the librarian's room, with the reference, magazine and ladies' rooms under his supervision. The difference in level between the newsroom and lending library facilitates this supervision, at the same time giving an opportunity to more effectually light the basement rooms. The lending library is on the open-access system, as desired, and the bookcases are so placed that the borrowers are all within view of the librarian's table. The book accommodation is supplemented

by the book-store in the basement. Rooms for the caretaker are provided on the second floor, and the flat over the reference library and librarian's room would form a roof garden, for which purpose the parapet-wall towards the New Kent Road has been kept high. The building is proposed to be built of Portland stone; heating by low-pressure hot water, and ventilation by a mechanically-aided "natural" system.

The bookcase accommodation has been calculated at ten volumes per foot run, with cases eight tiers high, except in the reference library, where it has been taken at nine volumes per foot run with cases seven tiers high.

The accommodation is as follows:—

Basement:

Filing room, 1,350 volumes.

Book store, 9,360 volumes.

Ground Floor:

Lending library, 10,640 volumes.

Newsroom, 30 readers—10 at slopes, 18 at tables, and 2 at directory and time-table stand.

First Floor:

Reference library, 4,491 volumes (12 readers).

Magazine room, 378 volumes (35 readers).

The total cost of the building is put at £5,900, this being made up as follows:—

70,500 cub. ft. at 1s.	£3,525
Parapet wall and chimneys not included in cubing	100
Heating and ventilating	300
Electric lighting and gas	300
Furniture and fixtures	1,500
Carving	175
	£5,900

A Sanatoria for Workers suffering from Consumption is to be built at Benenden, in Kent. The foundation stone will be laid next month. Provision for thirty beds will be made as a start, additional beds to be provided as further funds are received. The National Committee entrusted with the scheme, with Princess Christian as their head, earnestly appeal for donations, which should be sent to Mr. E. Douglas White, 19, South Molton Street, Bond Street, London W.

NOTES ON COMPETITIONS.

Coopers' Company's School, Bow.

In the announcement of the award in this competition published on p. 300 of our issue for last week the name of Mr. Alan E. Munby was incorrectly given "C. G. Mumby," as joint architect with Mr. T. Phillips Figgis of the first-premiated design. We regret the error.

Standard Colour Card Competition.

A notice of this competition has already appeared in these columns, but we are glad to hear from the promoters, Messrs. Pinchin, Johnson & Co., Ltd., varnish, colour and paint manufacturers, of 23-25, Billiter Street, E.C., that applications for the sample colour slips are coming in from all quarters. Those who have not already applied should do so, as the competition will close towards the end of next month. Messrs. Pinchin, Johnson send us a set of the colour slips complete. The object of the competition is to establish a standard card of sixty different colours. The colour slips are sent out in numbered envelopes, each containing four slips giving four different shades of every colour. From each of these four shades competitors have to select the one which corresponds most nearly to their idea of what the colour should be: thus, there are four different shades of lemon chrome, envelope No. 10, marked a, b, c and d respectively. The selection has to be made for the whole sixty colours and the slips stuck down on the card. The promoters will build up their standard card in accordance with the selections made, and the competitor whose card is nearest the "standard" will be awarded the first prize of £50; the second £20, the third £10, and the next twenty £1 each. After the competition is over, and the awards have been made, Messrs. Pinchin, Johnson will make available this set of colours, agreed to by general consensus of opinion as being of the particular shades named: and such a card should be of very great service to painters, decorators and architects.

Hospital at Leuchars, Edinburgh.

Twenty-five designs were submitted to Mr. Morham, the city architect of Edinburgh, for the infectious diseases hospital to be erected at Leuchars, and the first premium has been won by Mr. W. Carruthers Laidlow, of 4, York Buildings, Edinburgh.

Competitions Open.

The following is a list of competitions open:—

DATE OF DELIVERY.	COMPETITION.
June 26	NURSING AND CONVALESCENT HOME AT GLOSSOP, to cost £6,000. Premiums of £20 and £10. Particulars from Mr. T. W. Ellison, town clerk, Norfolk Chambers, Glossop.
" 30	ELEMENTARY SCHOOL AT EAST WEMYSS. Particulars from Mr. A. Watson Taylor, clerk to the School Board, East Wemyss, R.S.O., Fifeshire.
July 2	SECONDARY SCHOOL FOR GIRLS AT AIGBURTH VALE, for the City of Liverpool Education Committee. Limited to architects in Lancashire and Cheshire. Particulars from the Town Clerk, Municipal Offices, Liverpool.
" 4	SCHEME OF SEWERAGE AND SEWAGE-DISPOSAL WORKS AT WARBLINGTON. Premiums of £100 and £50. Particulars from Mr. J. W. Loader Cooper, clerk to the U.D.C., Queen Street, Emsworth.
Oct. 1	ALPHABET COMPETITION. Prizes of £20, £10 and £5. For particulars see "Architectural Review."
" 31	BOURSE AT CAIRO.—Premiums of £250 and £100. International competition. Designs to be submitted to the "Corporation des Agents de Change," Cairo, Egypt.
—	NEW MUNICIPAL BUILDINGS AT STIRLING (to cost £12,000). Premiums of £100. Particulars from Town Clerk, Borough Buildings, King Street, Stirling.

THE NEW WARING BUILDING.

THE splendid building which Messrs. Waring & Gillow have erected in Oxford Street is now open to the public, and should be visited by every architect who is interested in modern design and decoration, quite apart from the display of old and new furniture to be seen there. Of the façade of the building we need not now speak, as a critical note on the design appeared in our columns two weeks ago. It is certainly a tribute to the ability of the architect, Mr. R. Frank Atkinson, F.R.I.B.A. The interior of the building, however, is the great sight. From an architectural point of view there is first the rotunda, into which the spacious entrance-hall leads. This rotunda is the focus of the interior. Its diameter is 54ft. and its height about 85ft. For the bottom 17ft. the walls are lined with a dull-polished stone, and then comes the first-floor balcony, supported on bronze brackets, the walls above being carried out in a light yellow stone; the whole constituting a very fine feature. Another notable place is the linen department, the design of which is based on what is called the "Colonial Adams" style. This is quite a unique shop, the woodwork, including elegant pilasters, being of waxed mahogany throughout, forming a most delicate colour scheme in conjunction with the soft green carpet and the silver-grey of the walls above the arches. Another fine room is the antique salon on the first floor, decorated in Georgian style and embellished with a richly-modelled plaster ceiling. The restaurant on the third floor is still another most delightful room—it is essentially modern in colour and design, with a mantelpiece in oak and tile work; and the ladies' room adjoining is also a most attractive apartment. These strike us as being perhaps the most notable rooms of the interior, but there are scores of others which charm the eye. From the standpoint of furniture and furnishing, of course, the ruling feature is the arrangement of innumerable rooms shown complete in every detail. It need hardly be pointed out what an excellent way of exhibiting furniture this is, and how much better the effect of any particular article can be judged than when seen jumbled up in the ordinary show-room. The schemes are ranged from the lowest to the highest prices. There are complete houses shown, from kitchen to

attic, and in every case the most consummate taste is apparent. The rooms are far too numerous for us to attempt any particularization of them. We can only say how impressed we were with the excellence of their arrangement, the variety of their colour schemes, and, with all, the admirable sense of cosiness. The rooms are furnished to live in as well as to look at, and on that account we are sure they will be appreciated by every visitor to this most remarkable building.

[When using the illustration of the front of the building in our issue for May 30th we omitted to state that we were indebted to the Columbian Fireproofing Co., Ltd., for the block. We now make that acknowledgment.]

A PRICE LIST FOR ESTIMATING.

WITH our monthly "Contractors' Supplement"—the next of which will appear in our issue for June 27th—readers will remember we have included a list of fittings and specialities used in buildings, each item being priced, and particulars given of its size, weight, &c. This list is a most useful one, as it affords in a compact form a record of new specialities put on the market, as well as of the fluctuations in the prices of old-established goods. The ordinary price-books, by reason of their being published at yearly intervals, must necessarily get out of date, and it is on that account our list is particularly serviceable. Moreover, to architects writing specifications and builders preparing estimates it is of special use, as it affords prices and particulars which cannot be found elsewhere.

Mr. T. Parsons, retired builder, of Truro, died recently.

Mr. Allen Levey, builder, of Bishop Stortford, died recently in his seventieth year.

Stone Preservation.—Satisfaction is expressed by Mr. Alexander Muir with the result of coating the masonry of the large pile of municipal buildings at Glasgow with Szerelmey stone preservative liquid. Although some stones are showing decay since they were treated, yet Mr. Muir considers that they should have been cut out and replaced by new masonry.



This house is proposed to be built on an exposed site in Perthshire, with a south aspect. The walls will be of local stone and the roofs covered with red tiles. The half-timber and external doors will be treated with Carbolignum. The accommodation provides three sitting-rooms and offices on the ground floor, and five bedrooms, with billiard-room in the roof. The architect is Mr. Ernest G. Theakston, of 4, Hildrop Road, London, N.

R.I.B.A.

A BUSINESS meeting of the Royal Institute of British Architects was held on Monday evening at 9, Conduit Street, W., the chair being occupied by Sir John Taylor, K.C.B., vice-president.

The following elections took place:—

As Fellows.

(Of London where not otherwise stated.)

C. H. Ashworth (Dublin)	A. B. Jackson
T. Baird, junr. (Glasgow)	R. C. James (Bristol)
Andrew Balfour (Glasgow)	W. T. Jones (Durham)
R. S. Balfour	H. V. Lanchester
Andrew Black (Glasgow)	C. H. Lohr
G. Bland (Harrogate)	R. S. Lorimer (Edinburgh)
P. Bown (Harrogate)	R. J. Macbeth (Inverness)
Walter H. Brierley (York)	W. F. McGibbon (Glasgow)
J. Dixon Butler	H. P. G. Maule
J. A. Campbell (Glasgow)	R. Miller (Glasgow)
H. E. Clifford (Glasgow)	E. A. Rickards
J. McLean Crawford (Glasgow)	F. W. Roberts (Taunton)
N. C. Duff (Glasgow)	G. H. Sale (Derby)
W. N. Dunn	R. D. Sandilands (Glasgow)
W. A. Forsyth	A. Skirving (Glasgow)
W. V. Gough (Bristol)	J. Thomson (Glasgow)
John Hamilton (Glasgow)	W. S. Wilson (Durban)
W. Cecil Hardisty (Manchester)	W. H. Wood (Newcastle-on-Tyne)
F. G. Hicks (Dublin)	H. T. Wright (Newcastle-on-Tyne)
J. K. Hunter (Ayr)	

As Associates.

E. A. Agutter (Pietmaritzburg)
John Barr (Lindfield, N.S.W.)
A. F. Benjamin
J. T. W. Brooke (Manchester)

As Hon. Associate.

Dr. C. H. Smith, Keeper of Greek and Roman Antiquities at the British Museum.

As Hon. Corresponding Members.

J. T. J. Cuypers, C.E., Amsterdam.
H. Muthesius, Berlin.

Following the business meeting a general meeting was held, when an adjourned debate took place on Mr. Paul Waterhouse's paper on the London Traffic Commission report. A resolution proposed by Mr. H. D. Searles-Wood and seconded by Mr. John Slater was adopted suggesting that architects should be represented on the Traffic Board proposed by the Royal Commission, or competent professional assistance employed by the board. Professor Beresford Pite, Sir Aston Webb, and Messrs. E. W. Hudson, W. Woodward and the chairman took part in the discussion.

STANDARD TEMPLATES FOR PIPE FLANGES.

IT has been considered by the Engineering Standards Committee that templates for pipe flanges could be manufactured more cheaply and accurately in quantities by proper machinery than by the old-fashioned way of making a single template at a time. They entered therefore into an arrangement with Messrs. Joseph Sankey & Sons, Ltd., of Bilston, who have long been known in the electrical world for their accurate stamping of core discs for dynamos and motors, to manufacture commercial sets of standard pipe flange templates in large quantities. In order to ensure a high degree of accuracy the Committee first arranged for the manufacture of a set of male templates for all the sizes and drillings recommended by them in their standard tables for pipe flanges (Report No. 10). These male templates were forwarded to the National Physical Laboratory, where they were carefully measured up and a certificate of their accuracy obtained. All the commercial sets are carefully checked against the verified standard set before being issued. Accuracy of drilling is thus ensured, and it is hoped that the difficulty of flanges made by one maker refusing to fit the flanges of another, though they both may purport to be drilled in accordance with the Committee's recommendations, will be overcome. All engineers at one time or another have experienced the difficulty and annoyance of finding that flanges which have been nominally drilled to the same dimensions refuse to go together because either the bolt circles are slightly different or the spacing of the holes is not

quite uniform. The fact that all commercial templates will fit in any position the corresponding certified male templates effectually does away with these difficulties, and the templates being made in large numbers Messrs. Sankey are enabled to offer them at a price below that at which an engineer could make them for himself. The templates are made of thin steel plate painted over with aluminium paint, a small piece being cut out at the extremity of each centre line so as to enable the fitter to see that the centre line of the template coincides with the centre line of his flange. In the interest of the engineering industry it is desirable that the existence of these templates should be as widely known as possible in order that full advantage may be taken of the standardization which the Committee has sought to effect.

Notes and News.

The A.A. Third Summer Visit will take place next Saturday, to Ightham Mote, near Sevenoaks, and Fairlawn, Tonbridge.

The Exhibition of Model Cottages at Cleveleys, near Blackpool, is to be opened next month. About a dozen cottages are in course of erection.

Quantity Surveyors' Association.—Mr. A. J. Gate, F.S.I., of London, is the new president of this Association, and Messrs. H. Curtis-Card, F.S.I., and W. R. Hood, F.S.I., are the new vice-presidents.

Workmen's Compensation.—At the Wigan County Court recently a joiner's apprentice named Bell obtained £50 18s. and costs from a builder named Ablett as compensation for the loss of two fingers cut off by a planing machine.

Messrs. Mellowes & Co., Ltd., of Corporation Street, Sheffield, have secured the orders for glazing, on their "Eclipse" patent imperishable system, the roofs of extensions to works of Messrs. Cammell, Laird & Co., Ltd., at Sheffield; Hadfield's Steel Foundry Co., Ltd., Sheffield; Marshall, Sons & Co.'s works at Gainsborough; Denaby & Cadeby Main Collieries, Ltd., Conisbro'; Platt Brothers & Co., Ltd., Oldham; and Samuel Fox & Co., Ltd., Stocksbridge. Also the Grangemouth Dock Extension, Caledonian Railway; the Vegetable Market Extension, Bradford; and the Torquay Car Sheds Extension.

The Condition of Earlswood Asylum.—The Asylum for Idiots at Earlswood, Redhill, has for the past three years been in a critical condition by reason of its faulty foundations. Extensive works of a temporary as well as permanent character have been carried out at heavy expense, involving filling in solid foundations, pulling down and rebuilding dangerous portions of the structure, as well as shoring up and holding together the sections of the building under treatment. Two-thirds of the work have been completed, but more has been found necessary than was at first anticipated. Not only have the walls had to be underpinned to a depth of 5ft., but they have also had to be re-faced with brick, owing to the outer facing of stone having separated from the inner wall.

Alleged Illegal Position of Sub-Contractor.—At last week's meeting of the Blackpool Town Council, Councillor Ellis asked if it was correct that the sub-contractor for the proposed new Council school in Waterloo Road was an alderman of the Council and a justice of the peace. A councillor stated that this was the case. The town clerk, in reply to Councillor Ellis, said he did not think the position was illegal. Councillor Ellis said the Act distinctly stated that such a position could not be held, and he should communicate with the Local Government Board in regard to the matter.

Mr. George Langridge is the new president of the Surveyors' Institution.

A General Lock-out in the Building Trade at Vienna has been declared, affecting 150,000 men.

Change of Address.—Messrs. Hubbard & Moore, architects and surveyors, have removed from 85, Gresham Street to 112, Fenchurch Street, E.C.

Cottage Baths.—The Birmingham Corporation propose to erect cottage baths on a site in Bordesley Street at a cost of about £2,000: this as an experiment.

The Amsterdam Exchange, completed only a few years ago at a cost of £850,000, has been condemned by an expert commission. The foundations have given way, and cracks have appeared in the building.

A German Visit.—A party of German architects and students from the Royal Technical School, Hanover, left England on May 29th, after a stay of about a fortnight. They had been visiting the principal cities and towns, studying the architecture of cathedrals, municipal buildings and other institutions. More especially they paid attention to Gothic and Early English architecture. Herr W. V. Roeder, an accomplished linguist and an old Edinburgh student, was in charge of the party, which included Professor Mohrmann, one of the first Gothic authorities in Germany, and Professor Jordan, an eminent painter.

A revised and enlarged catalogue of warming and ventilating appliances has just been published by Messrs. John Gibbs & Son, of 72-76, Duke Street, Liverpool. The greater part of the book is devoted to ventilation, in connection with which this firm have a deservedly high reputation, their appliances being extensively used by the Admiralty, H.M. Office of Works, and leading railway companies, corporations and architects. Many of the designs for extractors, apart from the effectiveness of their construction, have architectural merit and are by no means disfiguring to any building upon which they may be placed, as is too often the case with ventilating flèches.

Plymouth Asylum Extension.—The extension to the Plymouth Borough Asylum, at Wrangaton, was opened by the mayor on Wednesday last. It provides additional accommodation for 200 patients, in two wards; thus bringing the total accommodation up to 400. Messrs. Hine & Odgers, of Plymouth, were the architects, and Messrs. Dart & Pollard, of Paignton, the builders, whose contract was for £32,126 (this firm however failed, and the work was completed by the trustee of the estate, through Mr. W. H. Lethbridge, of Paignton). The sanitary work was carried out by Messrs. Doulton & Co., of Lambeth, and the hot-water supply and general engineering by Messrs. J. Weeks & Co., of Chelsea.

Tension in the Bradford Building Trade.—A somewhat piquant situation has developed in the Bradford building trade as the outcome of allegations made by the Trades and Labour Council that operatives have been "victimised" in consequence of the action of trades unionists in building trade disputes. So much publicity had been given to these charges that the Bradford and District Building Trades Federation felt bound to take notice of them. A letter was therefore written by the secretary of the Central Board to the secretary of the Trades Council inviting that body to substantiate the charges before a special meeting of the Board, which he offered to convene for the purpose. The secretary of the Trades Council has replied stating that though his council are convinced that the charges are well founded, and that no further proof is needed, they "do not propose to subject any workman to further risk by offering evidence."

THE TIMBER TRADE.

London Market in May.

DURING the past month the London timber market has undergone little change beyond some appreciation in the prices of floorings, battens and scantlings, which is satisfactory so far as it goes but is evidence rather of a scarcity of stock than of an increased demand for it. There is a further reduction in the deliveries of 1,700 standards from the docks, and nearly 600 standards overside, and this continued decline in the volume of the business on the Thames has made London buyers callous of the strong position of the markets in practically all wood-exporting countries. The free on board market for all sizes except deals continues strong, and a fair business has been possible during the month. Messrs. Churchill & Sim report that a few cargoes of deals were sold for shipment outside Europe at quite satisfactory prices, but the demand from the Cape is lifeless, and is likely to continue so until enterprise is stimulated by a final settlement of the labour problem. Very little progress was possible on the Russian side during the month, buyers' and sellers' ideas of prices being out of harmony for the moment. There is no difficulty in securing plentiful tonnage at cheap rates, and, if anything, freights are rather easier.

Messrs. Denny, Mott & Dickson, Ltd., report on Baltic and White Sea goods as follows: "The volume of trade during May has improved, and this, in face of the continued upward trend of prices, shows a more satisfactory position. The caution which has hitherto been a marked feature of this year's business is still in evidence; and the bulk of present transactions go to fill temporary requirements only. Very little forward buying is being done. The recent prices ruling in the auctions show a continued demand for spot good, and two or three shippers have been tempted to venture consignments, which, however, have given very indifferent results to them. Floorings and all sizes of battens and scantlings are a firm market; but deals, especially in the lower qualities, are decidedly weak. Whether prices will be sustained at the present level depends on imports being on a moderate scale; but granting this, the outlook for the autumn trade should not be unsatisfactory."

The abstract of dock stock, consumption, &c., for May, published by Messrs. Foy, Morgan & Co., is given in the table at the foot of this page.

Dock Stock.

The stock of wood in the public docks on May 31st was:—

	Pieces.
Foreign deals and ends - - -	642,000
Do. battens - - -	1,057,000
Pine deals and battens - - -	551,000
Spruce do. do. - - -	443,000
Boards, rough - - -	2,361,000
Do. prepared - - -	4,985,000

totalling 10,039,000 pieces, as against 12,412,000 in 1905, 14,333,000 in 1904, and 14,254,000 in 1903.

In other kinds the stock was as follows:—

Foreign wainscot logs - - -	356 pieces.
Do. oak timber - - -	501 loads.
Do. fir timber - - -	1,698 do.

Foreign Oregon pine, &c., spars and masts - - -	4,722 loads.
Colonial oak timber - - -	981 do.
Do. birch timber and planks - - -	3,197 do.
Do. elm and ash timber - - -	581 do.
Do. yellow pine - - -	220 do.
Do. red pine - - -	64 do.
United States pitch-pine timber - - -	12,174 do.
Do. do. deals - - -	12,000 pieces.
East India teak - - -	7,993 loads.

Deliveries.

The deliveries have been—

	First five months. Pieces.	May. Pieces.
Foreign deals and ends - - -	1,377,000	278,000
Do. battens - - -	2,296,000	481,000
Pine deals and battens - - -	444,000	98,000
Spruce do. do. - - -	504,000	109,000
Boards, rough - - -	2,263,000	439,000
Do. prepared - - -	5,795,000	1,278,000
Total - - -	12,679,000	2,683,000

The deliveries from ship to craft have been—

	First five months. P.s.h.	May. P.s.h.
Deals and battens - - -	17,625	7,607
Boards - - -	5,508	1,964
Total - - -	23,133	9,571

Soft Woods.

Swedish Deals and Battens.—The importation has been on about the same scale as last year, but the demand has shown no elasticity. Prices for floorings and for all sizes of battens and scantlings remain firm, but deals continue to be neglected, and the stock of all descriptions is the smallest in the recent history of the trade.

Norwegian Boards.—Prices for floorings improved during the month in sympathy with smaller shipments from the other side, and owing to the higher cost of new supplies in the immediate future.

Russian Deals.—There is no change to record in prices of White Sea deals either here or for shipment. Shippers are quite content to wait until buyers are in the market again, which they are not at present except at some concessions in prices, and these are not forthcoming.

Finnish Battens and Boards.—So far the importation has been limited to one full cargo. Prices have slightly improved for scantlings and battens.

Prussian Timber.—A little more attention has been paid to fir timber owing to the continued high price of sawn pitch-pine, but the demand is very small. Oak has been selling rather more freely during the month, especially for the cheaper classes of timber.

Canadian Timber.—A little more progress has been possible in the realization of the better quality pine deals, but prices have only been maintained by patiently waiting for the demand. Spruce has not shown any sign of improvement in prices in spite of the small stock and the high cost of fresh supplies. The position of hardwoods is unchanged, but some shipments of birch timber from the lower ports have suffered in the prices realized, owing to the small enquiry for them. The market for sawn timber shows no change, but, if anything, there is a better enquiry on the spot. The wood has been offered for shipment rather more freely of late, as is usual at this season of the year, and the impression among buyers at one time was that prices would be lower. It is, however, being very clearly demonstrated that shippers at the Gulf Ports are not so dependent as

they formerly were on the European demand, the vast quantities required for home consumption and for South America making them somewhat independent. This demand, if it continues, should have a steadying effect on prices on this side, which will be very welcome to merchants who have suffered from the vagaries of this particular market for many years. Deals continue in request at high figures, and the supply is insignificant.

Hardwoods.

Teak.—Messrs. Denny, Mott & Dickson report that the landings in the docks in London during May consisted of 1,771 loads of logs and 383 loads of planks and scantlings, or a total of 2,154 loads, as against 1,465 loads for the corresponding month of last year. The deliveries into consumption were 314 loads of logs and 393 loads of planks and scantlings—together 707 loads, as against 561 loads for May, 1905. The stock remains practically on a level with the low stock of a year ago. The imports for the month show an increase of 700 loads on those for May, 1905; but out of this quantity nearly 500 loads were in Java timber, principally logs which have been coming forward too freely, and, owing in many cases to the indifferent quality and poor specification, fail to find buyers. The consumption showed some improvement upon the previous month, but still remains restricted, owing to the high prices of both logs and planks. The limited supplies at the shipping ports, however, cause shippers to decline business unless they obtain their full rates; and the consequence is that consumers only buy for their actual stock requirements. Messrs. C. Leary & Co. give the following quotations according to specification:—Timber £12 10s. to £19, flitches £19 to £20, planks £13 10s. to £19 10s. per load on c.i.f. terms.

Mahogany.—This market continues in a firm condition, small and inferior wood especially having appreciated in a marked degree, and good first-quality timber is firmly held.

Walnut.—In American black, sizeable logs of prime wood find interest at remunerative prices, but Italian and French sell slowly.

Odessa Oak.—Supplies coming forward are going direct into consumption, as buyers have practically purchased all the season's shipments of first-class logs, butts and wainscots.

OUR PLATE.

County Hall, Northallerton.

THE view represents the interior, from the public gallery, of the council-chamber of the new county hall at Northallerton, recently completed for the North Riding of Yorkshire County Council. The chamber is 45ft. square, and provides accommodation for seventy-two aldermen and councillors, as well as for the officials and reporters. The upper portions of the walls, together with the enriched cornices, coffered arches and domed ceilings, are of fibrous plaster. The dado is of Cuban mahogany; it is raised and richly carved on the wall behind the chairman. The seating is of Cuban mahogany upholstered in green morocco leather. Mr. Walter H. Brierley, F.S.A., of York, was the architect.

ABSTRACT OF STOCK, CONSUMPTION, &c., IN LONDON DOCKS, FOR MAY.

All Docks.	Deals (Fir).	Battens (Fir).	Pine.	Spruce.	Pitch-pine Deals.	Deals and Battens in Aggregate.	Rough Boards (All Countries).	Flooring.	Floated Timber.
	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Loads.
Public dock stock - - -	584,509	1,100,832	549,108	443,232	11,917	2,689,598	2,360,527	4,984,902	19,441
Monthly public dock consumption - - -	239,480	513,513	101,298	109,472	4,288	968,051	439,439	1,282,982	2,944
Overside stock - - -	—	—	—	—	—	—	—	—	—
Overside consumption (estimated of dock):—									
98 per cent. Sawn	234,690	503,243	99,272	107,283	—	944,488	431,010	808,279	—
63 " Planed	—	—	—	—	—	—	—	—	—
Duration of supply at same rate of consumption - - -	1'23 months.	1'08 months.	2'74 months.	2'04 months.	2'78 months.	1'41 months.	2'71 months.	2'38 months.	6'60 months.





Correspondence.

A National Architectural Record Society.

To the Editor of THE BUILDERS' JOURNAL.

SIR,—Through the columns of your paper may I suggest the formation of a National Architectural Record Society? This society would be divided into county groups, and each group divided into sections corresponding to the various Local Government divisions of each county, urban and rural. Furthermore, there should be a correspondent for each parish, if possible; if not, then for a group of parishes; the whole to be united under the London group.

The object of the society would be the cataloguing of all books, articles, pamphlets, engravings, maps, plans, diagrams, measured drawings, &c., referring to streets, buildings, &c., still in existence or that have disappeared; the collection of measured drawings, plans, photographs, and, to this end, the supplying of information in regard to all ancient buildings within the jurisdiction of each group, especially to those desirous of making measured drawings of buildings within that district; the giving of lectures on architecture generally, in connection with university extension or otherwise; and the organization of visits to interesting buildings. There should also be published a year-book of the whole society, giving the names of all officers, reports of the work done by the various groups, details of work needed to be done or measured, and so on.

I shall be most happy to hear from any of your readers who would be willing to co-operate with me in endeavouring to found such a society, and especially from those who would consent to act as local secretaries *pro tem*.

I am daily experiencing the need of such a body, if only for the purpose of reference and gathering information. It could carry on the work the result of which we see in that splendid little book—the "Handbook of English Ecclesiology." In this way complete catalogues of the existence of rare examples could be made once for all.

The need of such a society is shown by the continual publication of enquiries in your columns as to what churches, &c., are worth measuring in or near such and such a place. What becomes of all these measured drawings? Some at least of them must be of value. Would not the students who make them be willing to leave copies of their work on the spot, or elsewhere where they would not be lost sight of or forgotten? How many subjects have been measured over and over again and other valuable bits overlooked and left severely alone?

Again, could it not be possible for architects who have restored or altered old houses or churches to let copies of their drawings be preserved on the spot, so that the original state, at least before the last alteration or addition was made, could be seen?—Yours truly,

(REV.) ROBERT A. DAVIS.

BROXWOOD, PEMBRIDGE, R.S.O.,
HEREFORDSHIRE.

Hot-water and Heating Services.

To the Editor of THE BUILDERS' JOURNAL.

SIR,—I am instructed by my Council to communicate with you and respectfully draw your attention to the action of the plumbing trade (both masters and operatives) in interfering with the execution of contracts placed in the hands of heating and domestic engineers by architects and other clients, and to the attempts of the plumbers to secure a monopoly of the work of domestic hot-water supply.

The plumbers' claims, which have been made in various places throughout the

country, are that all such work in any metal is plumbers' work only, and that it must not be undertaken by heating and domestic engineers. These claims have been successfully resisted, although in some cases the plumbers struck work and caused serious loss and annoyance to all concerned.

This class of work has always been largely carried out by heating and domestic engineers, and the experience of some firms (members of this Association) covers a period of over eighty years. The claims of the plumbers are of quite recent date, and cannot be admitted, as, if acceded to, the monopoly created would be a hardship and injustice not only to the master engineers but also to the workmen engaged in this special branch of engineering, who by training and experience are thoroughly qualified to do the work in the most efficient and satisfactory manner.

The annexed resolution (Appendix No. 1), which was adopted at a joint conference between representatives of both master engineers and master plumbers, expresses the general position taken up and maintained by the members of this Association.

I am further to advise that, with the object of preventing trouble and giving correct information as to facts, my Council submitted representations to the Royal Institute of British Architects, and an extract from a letter conveying the decision of this body is also annexed (Appendix No. 2). This, you will observe, is strictly neutral and impartial, and gives no support to the plumbers' claims for a monopoly.

As repeated assertions have been made by the plumbers that the Manchester Society of Architects agree that the work in question is plumbers' work only, I further annex (Appendix No. 3) copy of a letter received from this Society which makes it clear that their position is the same as that of the R.I.B.A.

My Council desire me to ask your kind and careful consideration of this matter and the favour of your co-operation, and I am to say that any communication from you will receive the best attention, and further information can be supplied if required.—Yours truly,

H. B. WATT, Secretary,
National Association of Master Heating
and Domestic Engineers.

12, GREAT JAMES STREET,
BEDFORD ROW, W.C.

APPENDIX NO. 1.

Joint Resolution of Master Engineers and Master Plumbers.

"At a meeting held May 22nd, 1902, it was mutually resolved by the representatives of the National Association of Master Plumbers of Great Britain and Ireland and the Institution of Heating and Ventilating Engineers that in future it be observed that all lead work be considered plumbers' work, and that a neutral line be taken as regards all iron, brass, copper or other metal-work which may be executed by engineers or plumbers."

Proposed by Mr. D. M. Nesbit, London, on behalf of the Institution of Heating and Ventilating Engineers; seconded by Mr. J. H. Taylot, Huddersfield, on behalf of the National Association of Master Plumbers, and unanimously agreed to.

APPENDIX NO. 2.

Extract from Letter from the Royal Institute of British Architects to the National Association of Master Heating and Domestic Engineers.

"27th February, 1906.
"I am directed by the Council to inform you that the Committee appointed to receive deputations from the National Association of Master Plumbers of Great Britain and Ireland, the National Association of Master Heating and Domestic Engineers, and the United Operative Plumbers' Association, with regard to the right of the different trades to deal with hot-water work for heating and hot-water supply, has presented its report, with which the Council is in entire agreement."

"I am to inform you that the Royal Institute of British Architects is concerned only with the improvement and efficiency of craftsmanship, and does not concern itself with trade questions. It therefore cannot see its way to lay down any rule or to advise its members as to which trade should have the right or preference in the execution of hot-water work."

"(Signed) W. J. LOCKE,
"Secretary."

APPENDIX NO. 3.

Copy of Letter from the Manchester Society of Architects to the National Association of Master Heating and Domestic Engineers.

"16th March, 1906.
"With reference to the circular issued by the Master and Operative Plumbers' Associations, dated March 25th, 1903, which emanated from this Society, my Council

regrets to hear that it has not been construed in the spirit intended."

"I am instructed by my Council to inform you that it is in complete accord with the letter, copy of which I enclose, issued from the Royal Institute of British Architects, dated 27th February, 1906, and to inform you that it desires the same to be accepted as its view of the matter."

"(Signed) PAUL OGDEN,
"Honorary Secretary."

King's Norton School Competition.

To the Editor of THE BUILDERS' JOURNAL.

SIR,—In this case the school consists of three separate one-storey buildings. The infants' school, given in your issue for May 30th (p. 287), might have some excuse had it had unavoidably to follow the lines of a boys' or girls' school placed above; but, being a one-storey building, its plan gives no indication of being an infants' school, except that of having classrooms of smaller dimensions. It is necessary to point this out in order to prevent future assumption that the plan represents a first-rate arrangement for infant teaching.—Yours truly, E. R. ROBSON.

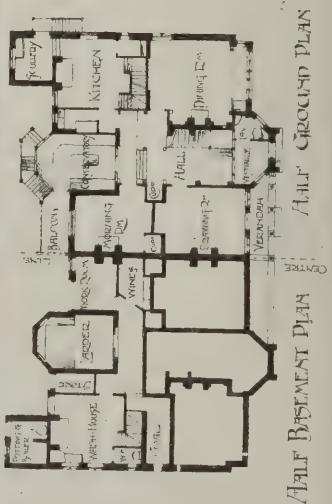
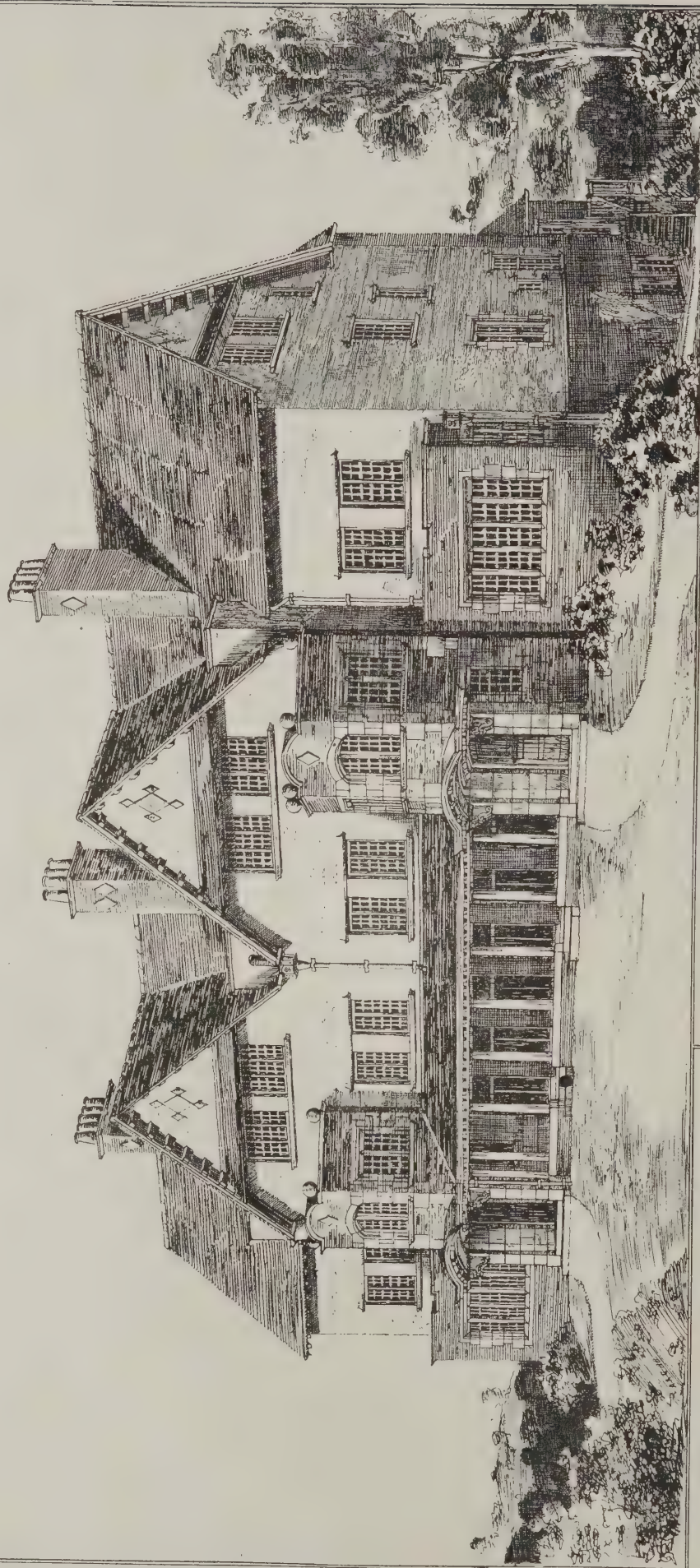
9, BRIDGE STREET, WESTMINSTER.

Law Cases.

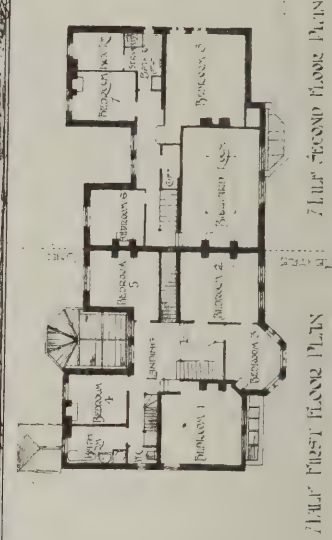
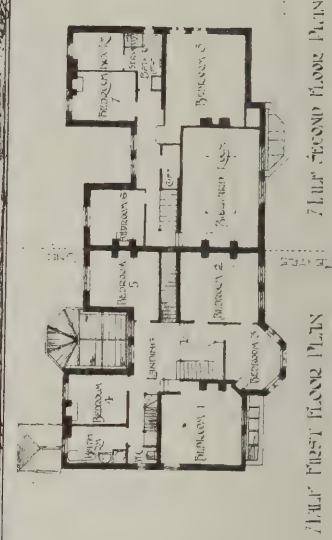
A Building Line Case at Birmingham.—

At King's Heath, Birmingham, recently the King's Norton and Northfield Urban District Council summoned Mr. S. J. Roberts, builder, of Moseley, for exceeding the building line without the consent of the authorities. The defendant erected some shops in High Street, King's Heath, and consent was given by the Building Committee to bring the bay windows 5ins. beyond those of the next premises, the property of Mr. Grant. It appeared that the plan deposited and sanctioned was incorrect. The plan showed Mr. Grant's bay windows adjoining projected 1ft. 1in. The Committee allowed defendant 5ins., making 1ft. 6ins. As a matter of fact, the line of Mr. Grant's bay only projected 7ins., and it was alleged the total projection was 1ft. 11ins. A large amount of correspondence had taken place, and the defendant admitted a mistake of 2ins. caused by an error of the joiner.—The Bench considered defendant had committed an offence under the Act, and fined him 1d. a day from February 14th to May 25th, since the notice of the Council was sent, ordering him to carry out the necessary alterations and pay the legal costs of the prosecution. They also intimated that unless the work was carried out within a month the full penalty of 40s. would be imposed for every day the encroachment was in existence.

By-laws as to Party-walls.—At the Southampton Borough Police Court recently the hearing took place of ten summonses against Mr. John Smith, builder, respecting party-walls between ten houses in Thornbury Road, the party-wall being so constructed as to exceed 32ft. in length and not 13ins. thick below the topmost storey, as required by section 24 (a) of the by-laws. For the defence, Mr. Ensor stated that similar plans to those in question had been before the Council and approved. Defendant had put in cross-walls which had been approved by the committee as substantially meeting their requirements, and he should not be prosecuted in May when the same plans were approved in December. Mr. W. Burrough Hill stated that the by-laws did not contemplate the extra support afforded in this case, and he often got concessions from the Corporation when equal strength was shown. The wall, as it existed now, was stronger than if it had been carried out within the strict letter of the by-law. The Bench imposed a penalty of £5 and costs in respect of the one house completed, and being advised as to the desirable amendment of the by-law, the town clerk withdrew all the other summonses, saying he would convey to the Works Committee the opinion of the Bench.



SEMI-DETACHED VILLAS —
SPRINGFIELD AVENUE HARROGATE
FOR . R. S. DALLISER ESQ
NOTE SITE SLOPING CONSIDERABLY TO THE REAR . . .
ARTHUR A. GIBSON
ARCHITECT
5 PATERNOSTER SQUARE
LONDON, E.C. 4



Inquiries Answered.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Correspondents are particularly requested to be as brief as possible.

The querist's name and address must always be given, not necessarily for publication.

Architectural Department, Board of Education.

BRIXTON.—EDUCATION writes: "How can I obtain an appointment in the Architectural Department of the Board of Education, and where should I apply?"

The architectural staff of the Board of Education consists nominally of only one architect, who actually has one assistant. It is quite impossible, therefore, to obtain an appointment as architect in this department.

H. Y. M.

Surveyors for Canada.

DERBY.—W. B. writes: "Referring to the enquiry under this head on p. 250 of your issue for May 9th, having a great desire to get on a big survey company, I should be glad if you could give me further particulars regarding same. Perhaps you could also inform me to whom I should write for more detailed particulars."

X. writes: "In your issue for May 9th, in answer to an enquiry by 'Cinque Port,' you say it is possible to work up for an appointment as surveyor under the Government while acting as a draughtsman in Canada. From whom can I get particulars?"

We presume our first correspondent refers to the surveying parties which are formed in the spring, and start out when the ice breaks up. These parties consist of about six men when small, and from ten to twelve when large. They comprise the surveyor, a clerk to take down notes, measurements, &c., men to carry the chains for measuring, axe men who cut down the undergrowth and clear a path, mound diggers who pile up the earth to take the permanent surveying posts, and dig the holes at the north, south, east and west corners, which is the form the stations take; a cook and a teamster. The wages of these assistants are about two dollars per day, with keep. Several of these parties go out in the spring from Winnipeg, and the way to join them is to become acquainted with the surveyor, and show to his satisfaction that you are capable of undertaking the work. Replying to both our correspondents we would say particulars can be obtained from several sources, but we can only remember at the moment Mr. J. F. Robinson, Departmental Commissioner, Public Works Department, Regina, Saskatchewan. Further particulars can also be obtained from the professional handbook issued by the Emigrants' Information Office, 31, Broadway, Westminster.

Fuming Oak.

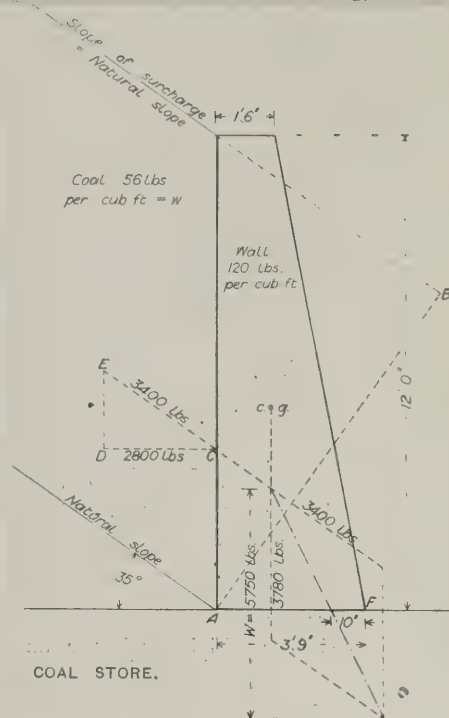
CHESTER.—J. M. writes: "Which is the most efficient and cheapest way to fume oak? Please describe the process fully."

The best way to fumigate oak is with ammonia. The process is fully described on p. 392 of our issue for December 19th, 1900. The work is put in a small cupboard or room and there exposed to the fumes. With a room about 12ft. square and 8½ft. high, packed pretty full of oak joinery, three Winchester's of liquid ammonia fort. 0.880 would be allowed, and the fumigation would be completed in twenty-four hours.

Coal Store.

LONDON.—A. S. D. writes: "The accompanying sketch shows a coal store. Please give formulæ for finding (1) the pressure of the coal on the walls when the store is filled, as shown, 12ft. against walls; (2) thickness of brick walls to resist that pressure—(a) brickwork in mortar, (b) brickwork in cement."

There are so many points to be attended to in designing coal stores that they should be left to experts. The thrust from the coal against the side walls will be the same as if the wall were a surcharged retaining wall as shown by the accompanying illustration, but it is not usual to rely upon the stability of an unsupported wall. Tie bolts are inserted at intervals between the two sides, and then walls of parallel thickness are used. The roof adds weight and therefore stability to the walls, but no particulars are given. Taken as an unsupported retaining wall, the method of working will be as follows:—From A, the inner edge of base, set out the angle CAB equal to the natural slope, and produce AB to meet the slope of surcharge produced in B. Then the horizontal pressure on the back of the wall at c, which is one-third of the height, will be $\frac{1}{2} w (AB)^2 = \frac{1}{2} \times 56 \times 10^2 = 2,800$ lbs. Next from c draw CE parallel to the natural slope to meet a vertical from D in E, giving EC as the thrust at back of wall. This thrust must now be combined with the weight of wall as shown, the



resultant cutting the base AF joins. from the outer edge F, and having the vertical component 5,750 lbs. The stability can be checked by the formula $\frac{2}{3} \cdot \frac{W}{d} = \frac{2 \times 5750}{3 \times 0.83} = 4,600$ lbs., or, say, 2½ tons per sq. ft., which is well within safe limits.

HENRY ADAMS.

Proportions and Stability of Hall.

ENQUIRER writes: "I should be glad of a further explanation of the answer to the enquiry about the proportion and stability of a hall on p. 211 of your issue for April 18th last. Does Professor Adams mean that the pressure of wind on the side walls of a two-storey building with 14in. walls will necessitate extra piers under each principal? If these are absolutely necessary, half the buildings of this class are unstable, yet many have stood the wind in exposed situations for years. I should also like to call your attention to the need of a tabulated list of the scantlings of moderate-sized wooden roof principals, say up to 50ft. span, other than the king- or queen-post type. For instance, the school or German truss, the collar beam with and without arched rib, hammer beam, and others similar, have never been dealt with in a scientific and systematic manner, so far as I know. These tables could be published in the form of a card to be hung up for reference, and the strengths in oak, pitch-pine and fir given: also a table of sizes of hip rafters might be included. Some of our professors might deal with a matter of this sort, but I am afraid it is too practical and commonplace to interest them."

I think you are labouring under some misapprehension. The case in question is not a simple "two-storey building with 14in. side walls"; it is a public building of two floors with a clear roof-span of 35ft. and a height of probably the same amount, so that strong piers under each principal are absolutely necessary.

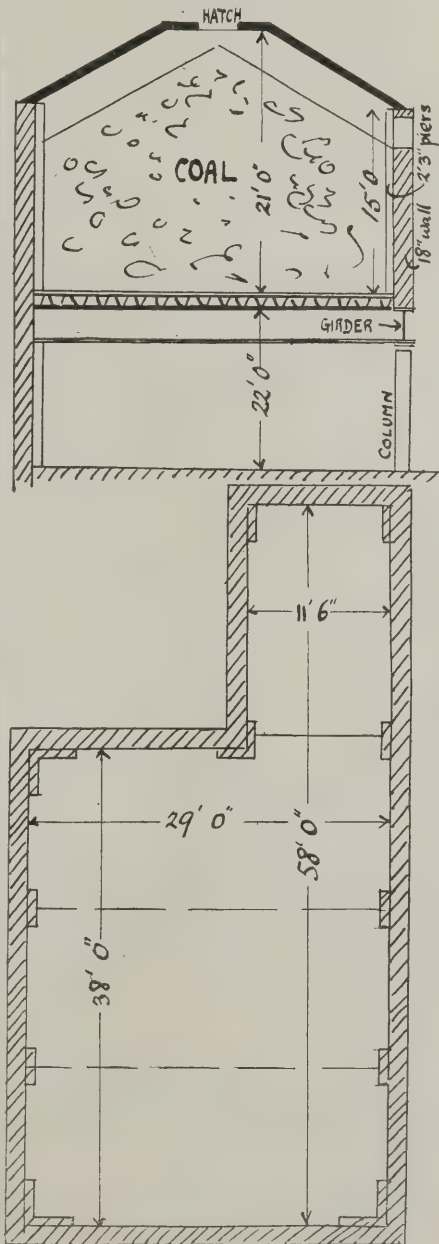
HENRY ADAMS.

Moment of Inertia for Rolled Joist.

HARLESDEN.—N. K. writes: "In your issue for November 22nd, 1905, p. 302, the greatest and least moments of inertia are given for a 12in. by 6in. by 54 lb. rolled steel joist as 369'91 and 31'43 respectively. I can work out the former from the formula

$$I = \frac{bd^3 - h^3(b-t)}{12}$$

given in your issue of November 8th, 1905,



p. 265; but I cannot find a formula for the latter, where the neutral axis passes through the centre line of the web. Kindly give same with the working out, to show how the 31.43 is obtained?"

The rolled joist being taken as in Fig. 1,

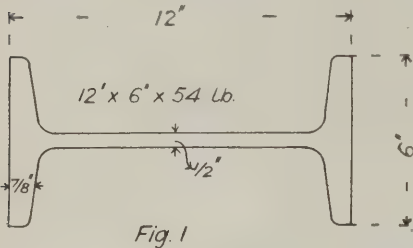


Fig. 1

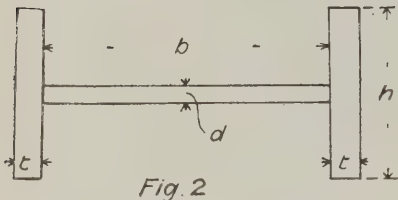


Fig. 2

the simplified form will be as Fig. 2, and the least moment of inertia will be

$$I = \frac{2bh^3 + bd^3}{12} = \frac{2 \times .875 \times 6^3 + 10.25 \times .5^3}{12} = \frac{378 + 1.28}{12} = 31.6.$$

The difference between this and the 31.43 quoted is due to the corners of the flanges having been taken as square.

HENRY ADAMS.

Bent Joist to Carry Roof.

TEDDINGTON.—STRUCTURE writes: "I send tracing of a rolled steel joist for carrying the timbers of a tiled roof. The loads are distributed as shown. I estimate that the section at loads A B and C D should be 8 in. by 5 in. r.s.j. and at load B C 10 in. by 5 in. r.s.j., or their equivalents. It is proposed to use a 12 in. by 5 in. by 39 lb. r.s.j. Would this be strong enough? The wall is 14 ins. thick, and no piers or buttresses are to be used. How is the strength of the beam determined so that there will be no movement of the shoe on the stone template tending to overturn the wall? No tie rods are to be used."

The rolled joist, Fig. 1, may be calculated as a straight beam with the loads as shown in Fig. 2. The loading being symmetrical, the reactions at A and B will each be $\frac{2+2+2}{2} = 3$ tons, assuming that the joint

plate at B is insufficient to make it a continuous girder. The bending moment at C will be $3 \times 4.5 = 13.5$ ton-ft., at D $3(4.5 + 4.75) - 2(4.75) = 27.75 - 9.5 = 18.25$ ton-ft.,

and at E $3(4.5 + 4.75 + 4.75) - 2(4.75 + 4.75) = 42 - 19 - 9.5 = 13.5$ ton-ft., as at C. The maximum bending moment in this case being 18.25 ton-ft., and the maximum bending moment for a distributed load being $\frac{WL}{8}$, we have $\frac{WL}{8} = 18.25$, whence $WL = 8 \times 18.25$; but $L = 18.5$ ft., therefore $w = \frac{8 \times 18.25}{18.5} = 7.89$, say 8 tons, equivalent load distributed uniformly over 18 ft. 6 ins. span, for which a 12 in. by 5 in. by 39 lb. rolled steel joist will be ample. As the rolled joist cannot be bent to the shape required at C, it must be cut and strongly connected by $\frac{1}{2}$ in. plates carefully fitted on each side of the web.

HENRY ADAMS.

A TENNIS COURT.

A NEW royal tennis court has recently been built at Moreton Morell, $6\frac{1}{2}$ miles from Leamington, and as it embodies features which are somewhat novel we publish the following particulars:—The exterior is of red brick with stone dressings relieved with panels of grey rough-cast. The frontage of the court is 120 ft. and the depth 55 ft. The tennis court towers above the front buildings, the centres of which break forward, and in between is situated the squash racket court. The vestibule, saloon, dedans and lounge are three steps above the court floor level, and command a good view of the play. The squash racket court is a reproduction of the Tuxedo court near New York, and is lined with wood, both walls and floor; a small gallery for spectators, 4 ft. above the floor, being furnished, with a net to stop the balls coming through the opening, 10 ft. by 5 ft.; above this is another gallery fitted along the front with a massive turned balustrade. The walls of the tennis court are black (Bickley's patent); an oak polished moulding forms the play line, above which is cement-work jointed and stained a bright buff colour. Surmounting all is an elaborate cornice and frieze filling the angle all around the court and following the slope of the roof, the underside of which is covered with a fine white plaster on expanded steel lathing which reflects a clean light down on the floor; the light-coloured walls above the playline also reflect light down about the floor. The bright red floor does not kill the ample light like a black floor; indeed, this combination of arrangements make the light in the court a surprise to tennis players. The side windows and the skylight admit an abundance of light without any glare. The side windows are managed from an outside gallery; thus no unsightly blinds or cords are required. The professionals' residence con-

sists of a suite of rooms at the opposite end to the entrance, while the space behind the pent house and grill is fitted up as a workshop for the marker. The heating is from a stokery underneath the marker's quarter, where there are three distinct boilers, a large one to heat the two courts, one for radiators and one for baths. Electric light is installed throughout. The work was entrusted to Mr. Joseph Bickley, of 62, Lillie Road, London, S.W., who has earned an excellent reputation in the way of designing and equipping tennis and racket courts.

MANCHESTER NOTES.

Proposed New Town Hall for Salford.

A sub-committee appointed by the Salford Corporation to consider the inadequacy of the present town hall, and the need for better accommodation for the various departments now housed in several adjacent buildings, has come to the conclusion that any practicable extension of the present building would be, at best, but a temporary and costly expedient. The sub-committee therefore "thinks it would be wiser to provide a new town hall adequate to the present needs of the borough, and to provide for the reasonable requirements of the future." The committee suggests the erection of a new town hall in Peel Park, which, they think, would not cost more than £70,000. The old building could then be used for the less important departments. A meeting of the Town Hall and Markets Committee will shortly be held to discuss this report, and an inspection of the proposed site in Peel Park will be made.

Stone for Manchester Infirmary.

The Bath Stone Firms, Ltd., has secured the contract for Portland stone for the superstructure of the new Manchester Infirmary. About 10,000 tons, or 160,000 cub. ft., will be required, which will necessitate a cargo a week for twelve months. The contractors, Messrs. H. Arnold & Sons, will work the stone on the site, and about 400 or 500 men will be employed.

State of Building Trade.

On the whole the building trade in Manchester and neighbourhood shows a welcome improvement, though some firms are still short of work. Many architects report a good number of contracts in hand, schools and libraries forming no inconsiderable proportion of the work.

Alterations in Lancashire Towns.

Architecturally the Lancashire manufacturing towns are more notorious than famous, and in truth any beauty they have possessed has been generally of the severely utilitarian type. Most of the towns can boast of one or two good churches, some of fine town halls, but the prevailing appearance is usually black and monotonous, sometimes even squalid. Within the last six or eight years, however, considerable changes have been made. Banks, brewers and education committees have erected substantial and well-designed premises; libraries and art galleries have sprung up amongst the small property inhabited by the cotton operatives, and shop-fitters have revolutionized many streets. Bury, Rochdale, Bolton, Blackburn and Accrington are cases in point, and in Warrington the change is even more pronounced. Unlike most of the places named, Warrington is essentially an ancient town. It is mentioned in the Domesday Survey. The streets, therefore, are often narrow and tortuous. Now its main thoroughfare is being widened and old timbered and thatched buildings on both sides are giving way to frontages of terracotta and polished granite. The next few years will see a good deal of rebuilding in this smoky town.

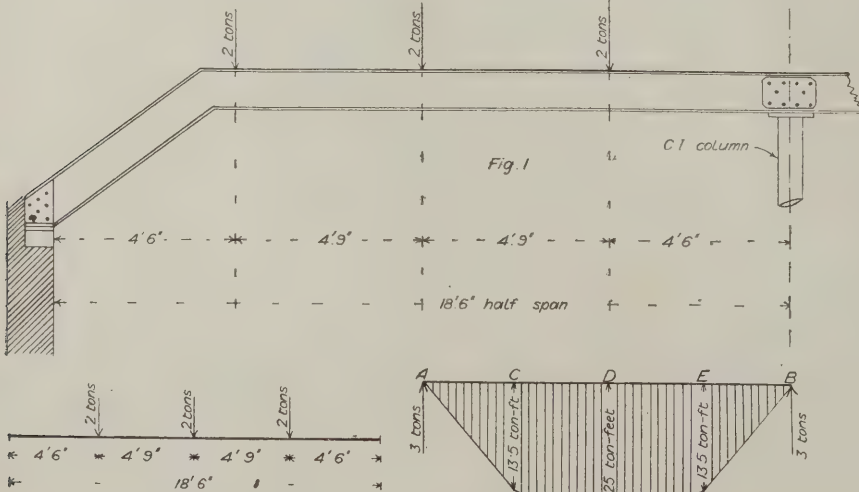


Fig. 1

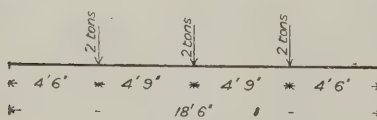


Fig. 2

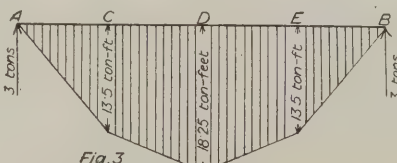


Fig. 3

BENT JOIST TO CARRY ROOF.

Oak Staircase
near
Piccadilly



(Note This scheme has been modified in execution.)

Complete List of Contracs Open.

With a few exceptions, news of Contracts Open are not repeated after they have been published once in these columns, so that readers will find particulars in our previous issues of other contracts that still remain open.

Unless expressly stated to the contrary all deposits required for bills of quantities, &c., are returned on receipt of bona-fide tenders.

The words "Fair Wages Clause" inserted in certain paragraphs signify that persons tendering must conform to a fair-wages clause in the contract, which requires them to pay the rates of wages current in the district.

BUILDING.

June 15. Kirkcaldy.—Alterations on the platform at Pathhead Public Hall. The plan may be seen and copies of the specification obtained upon application at the Burgh Surveyor's Office. Tenders to be left with W. L. Macindoe, town clerk, Town Clerk's Office, Kirkcaldy, not later than June 15.

June 15. Turnbridge.—Mason's, bricklayer's, joiner's, plumber's, slater's, painter's, concrete's, iron and steel founder's, and patent glazier's works required in the erection of a mill shed at Turnbridge. Plans may be seen and quantities obtained at the offices of Lunn & Kaye, architects and surveyors, Huddersfield, to whom tenders are to be sent free of charge by June 15.

June 15. Shirley.—Erecting a foresters' hall at Park Street, Shirley. The competition will be confined to builders residing in the county borough of Southampton. Plans and specifications may be seen and the bill of quantities obtained on payment of a deposit of £2 2s., on application to H. J. Weston, architect, 24, Portland Street, Southampton. Sealed tenders, endorsed "Tender, Foresters' Hall," to be delivered to Henry R. Hale, secy., Court Windsor Castle, No. 1858, A.O.F., 14, Andover Road, Freemantle, Southampton, by 4 p.m. on June 15.

June 15. Colinton.—Mason, carpenter and joiner, plumber, slater and plaster works in connection with the addition proposed to be made to the cottage at Torduff, Colinton. Schedules of quantities may be had on application to C. C. Carse, architect, 37, Frederick Street, Edinburgh, at whose office plans of the proposed addition may be seen. Tenders, endorsed "Torduff, Cottage, Colinton," must be lodged with William Boyd, W.S., clerk to the Trust, Water Trust Offices, 12, St. Giles Street, Edinburgh, not later than 10 a.m. on June 15.

June 15. Cockenzie.—Alterations and additions to Cockenzie school, for the School Board of Tranent. The whole work is to be done under one contract, and the contractor will be bound to carry it through within a short specified time, which will be strictly enforced. Schedules of quantities will be supplied on application to Lyle & Constable, architects, 3, Hill Street, Edinburgh, and at Musselburgh, on or before June 15.

June 16. Penzance.—Alterations to stores in Jennings Street. Plans and specification may be seen on application to R. J. Chappell, of 48, Chapel Street, Penzance, to whom sealed endorsed tenders must be sent not later than June 16. A further particulars may be had of N. C. Whear, jun., architect, Penzance.

June 16. Truro.—Work at Gylval Trythall Council School, for the Cornwall Education Committee, including the erection of lavatory, &c., according to plans and specification, which may be seen at the school or at the office of Sampson Hill, architect to the Committee, Green Lane, Redruth, from whom all particulars relating to the work may be obtained. Forms upon which all tenders must be made may be had from the architect or at the school. Sealed endorsed tenders to be sent to F. R. Pascoe, secy., Education Office, Truro, on or before June 16.

June 16. Pannal.—Erection of a villa residence at Pannal, for G. E. Dixon. Plans may be seen and quantities obtained at the offices of John E. Stocks, architect, Greek Street Chambers, Park Row, Leeds. Tenders to be lodged not later than noon on June 16.

June 16. Camborne.—Rebuilding business premises at Camborne, for Henry H. Berriman, according to plans and specifications, which may be seen (by appointment) at the office of Sampson Hill, architect, Green Lane, Redruth, or at the Proprietor's residence, Chapel Street, Camborne, where sealed endorsed tenders are to be sent not later than 10 a.m. on June 16.

June 16. Lancaster.—Erection and completion of new branch store at Lancaster, co. Durham (including three shops, warehouse, manager's house, stabling, &c.), for the Annfield Plain Industrial Co-operative Society, Ltd. Drawings, specifications and conditions of contract may be seen and forms of tender obtained at the Architect's Office, 22, Durham Road, Black Hill, co. Durham. Tenders to be sent in to W. R. Pigg, secy., Co-operative Store, Annfield Plain, R.S.O., endorsed "Tender for New Branch Store at Lancaster," on or before June 16.

June 16. Southampton.—Provision of a cookery centre, Portswood School, together with the necessary furniture for same; certain alterations at Northam School. Plans and specification may be seen at the offices of the Borough Engineer and bills of quantity obtained on production of the Borough Treasurer's receipt for £1 ts. for each work. Tenders, endorsed "Portswood Cookery Centre" or "Northam School Alterations," to be forwarded to J. Cruickshank, secy., Education Offices, Southampton, not later than June 16.

June 18. Woodbridge.—Erection and completion of a Masonic Hall, New Street, Woodbridge. Plans and specification can be seen at the office of H. J. Wright, architect, 4, Museum Street, Ipswich, between 10 a.m. and 4 p.m., Saturday 10 to 1, when quantities can be obtained upon the deposit of a cheque for £2 2s. Tenders, sealed and endorsed, to be delivered to George Booth, jun., Church Street, Woodbridge, not later than 5 p.m. on June 18.

June 18. Wellington.—Completion of All Saints' Church by the erection of a tower with spire. The plans and specification may be inspected in the vestry between 9 a.m. and 6 p.m. until June 16. Bills of quantities may be obtained at the office of the architect, J. Houghton Spencer, 5, Hammet Street, Taunton, and sealed tenders should be addressed to him, and endorsed "All Saints Church Building Tender," not later than Monday, June 18.

June 18. Colwyn Bay.—Erection of a new county police-station and magisterial quarters in Colwyn Bay. Builders desirous of tendering are requested to forward their names, together with a deposit of £1 ts., to the county architect and surveyor, Walter D. Wiles, 42A, High Street, Wrexham, on or before June 18.

June 18. Ynysddu.—Alterations and extensions to the school. Plans and specifications may be seen at the office of R. L. Roberts, M.S.A., Abercarn, and bills of quantities obtained on payment of £2 2s. Sealed tenders, endorsed outside "Ynysddu School Extensions," are to be delivered to C. Dauncey, County Council Offices, Newport, Mon., not later than June 18.

June 18. Colchester.—Extension of the tram car shed, Magdalen Street. Plans, specifications, bills of quantities, &c., may be obtained upon application at the office of Herbert Goodyear, A.M.I.C.E., borough engineer, Town Hall, Colchester, to whom sealed tenders, endorsed "Extension of Tram Car Shed," are to be delivered not later than June 18.

June 19. Durham.—Alterations to Springwell Council School. Plans, specifications and conditions of contract may be seen at the school and at the Architect's Office. Quantities may be obtained on application to the architect, W. Rushworth, F.R.I.B.A., architect, County Education Offices, Durham, to whom sealed and endorsed tenders are to be delivered by June 19.

June 19. Plymouth.—Erection and completion of a chapel at the New Cemetery, Egg Buckland, for the Plymouth Borough Council, in accordance with the plans, drawings and specifications, which can be seen and forms of tender and bills of quantities obtained on receipt of a deposit of £2 in cash. Sealed tenders, accompanied by the fully priced out bills of quantities, are to be deposited at the offices of James Paton, borough engineer and surveyor, Municipal Offices, Plymouth, not later than 5 p.m. on June 19.

June 20. New Fryston.—Erection of a signal cabin at Fryston South, situate near New Fryston village, midway between Castleford and Burton Salmon, for the North Eastern Railway. Plans, specification, quantities, and indenture may be seen at the office of the Company's engineer, W. J. Cudworth, at York, where detailed quantities and form of tender may be obtained on personal application. Sealed tenders marked "Tender for Signal cabin at Fryston South," to be sent to the engineer, W. J. Cudworth, at York, not later than June 20.

June 20. Sandwith.—Enlargement of Sandwith Council Schools. Plans and specifications can be seen at the schools on application to the caretaker, Mrs. Parker, Townend, Sandwith. Separate and full tenders, sealed and endorsed, to be delivered to C. C. Hodgson, Cumberland Education Committee, The Courts, Carlisle, on or before June 20.

June 20. Ramsey.—Erection of proposed new school buildings for the Governors of Ramsey Grammar School. Plans and specification can be seen at the County Surveyor's Office, 36, High Street, Huntingdon, and quantities obtained on payment of £2 2s. Tenders to be sent in to P. L. Rogers, clerk to the Governors, Ramsey, Hunts, not later than June 20.

June 20. London.—Erection of extension buildings to the new Hampstead General Hospital at Haverstock Hill. The drawings, specification, condition of contract, form of contract and form of bond can be inspected and the bills of quantities and form of tender obtained at the offices of the architects, Young & Hall, 17, Southampton Street, Bloomsbury, W.C., between 10 and 4, upon depositing the sum of £5. Tenders (which will be received and considered only on the printed form, which must not be varied) must be enclosed in the printed envelope supplied for the purpose. Priced bills of quantities, under separate cover, and sealed in the printed envelopes provided, must accompany the tender. The Committee reserve to themselves the right to open these quantities, with a view to considering any tender, and before the acceptance of same, otherwise they will be returned unopened. Both tender and priced bills of quantities are to be delivered at the hospital not later than noon on June 20.

June 20. Lochboisdale.—Mason, carpenter, slater, plumber and plasterworks for manse at Lochboisdale, South Uist. Plans and specifications can be seen with MacLennan, merchant, Lochboisdale, who will receive offers up to June 20.

June 21. Swansea.—Building a new church at Port Tennant, Swansea, for the Rev. W. Evans. The plans and specification can be seen and quantities obtained on deposit of £2 2s. at the office of E. M. Bruce Vaughan, F.R.I.B.A., 21, Dumfries Place, Cardiff, to whom tenders must be sent by June 21.

June 21. Leeds.—Proposed Secondary School, Whin gate, Armley. Contractors desirous of tendering are requested to send in their names to W. S. Braithwaite, Architect's Department, Education Offices, Leeds. The notification of a desire to tender should be accompanied by a deposit of £1 ts. Tenders, endorsed "Tender for Secondary School, Armley," are to be sent in to James Graham, secretary for Higher Education, Education Offices, Leeds, not later than 10 a.m. on June 21.

June 21. London, E.C.—New fog signal house, dwelling, &c., on Flat-holm Island, near Cardiff, for Trinity House, E.C. The plans may be inspected and forms of tender and specifications obtained either at Trinity House between 10 a.m. and 5 p.m., or on application to the Officer-in-charge, Trinity Store, Cardiff. Applicants when receiving a form of tender and specification will be required to deposit one pound (£1), on producing the receipt for which at the offices of Corderoy, Selby & Corderoy, 21, Queen Anne's Gate, London, S.W., they may obtain the Surveyor's quantities in connection with the work. Tenders, sealed and marked outside "Tender for new Fog Signal House, &c., Flat-holm," must be addressed to A. Owen, secy., and delivered at Trinity House on or before June 21, and no tender can be entertained that is not made on the forms provided.

June 21. Port Isaac.—Alterations to boys' and girls' hat and cloak rooms, at the Council School, according to plan and specification, which may be seen at the Council Schools, Port Isaac, or at the office of B. C. Andrew, architect to the committee, Biddick's Court, St. Austell. Forms upon which all tenders must be made may be had from the architect or the secretary. Sealed endorsed tenders to be sent to F. R. Pascoe, secy., Education Office, Truro, on or before June 21.

June 21. Whitcross.—Erecting a new shelter at Whitcross Council School according to the plan and specification which may be seen at the Council Schools, Whitcross, or at the office of B. C. Andrew, architect to the committee, Biddick's Court, St. Austell. Forms upon which all tenders must be made may be had from the architect or the secretary. Sealed endorsed tenders are to be sent to F. R. Pascoe, secretary, Education Office, Truro, on or before June 24.

June 21. Barry.—Building a new church at Barry for the Rev. H. H. Stewart. The plans and specification can be seen and quantities obtained at the office of E. M. Bruce Vaughan, F.R.I.B.A., 21, Dumfries Place, Cardiff. A deposit of £2 2s. must be made. The tenders are to be sent to the architect not later than June 21.

June 21. Darlington.—Erection of a manual instruction school at Corporation Road; also for large additions and alterations to the Gurney Pease Schools, Albert Hill. Plans and specification may be seen and bill of quantities and form of tender obtained at the offices of George Winter, borough surveyor and waterworks engineer, Town Hall, on depositing a cheque for £2 2s. Tenders, endorsed "Schools," must be sent to H. G. Stevenson, town clerk, Darlington, not later than noon on June 21.

June 21. Caerphilly.—Erection of forty cottages at Caerphilly, for the Castle Building Club. Plans and specification can be seen at the offices of A. O. Evans Williams & Evans, architects, Pontypridd, to whom tenders are to be sent by June 21.

June 21. Shipley.—Erection of a vicarage house for the parish of St. Paul, Shipley. Plans may be seen and bills of quantities obtained at the offices of S. H. & F. Healey, architects, 42, Tyrryl Street, Bradford, up to June 21, on which date the tenders are to be sent in.

June 21. Trealew.—Alteration and conversion of the old Trealew Schools into a school for girls and infants. Plans and specification may be seen and bills of quantities obtained at the office of the architect, Jacob Rees, Hillside Cottage, Pentre, on the deposit of £2 2s. which will be returned on receipt of a bona-fide tender. Tenders must be made out upon the form of the Council, a copy of which may be had from the Architect at the above address. Sealed tenders, endorsed "Tender for Trealew Schools," accompanied by the priced quantities, must reach T. W. Berry, Director of Education, Council Offices, Pentre, Rhondda, on or before June 21.

June 22. Salisbury.—Alterations to the operation ward at the Infirmary, the plans and specifications of which can be seen at the offices of the architects, John Harding & Son, 58, High Street, Salisbury. Tenders to be delivered to S. Buchanan Smith, secy., Crown Chambers, Salisbury, before 4 p.m. on June 22.

June 22. Holywell.—Alterations and extensions to the County Intermediate School, Holywell, in the county of Flint. Plans and specifications may be seen at the offices of the architect, Samuel Evans, North and South Wales Bank Buildings, High Street, Mold, from whom bills of quantities may be obtained on payment of a sum of £2 2s. Tenders to be made out on forms to be supplied and sent in to F. Llewellyn-Jones, solicitor, clerk to the Holywell County School Governors, Town Hall, Holywell, North Wales, on or before June 22, in sealed envelopes, marked "Tenders for Extensions at Holywell County School."

June 23. Gillingham.—Erection of a new school at Hempstead, Gillingham, to accommodate seventy-six children. Drawings, specification and conditions of contract may be seen on application to Charles H. Langley, 66, Gillingham Road, Gillingham. Bills of quantities and form of tender may be had on payment of £1 ts.

The time to be allowed for erecting the building is four months. Tenders, duly endorsed, must be delivered to E. T. Atchison, secty., 8, Waterloo Road, Gillingham, Kent, before noon on June 23.

June 23. Shrewsbury.—Erection of wooden buildings, stages, &c., for the Shropshire Horticultural Society's annual show in August. Plans and specification will be supplied on application to Walter Richards, Swan Hill, Shrewsbury, on payment of £1 1s. The work will be divided as follows:—(1) Buildings and boardings; (2) horse track, stages and fittings; (3) draining; (4) plumbing. Tenders will be received for any or all sections, and must be sent in by June 23 next, addressed "Chairman of Committee," endorsed "Tender for Erections," to the care of Adnitt & Nanton, hon. secs., The Square, Shrewsbury.

June 25. Barnsley.—Erection of three elementary schools, to accommodate 360, 300 and 360 scholars respectively, on a site in Racecourse Road, Barnsley. Applications, together with a deposit of £2 2s., to be made to the architect, Ernest W. Dyson, 14, Market Hill, Barnsley, not later than June 25. Fair wages clause.

June 25. Sevenoaks.—Erection of an isolation hospital at Otford, Sevenoaks, Kent, for the R.D.C. The drawings, specifications, and conditions of contract, prepared by the architect, M. Maberly Smith, can be seen at the offices of Cleed & Belcher, of 8 and 9, Martin's Lane, Cannon Street, E.C., to whom intending competitors are requested to send in their names before June 15, and from whom bills of quantities, together with forms of tender, can be obtained on and after June 20, on payment of £2. Tenders are to be delivered before noon on June 25, at the office of George F. Carnell, clerk, 130, High Street, Sevenoaks.

June 26. Stanleytown.—Erection of three houses and vestry at Stanleytown, Rhondda Valley, for the Trustees of the Welsh Calvinistic Methodist Chapel, Pontygaith. Plans and specification may be seen with William Williams, grocer, Cash Stores, Pontygaith, to whom sealed and endorsed tenders are to be delivered before 5 p.m. on June 26.

June 26. Wrexham.—Erection of a new post-office at Wrexham. Drawings, specification, and a copy of the conditions and form of contract may be seen on application to the postmaster between 10 a.m. and 5 p.m. Bills of quantities and forms of tender may be obtained at the Office of Works, on payment of £1 1s. Tenders must be delivered before noon on June 26, addressed to the Secretary, H.M. Office of Works, &c., Storey's Gate, London, S.W., and endorsed "Tender for New Post Office, Wrexham."

June 26. London, S.W.—Erecting a public elementary school to accommodate 840 children on a site in Fountain Road, Tooting, S.W., for the London County Council. Persons desiring to submit tenders may inspect the drawings, form of tender, and obtain the bills of quantities, of form of tender, and other particulars at the Education Offices (Architect's Department), Victoria Embankment, W.C., upon payment to the cashier of the sum of £5. Tenders must be upon the official forms, and the printed instructions contained therein must be strictly complied with. Fair wages clause. Each tender must be enclosed in the envelope provided, and delivered at the Education Offices (Room 119), Victoria Embankment, W.C., not later than 11 a.m. on June 26, after which hour no tender will be received.

June 26. Wakefield.—Erection of the second portion of the Main Institution of the Storries Hall Asylum, for the West Riding C.C. Plans may be seen, and bills of quantities obtained on application to the offices of the county architect until June 16. A deposit of £3 3s. is required. Cheques, &c., to be made payable to, and forwarded to the West Riding Treasurer, County Hall, Wakefield. Sealed tenders, properly endorsed, to be delivered at the offices of J. Vickers-Edwards, county architect, County Hall, Wakefield, not later than 9 a.m. on June 26.

June 26. Edgeworth.—Erection of a new public elementary school at Hob Lane, Edgeworth, near Bolton. The plans may be seen and bills of quantities obtained at the office of the county architect, Henry Littler, 16, Ribblesdale Place, Preston, by payment of a deposit of £2. Tenders must be delivered before noon on June 26, sealed and endorsed, to J. B. Goulburn, Turton U.D.C. Offices, Bromley Cross, near Bolton.

June 26. Leyton.—Pulling down of Knotts Green House, Leyton, E., and clearing the site, for the U.D.C. Specification, conditions and form of tender for the above may be obtained on written application on or before June 20 to William Jacques, A.R.I.B.A., of 2, Fen Court, Fenchurch Street, E.C. Sealed tenders (in special endorsed envelopes supplied with the forms) must be delivered at the meeting of the Council to be held on June 26 at 7 p.m.

June 27. Port Talbot.—Erection of thirty-five houses at Port Talbot. Plans and specifications may be seen at the offices of R. O. Clarke, C.E., Station Street, Port Talbot. Sealed tenders are to be addressed to Chairman of the Port Talbot Building Club, Grand Hotel, Port Talbot, not later than June 27.

June 28. Seaford.—Stabling, riding-school and house, for the Seaford West Co., Ltd., at Seaford. Names to be sent in at once to W. Lambe, Estate Office, Claremont Road, Seaford, Sussex, from whom quantities and other particulars can be obtained in due course on deposit of £3 3s., which will be returned on receipt of a bona-fide tender. All tenders to be sent sealed to the Estate Office by noon on June 28.

June 29. Shrewsbury.—Additions at Highley Council School. Plans and specifications may be seen, and bills of quantities and forms of tender obtained, at the offices of Gething & Son, architects, Oxford Chambers, Kidderminster, on payment of £1 1s. Tenders, sealed and endorsed "Highley Council School," should be delivered to H. E. Wale, secty., 11, College Hill, Shrewsbury, not later than noon on June 29.

June 30. Barmouth.—Erection of a new police-station at Barmouth. Plans, specifications and further particulars may be obtained from E. Vaughton, C.E.,

tounty surveyor, Arthog, Dolgelly. Sealed and endorsed tenders are to be sent to the Office of the Chief Constable, Dolgelly, on or before June 30.

No date. Menston.—Extension of the Sunday schools S. John's Church, Menston. Persons willing to tender are requested to send in their names to Milnes & France, architects, 99, Swan Arcade, Bradford, and bills of quantities will be forwarded to them when ready.

No date. Horbury Junction.—Erection of thirty-eight houses and shop at Horbury Junction, near Wakefield. For particulars apply to Garside & Pennington, architects and surveyors, Pontefract and Castleford.

No date. Inverness.—Mason, carpenter, plumber and painter and glazier works of proposed garage at the Palace Hotel, Inverness. Contractors desirous of tendering are requested to lodge their names with Cameron & Burnett, architects and ordained surveyors, Academy Buildings, from whom schedules of quantities and all other particulars are to be obtained.

No date. Longton.—Erection of new classrooms and other alterations and additions to Heathcote Road Wesleyan Mission, Longton. Builders desirous of tendering will please forward their names to William Wood, architect and surveyor, Longton.

No date. Preston.—Rebuilding of the vicarage, Woodplumpton, Preston. The Building Committee invite tenders for the above work. For particulars and bills of quantities apply to the architect, F. Mallott, Lambert Road, Ribblesdale, Preston.

No date. Grimsby.—Additions to the Fisherlads Institute, Orwell Street. Plans and specifications may be seen at the offices of the architect, J. J. Cresswell, 77, Victoria Street, Grimsby.

No date. Camborne.—Erection and completion of eight or nine four-roomed houses and enclosures at Dolcoath Road, Camborne, for J. T. Richards, East Hill, Tuckingmill. Plans and specifications may be seen (by appointment) on applying to above.

No date. Mosterton.—Building a cottage at Wes Farm, Mosterton, for Joseph S. Hull. For particulars apply to F. T. Maltby, A.M.I.C.E., architect and surveyor, Dorchester.

ENGINEERING.

June 14. Porth.—Erection of a retort-house and an installation of three tubular regenerators and settings at the Porth Gasworks, for the Rhondda U.D.C. The drawings and specifications may be seen and forms of tender supplied upon application to Octavius Thomas, engineer and manager, Gas and Water Offices, Pentre, Glam., upon depositing the sum of £2 2s. Fair wages clause. Tenders to be addressed to the Chairman of the Gas and Water Committee, endorsed "Contract No. 36," and delivered at the office of Walter P. Nicholas, clerk, Council Offices, Pentre, Glam., on or before 10 a.m. on June 14.

June 14. Ware.—Supply of a drying closet, with heating-stove and six drying horses; one hand-power 40-50 shirt-washing machine; and one 26in. hydro-extractor. Full particulars can be obtained on application to the Master, Ware Union Workhouse, Ware. Sealed tenders, marked "Tender for Laundry," to reach G. H. Gisby, clerk to the Guardians, Town Hall, Ware, on or before June 14.

June 15. Manchester.—Goods hoist with direct hydraulic ram, to lift 30 cwt. at the Gas Meter Depot, Whitworth Street West. Drawing may be seen and specification obtained at the office of the City Architect, Town Hall. Sealed tenders enclosed in the official envelope, to be delivered at the above office not later than 9 a.m. on June 15.

June 15. Southampton.—Reconstructing part of the Town Quay (contract No. 2). Drawings, specification and conditions may be seen on application to E. Cooper-Poole, A.M.I.C.E., engineer to the Board, Town Quay, Southampton, between 10 a.m. and 1 p.m. Bills of quantities and form of tender may be obtained upon payment of a deposit of £5. Tenders (which must be on the printed form supplied), sealed and endorsed "Tender for the Reconstruction of Town Quay (contract No. 2)," and accompanied by the priced bills of quantities in separate sealed packet, must be delivered to J. E. Pailthorpe, clerk to the Harbour Board, Town Quay, Southampton, not later than noon on June 15.

June 16. Tunstall.—Overhauling the heating apparatus at the Victoria Institute (including free library and museum), and keeping the same in repair for one year from the 1st August next. The apparatus can be inspected on application to the caretaker. Tenders, properly endorsed, to be sent to Arthur P. Llewellyn, secty., Education Committee, Tunstall, on or before June 16.

June 18. Pontypridd.—Extension of generating station, station engine-house, foundations for new sets, and all contingent works, for the U.D.C. Plans may be seen and specification and form of tender obtained on application at the office of the engineer and surveyor, P. R. A. Willoughby, A.M.I.C.E., upon receipt by the Clerk of a deposit of £1 1s. Tenders, on the prescribed forms, sealed and endorsed "Engine-house Extension," must be received by Colenso Jones, clerk to the Council, District Council Offices, Pontypridd, on or before June 18.

June 18. Stoke-upon-Trent.—Supply and delivery of various piping. Specification and form of tender may be obtained from the Electricity Works, Stoke-upon-Trent, on payment of a deposit of £2 2s. Tenders to be sent in, addressed "The Electricity Committee, Stoke-upon-Trent," not later than June 18, endorsed "Tender for Piping."

June 19. Ashford.—Reconstruction of Willesborough Bridge. Firms desirous of tendering can see the plan and specification and obtain bills of quantities and tender forms between 10 a.m. and 5 p.m. on deposit of £2. Sealed tenders, endorsed "Willesborough Bridge," are to be delivered to Frederick W. Ruck, county architect, Maidstone, signed, not later than 5 p.m. on June 19. Tenders not on the form provided will not be considered.

June 20. Middleton.—Extensions and improvements to the existing water-supply of the urban district, including the construction of a town reservoir. The plans and specifications can be seen during office hours at the Town Clerk's Office. The contractor will be required to accompany his tender with the names of two sureties, who will enter into a bond for £700 for the due, complete and satisfactory performance of his contract. Tenders will be received by Jerome J. Ronayne, town clerk, Middleton, not later than 11 a.m. on June 20.

June 25. Stonehouse.—Supply of a cooking range for the Stonehouse Workhouse, for about 120 inmates, including two steam jacketed boiling pans, large single steaming chamber, and one vertical steam boiler, the latter to heat coil in tanks for baths. Sealed tenders, with plans and specifications duly endorsed, to reach R. Robinson Rodd, clerk to the Guardians, 52, Union Street, East Stonehouse, Devon, not later than noon on June 25.

June 25. Dundalk.—Extension of waterworks, for the U.D.C. Providing and laying of about 2½ miles of 10in. diameter cast-iron water main, together with the providing and laying of hatch boxes on the new and existing mains, the building of a meter chamber and hatch box chambers, with drainage therefrom, and all other works shown or described on the plans, sections and specification prepared by Maurice Sellars, C.E., town surveyor, which can be seen at his office, Town Hall, Dundalk, during office hours, and from whom forms of tender can be obtained on the deposit of £3. Sealed tenders, endorsed "Extension of Waterworks," giving the names and addresses of two solvent sureties willing to join in a bond of £500 for the due performance of the contract (the cost of such bond must be paid by the contractor), to be lodged at the office of Mathew Camerford, town clerk, Town Hall, Dundalk, not later than noon on June 25, after which no tender will be received or considered.

June 25. Epsom.—Construction of an engine-house, suction gas-house, valve-chamber engine and pump foundations, and various other necessary works, for the U.D.C., at the Waterworks, East Street, Epsom. The work to be carried out to the specification and to the satisfaction of W. Vaux Graham, M.I.C.E., 5, Queen Anne's Gate, Westminster, where drawings may be seen and copies of the specification and bills of quantities obtained on payment of £5 5s. Sealed tenders upon the form provided, endorsed "Tender for New Engine-house, &c.," must be forwarded to E. G. Wilson, clerk to the Council, Church Street, Epsom, not later than the first post on June 25.

June 26. Mynyddislwyn.—Works of construction as follows:—No. 1: The construction of a bridge and culvert, together with embankment, ballasting, metalling and fencing, &c., at the boundary of the districts near Wattsville, for the Mynyddislwyn and Risca U.D.C. No. 2: The construction of a road 36ft. wide from a point near Wattsville to Messrs. Burney, Brown & Co.'s Colliery, for the Mynyddislwyn U.C. Plans and specifications may be seen and bills of quantities and forms of tender obtained from Harold Seymour, engineer, at his offices at Pontillanfraith, between 10 and 4, or by appointment and on the deposit of the sum of £2 2s. Tenders must include both of the above works, but separate prices must be given for each. The person or persons whose tender is accepted will be required to enter into a contract to be prepared on behalf of the Councils, together with bond with approved sureties for £500 in respect of each of the said works. Fair wages clause. Tenders, marked "Tenders for Bridge and Road," must be sealed and delivered to T. S. Edwards, 24, Stow Hill, Newport, Mon., on or before June 26.

June 26. London, W.C.—Construction of covered reservoirs and other works at Fortis Green, Hornsey, for the Metropolitan Water Board. Forms of tender and contract, with specification and bills of quantities, may be obtained and the drawings inspected on application to the Engineer at The Firs, Southern Road, Fortis Green, East Finchley, N., on production of an official receipt for the sum of £5, which sum must first be deposited with the Comptroller at the Board's Central Offices, at Savoy Court, Strand, W.C. Such payments and applications must be made between the hours of 10 and 4 (except on Saturdays). Tenders, enclosed in sealed envelopes, addressed to "The Clerk of the Board," Metropolitan Water Board, Savoy Court, Strand, W.C., and endorsed "Tender for Reservoirs, Fortis Green," must be delivered at the Offices of the Board not later than 10 a.m. on June 26.

June 27. London, W.—Two triple-expansion steam pumping engines for the Hammersmith Pumping Station of the Western District, for the Metropolitan Water Board. Forms of tender and contract, with specification, may be obtained on application to the District Engineer, Standish Road, Hammersmith, W., on production of an official receipt for the sum of £5, which sum must first be deposited with the Comptroller at the Board's Central Offices, Savoy Court, Strand, W.C. Such payments and applications must be made between the hours of 10 and 4 (except on Saturdays). Tenders, enclosed in sealed envelopes, addressed to the Clerk of the Board, Metropolitan Water Board, Savoy Court, Strand, W.C., and endorsed "Tender for Pumping Engines, Western District," must be delivered at the Offices of the Board not later than 10 a.m. on June 27.

June 28. Beverley.—Supply and delivery of a Cornish boiler, 20ft. long by 5ft. 6ins. in diameter, at the Gasworks. The drawings may be seen and copies of the specification and full particulars obtained on application to F. W. Oldfield, engineer, Gas Offices, Hull Road, Beverley. Sealed tenders, endorsed "Tender for Boiler," must be delivered at the Town Clerk's Office not later than 10 a.m. on June 28.

July 1. Groningen (Holland).—Construction of a gasholder (including foundation) of a diameter of about 42 metres and a capacity of about 30,000 cubic metres. Drawings, &c., price 2/50 fl. (gs. 2d.), obtainable from Directeur van het Gasbedrijf, Groningen. Tenders to be sent in by July 1.

July 14. Madrid.—Erection of a cement or "biton" bridge over the Ebro River at Saragossa. For particulars apply to Direccion General de Obras Publicas, Madrid. Tenders to be sent in by July 14.

(Continued on p. xiv.)

Current Market Prices

Trade and Craft.

FORAGE.

		£	s.	d.	£	s.	d.
Beans	per qr.	1	15	0	1	16	0
Clover, best ...	per load	4	0	0	4	7	0
Hay, good	do.	3	12	6	3	17	6
Sainfoin mixture ...	do.	3	10	0	4	0	0
Straw	do.	1	8	0	1	14	0

MISCELLANEOUS.

Bricks Stocks, d/d to job	per 1,000	1	14	0	—	—	—
Do. Flettons on rail ...	do.	1	4	0	—	—	—
Do. Pressed Wire Cuts, d/d to job	do.	1	16	0	—	—	—
Do. Blue brindled wire cuts ...	do.	1	1	0	—	—	—
Do. do. wire cuts ...	do.	1	5	0	—	—	—
Do. do. pressed facings ...	do.	1	17	6	—	—	—
Coke Breeze, into carts at gasworks ...	per load	0	2	0	—	—	—
Do. d/d to job ...	do.	0	4	0	—	—	—
Sand	per yard	0	7	6	—	—	—
Ballast	do.	0	6	6	—	—	—
Granite Chippings ...	do.	0	10	6	—	—	—
Do. do. ½ in. ...	do.	0	11	6	—	—	—
Cement	per ton	1	11	6	—	—	—
Lime	do.	1	4	0	—	—	—
Castor Oil, French ...	per cwt.	1	1	10	1	2	0
Colza Oil, English ...	per gal.	1	5	9	—	—	—
Copperas	per ton	2	0	0	—	—	—
Lard Oil	per cwt.	2	15	0	2	17	0
Lead, white, ground, carbonate ...	per ton	16	0	0	—	—	—
Do. red	do.	15	0	0	0	19	0
Linseed Oil, barrels ...	per cwt.	1	1	3	—	—	—
Petroleum, American ...	per gal.	0	0	6½	0	0	6½
Do. Russian	do.	0	0	5½	0	0	6
Pitch	per barrel	0	8	0	—	—	—
Shellac, orange	per cwt.	9	10	0	—	—	—
Soda, crystals	per ton	3	2	6	3	5	0
Tallow, Town	per cwt.	1	7	6	1	8	3
Tar, Stockholm	per barrel	1	5	0	—	—	—
Turpentine	per cwt.	2	9	0	—	—	—

METALS.

Standard Copper ...	per ton	85	15	0	86	0	0
Do. Strong sheets ...	do.	99	0	0	99	10	0
Lead, Soft Foreign ...	do.	17	5	0	17	10	0
Do. English	do.	17	10	0	17	15	0
Do. pipes	do.	20	5	0	20	10	0
Do. sheets	do.	19	15	0	20	0	0
Galvanised Corrugated sheets	do.	12	10	0	12	12	6
Spelter G.M.	do.	27	10	0	27	15	0
Angles, Scotland ...	do.	6	15	0	7	0	0
Bars, do.	do.	7	15	0	8	0	0
Marked bars, Staffs ...	do.	9	0	0	—	—	—
Common bars do. ...	do.	6	15	0	7	17	6
Angles, M'boro.	do.	6	10	0	6	12	6
Joists do.	do.	6	5	0	6	7	6
Angles, Midlands ...	do.	6	10	0	6	15	0
Joists do.	do.	7	0	0	7	5	0
Girder plates, Midlands ...	do.	7	10	0	7	12	6
Angles, Foreign, c.i.f. Thames ...	do.	6	10	0	6	12	6
Tees do. do. do. ...	do.	6	12	6	6	15	0
Joists do. do. do. ...	do.	6	2	6	6	5	0
Channels do. do. do. ...	do.	6	5	0	6	7	6
Plates do. do. do. ...	do.	7	2	6	7	5	0
Tin, Foreign	do.	182	0	0	182	10	0
Do. English ingots ...	do.	182	10	0	183	0	0
Zinc, sheets, Silesian ...	do.	30	10	0	31	0	0
Do. do. Vielle Montaigne	do.	30	0	0	—	—	—

TIMBER.

Soft Woods.

Fir, Dantzic and Memel	per load	2	10	0	5	0	0
Pine, Quebec, Yellow ...	do.	4	0	0	7	0	0
Do. Pitch, American ...	do.	2	16	0	5	0	0
Laths, log, Dantzic ...	per cu. fath.	4	0	0	6	0	0
Deals, Tornea, Yellow, 1st & 2nd, 4x9	per std.	10	10	0	—	—	—
Do. Nederkalix, Yellow, 1st, 3x7	do.	10	0	0	—	—	—
Do. do. 2nd, 4x7	do.	9	0	0	—	—	—
Do. do. 2nd, 2½x9	do.	9	10	0	—	—	—
Do. Ljusne, Yellow, 4th, 3x11	do.	9	5	0	—	—	—
Do. Galatz, White, 2nd, 3x11	do.	9	15	0	—	—	—
Do. Mesane, Yellow, 4th, 3x8	do.	9	15	0	—	—	—
Do. Söderham, Yellow, 5th, 3x9	do.	10	5	0	—	—	—
Do. Quebec, Bright Pine, 1st, 3x9 & 10	do.	23	15	0	—	—	—
Do. do. 1st, 3x8	do.	21	10	0	—	—	—
Do. do. 1st, 3x7 & 8	do.	22	5	0	—	—	—
Do. do. Spruce, Unsorted, 3x9	do.	9	5	0	—	—	—
Do. Archangel, White, 1st, 3x9	do.	11	15	0	12	0	0

HARD WOODS.

Ash, Quebec	per load	4	2	6	7	5	0
Birch, New Brunswick ...	do.	2	10	0	5	0	0
Do. Quebec	do.	3	0	0	5	5	0
Box, Turkey	per ton	0	0	0	20	0	0
Cedar, Cuba	per ft. sup.	0	0	4½	0	0	5½
Do. Honduras	do.	0	0	5½	—	—	—
Do. Tobasco	do.	0	0	5½	—	—	—
Do. Brazilian	do.	0	0	4½	—	—	—
Elm, Quebec	per load	4	2	6	0	0	0
Jarrah, plank	per ft. cu.	0	2	6	0	3	0
Mahogany, Average Price for Cargo, Honduras ...	per ft. sup.	0	0	5	—	—	—
Do. Tobasco	do.	0	0	4	0	0	5½
Do. Cuba	do.	0	0	4	0	0	5
Do. African	do.	0	0	3½	—	—	—
Do. Lagos	do.	0	0	3	0	0	5

Wooden Sun Blinds.

Our attention has been called to the Baumann blind, the use of which has rapidly spread in Switzerland, France and Italy. It has been recently introduced in this country, as a matter of fact at the request of persons who had seen it abroad. The construction of this blind or shutter has been extended to roller shutters, screens, roller fronts to wardrobes, desks, cupboards, &c. Its appearance is superior to the linen blind, and it is far more serviceable, being perfectly rigid when down, yet so flexible that it rolls up into a very small space. Its durability, too, is proved by the fact that these blinds have been in use for over ten years and are still in good working order. The maker, Mr. W. Baumann, whose London address is at 69, Finsbury Pavement E.C., states that the blind costs little more in first cost than linen blinds. The construction of the blind is shown by the illustrations herewith. It will be seen that the Baumann blind is made of wooden laths cut obliquely and fastened to galvanized steel bands. The sides of the blind run in slots, which give rigidity when the blind is down. The laths vary from ½ in. in thickness, and are either placed close together or at intervals, as shown in Fig. 1, when the penetration of light and air is desired. The blinds are easily handled and, being well balanced, will remain at any height they are placed at. The bottom can be thrown forward by a projecting apparatus, as shown in Fig. 2. As a blind over 6ft. in

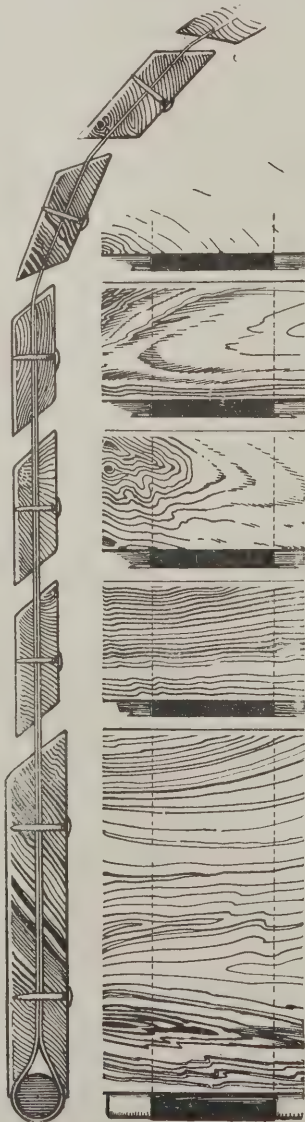


FIG. 1.—ACTUAL SIZE OF BAUMANN BLIND.

length can be rolled into a space of about 6ins. by 6ins., it can be fixed without difficulty between the reveals of most existing windows. It can, however, if required be fixed outside the window. In new buildings it would obviously be preferable to fix the roller behind a groove so as neither to obstruct the light nor be visible when rolled up.

An Innovation in Ironmongery Catalogues.

It is a constant source of annoyance that the ordinary catalogues of such goods as ironmongery and builders' hardware do not contain sufficient data regarding the sizes of the articles illustrated to be of real service in the preparation of working drawings and in the manufacture of parts of construction. Without exact sizes these cannot be completely finished where there are opportunities for economy of labour and time. It becomes necessary to fit goods on the job. One of the items on which a good deal of time is always wasted is in the fitting of locks to doors after manufacture, and perhaps fixing. In repair works the same applies also. The reason is that it is difficult to ascertain the exact size of locks, and so these goods are purchased haphazard and the woodwork cut about for them. Indeed, if mortices have been left, they generally have either to be enlarged to take the locks or the spaces are too large to begin with. We are glad therefore to see that Messrs. Carter & Aynsley, Ltd., of 54, Bishopsgate Street, E.C., are endeavouring to overcome this fruitful cause of delay and annoyance by publishing a catalogue which contains complete information about the sizes of locks. Their catalogue contains full-size photographic reproductions of a large number and wide variety of locks, together with keys and other details. It is therefore easy to obtain the exact dimensions of any lock, thus enabling the door to be prepared in the workshop to receive the lock exactly, while in the case of substituting new locks in place of old ones on existing doors this catalogue makes it possible to order a lock to fit the particular position, thus saving in the cost of repairs.

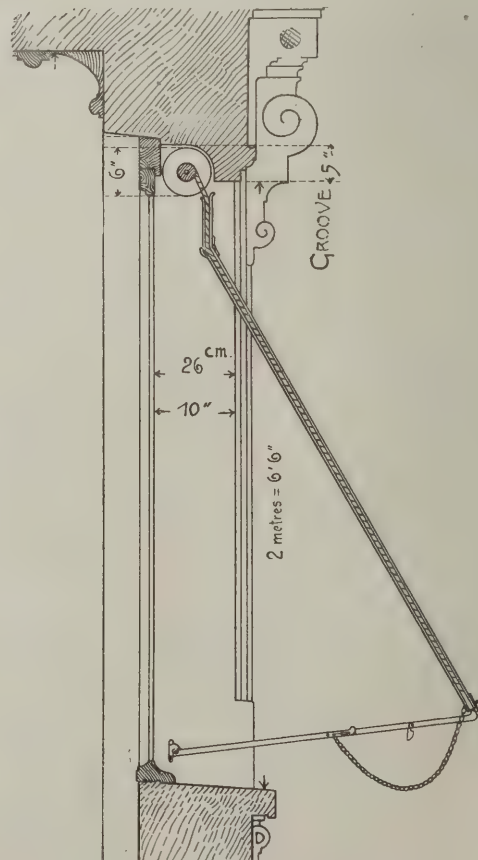


FIG. 2. BAUMANN BLIND CONCEALED IN GROOVE.

Tenders.

Addressed postcards on which lists of tenders may be stated will be sent post free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Fetter Lane, E.C.

Information from accredited sources should be sent to 'The Editor' at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Aberdeen.—For various works at Garthdee, Aberdeen, for Richards, Ltd. Messrs. Wilsons & Walker, architects, 18A, Union Street, Aberdeen. Quantities by architects:—

Mason—L. Smith	£6,173	0	0
Carpenter—G. Jamieson	2,165	0	0
Slater—Merson & Stewart	1,398	0	0
Iron—G. Thomson	498	10	0
Plumber—Thom & Strachan	448	18	0
Plasterer—J. Scott & Son	81	0	0
Painter—Gordon & Watt	64	17	0
Causeway—McAdam & Co.	188	3	6

[All of Aberdeen.]

Boston.—For the erection of a new post-office at Boston, for H.M. Office of Works, &c.:—

A.	B.	C.			
Bowman & Sons	£9,285	£9,840	£102	0	0
J. Lucas, Peterborough	8,865	8,702	33	0	0
H. Herbert & Sons	7,947	7,857	65	10	0
J. Lucas, Boston	7,843	8,037	130	0	0
J. Cracknell	7,860	7,719	190	0	0
J. G. Holmes & Sons	7,716	—	—	—	—
S. Sherwin & Son	7,496	7,683	150	0	0
E. Brown & Son	7,136	6,948	43	10	0
W. Greenfield	7,271	7,168	202	0	0
G. H. Vickers	5,993	6,123	—	—	—
H. W. Parker & Son*	5,880	6,098	—	—	—

A.—Portland stone. B.—Darley Dale stone. C.—Credit.

Brentford.—For remodelling the Rothschild Council School, for the Middlesex County Council. Mr. H. G. Crothall, architect:—

F. Smith	£1,520
D. D. Heath	1,510
E. Plaistowe	1,490
Wisdom Brothers	1,470
W. Lacey	1,426
J. Dorey & Co.*	1,330

* Recommended for acceptance.

Dundee.—Recommended for acceptance for the erection of a new Board school. Mr. J. H. Langlands, architect:—

Mason—W. Bennet	£7,163	0	0
Joiner—A. Bruce & Son	5,719	0	0
Plumber—A. L. Peacock & Co.	1,330	0	0
Plasterer—L. Reoch	904	0	0
Slater—W. Brand & Son	321	17	9
Painter—W. Norwell	495	0	0
Glazier—Donald & Smith	194	6	0
Heating—A. L. Peacock & Co.	1,096	0	0
Electrical installation—J. Mackenzie	567	18	9
Tiler—Field & Allan, Edinburgh	716	14	3
Granolithic work—L. Reoch	419	10	10
Smith—A. M'Call & Son	88	11	8
Blinds—Methven, Hyslop & Co.	53	12	0
Grates—Kirk & Coutts	74	0	0
Iron and steel work—Beath & Keay	2,775	0	0

Greenwich.—For the erection of additional classrooms and science rooms, cloakrooms, lavatories, gymnasium, and alterations and additions at the Roan Girls' School, Devonshire Road, Greenwich, S.E., for the Governors of the Roan School. Mr. A. Roberts, F.R.I.B.A., architect, 92, London Street, Greenwich, S.E. Quantities by Mr. Louis Jacob:—

	Heating.
Killby & Gayford	£6,356
Higgs & Hill	6,284
W. Martin	6,134
F. & T. Thorne	5,997
F. J. Gorham	6,090
Kennard Brothers	5,980
A. J. Staines	5,973
H. Groves	5,986
Holliday & Greenwood	5,949
W. Mills	5,769
Thomas & Edge	5,651
Martin, Wells & Co.	5,687
C. F. Kearley	5,659
W. Lawrence & Sons	5,644

T. D. Leng,* Czar Street, Deptford, S.E. ... £5,631 ... £670
B. E. Nightingale ... 5,586 ... 674
H. L. Holloway ... 5,576 ... 658
J. Appleby & Sons ... 5,440 ... 696
[Architect's estimate (without heating), £5,830.]

Hanworth.—For additions to the Council School, Hanworth, for the Middlesex County Council. Mr. H. G. Crothall, architect:—

E. Plaistowe	£2,449	0	0
W. Slark	2,423	17	9
Emmett	1,878	6	0
F. Smith	1,720	0	0
W. Lacey	1,718	0	0
C. H. Keen	1,592	18	6
H. Richardson*	1,250	0	0

* Recommended for acceptance.

Hertford.—For the erection of a Baptist church. Messrs. George Baines & Son, architects, 5, Clement's Inn, Strand, W.C.:—

J. Chessum & Sons	£2,787
C. North	2,758
S. Redhouse, sen.	2,699
T. Almond & Son	2,585
F. J. Coxhead	2,453
H. Norris & Son	2,452
Battley, Sons & Holness	2,447
R. Ginn & Sons	2,339
Ekins & Co., Ltd.	2,268
F. Wood & Co.,* Cardiff Grove, Luton	2,160

* Accepted, with additional estimates, making total accepted amount £2,251 10s.

Hereford.—For the erection of a villa on the Ryelands Building Estate, for Miss Parry. Messrs. Groome & Bettington, architects, Palace Chambers, Hereford:—

E. W. Wilks	£331	0	0
W. Powell	324	10	0
W. Preece*	316	0	0

* Accepted. [All of Hereford.]

London, N.—Accepted for the erection of a library at Wood Green, for the District Council:—

Lawrence & Sons, Tottenham, £7,641.

London, N.—For the extension of the infants' department and cookery and manual training centres at the Garfield Road Council schools, New Southgate, for the Middlesex County Council. Mr. H. G. Crothall, architect to the Education Committee:—

W. J. Wheeler	£3,924	14	9
W. Dudley	3,905	0	0
E. K. Wilton	3,770	0	0
Nicholls & Son	3,765	0	0
Newby Brothers	3,727	0	0
Stapleton & Son	3,719	0	0
A. Porter	3,637	0	0
W. Tout	3,634	0	0
J. Groves & Son	3,459	0	0
Treasure & Son	3,350	0	0
J. Stewart	3,240	0	0
H. Knight & Son	3,169	0	0
Mattock & Parsons	3,159	0	0
W. Lawrence & Son	3,144	0	0
Rowley Brothers*	3,056	0	0

* Recommended for acceptance.

London, N.—For the erection of a residence "Moulmain," The Grove, Church End, Finchley, for Mr. R. J. Bailey. Messrs. Bennett & Richardson, architects, 2, The Broadway, Finchley:—

Jackson	£830
C. W. Scott	800
Nicholls & Son*	697

* Accepted.

London, N.—For the erection of a residence "Westfield," Hendon Avenue, Finchley, for Mr. J. B. West. Messrs. Bennett & Richardson, architects, 2, The Broadway, Finchley. Quantities by the architects:—

W. Tout	£2,262
Nicholls & Son	2,250
Ford & Walton, Ltd.	2,235
Godson & Son	2,233
Mattock Brothers	2,193
C. W. Scott	2,166
F. Gough & Co.	2,164
Patman & Fotheringham, Ltd.	2,153
Sheffield Brothers	2,045
W. Lawrence & Son*	1,997

* Accepted.

Manchester.—For the superstructure of Section A. of the Manchester Royal Infirmary. Messrs. E. T. Hall (London) and J. Brooke (Manchester), architects:—

Holliday & Greenwood	£258,277
T. Rowbotham	256,752
Foster & Dicksee	253,620
Morrison & Co.	251,300
Mill & Sons	245,000
Brown & Son	244,480
Arnold & Son*	239,546

* Accepted.

Melncrythan.—For the erection of six houses at Melncrythan, near Neath, for Messrs. Grandfield. Mr. J. Cook Rees, architect, Neath:—

R. Pearce, Melncrythan	£1,167
Waring, Cole & Waring, Neath	1,110
W. Creighton, Neath	1,110
W. J. Card, Melncrythan	1,110

* Accepted.

Navan.—For the erection of fourteen two-storey cottages on the Kells Road, Navan, for the U.D.C. Mr. R. Barnes, town surveyor. Quantities by the town surveyor:—

C. Gogarty	£2,324	12	1
P. O'Brien	2,302	5	2
J. McGuinness	2,267	0	0
J. G. Doyle	2,175	0	0
G. P. Welsh	2,156	17	0
H. Henly	2,127	0	0
S. Worthington	2,042	0	0
L. Madden	1,905	0	0
N. Delany,* Navan	1,751	3	6
S. Henly & Sons	1,750	0	0

* Accepted.

South Norwood.—For the erection of Congregational church and schools. Messrs. George Baines & Son, architects, 5, Clement's Inn, Strand, W.C.:—

C. North,	£4,468
F. Wood & Co.	4,455
Patman & Fotheringham	4,392
Bulled & Co.	4,372
Akers & Co.	4,287
C. Brightman	4,250
W. Smith & Sons	4,248
Holt & Sons	4,200
J. Smith & Sons	4,193
Cropley Brothers	4,178
Castle & Son	4,100
G. E. Wallis & Sons, Ltd.	3,946
Battley, Sons & Holness	3,940
Walter Lawrence & Son,* Canal Works,	
Waltham Cross	3,874

* Accepted, with additional estimates, making total accepted amount £4,090 12s.

Uxbridge.—For the erection of a new secondary school and cookery and manual training centres in separate block at Uxbridge, for the Middlesex County Council. Mr. H. G. Crothall, architect:—

Treasure & Son	£7,295
D. D. Heath	7,248
J. Stewart	7,228
Fassnidge & Sons	7,166
W. J. Dickens	7,075
J. Dorey & Co.	6,985
F. G. Minter	6,970
Fairhead & Son	6,894
C. F. Kearley	6,819
Ward & Son	6,700
H. Knight & Sons	6,559
A. & B. Hanson	6,547
W. Lawrence & Son	6,544
W. J. Renshaw	6,530
Mattock & Parsons	6,249
Wisdom Brothers	6,000

* Recommended for acceptance.

West Hartlepool.—Accepted for the infirmary extension and new laundry, for the Guardians of Hartlepool Union. Mr. J. J. Wilson, architect, Tower Street, West Hartlepool. Quantities by architect:—

Laundry.	
J. A. Tweddle, South Road	£1,233
Infirmary extension.	
J. A. Tweddle, South Road	2,580

A new Public Library at Tipton has been built at a cost of £3,550. Mr. George H. Wenyon was the architect and Mr. E. Seckerson the builder.

Guaranteed
Door Springs.

Guaranteed
Gearing and
Fittings.

New Catalogue
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DOOR SPRINGS.

ROBERT ADAMS,

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THEOBALD'S ROAD,
(New Address) W.C.

FANLIGHT OPENERS & GEARING.

Metal Sashes.

Panic Bolts.

Weather Bars.

Reversible
Window

Fittings, &c.

CONTRACT LIST (continued from p. 323).

No date. Wigton.—Providing and laying about 3,760 lineal yds. of 6in. diameter cast-iron piping with valves, &c., complete according to plans, sections and specification prepared for the U.D.C. by the engineer, Joseph Graham, Bank Chambers, Bank Street, Carlisle. Plans and specification may be seen at the engineer's office and bill of quantities obtained on payment of £1 1s.

IRON AND STEEL.

June 14. Bude.—1,800 lineal yds. of 3in. cast-iron spigot and socket water-pipes of the following description:—Length of pipe 9ft., depth of socket 3ins., thickness of joint 1in. or 1½in., weight of each pipe 120 lb., for the U.D.C. All pipes to be coated with Dr. Angus Smith's solution whilst hot, both inside and out. All pipes to be tested at the works with a feet head of water of 600. Tenders to be marked "Water-pipes," and sent to R. A. Foster Melliar, clerk to the Council, Council Offices, Bude, not later than June 14.

June 19. Skipton.—Supply and delivery free of about 470 lineal yds. of unclimbable wrought-iron hurdles, 6ft. in height, with the necessary gates, &c., for the U.D.C. Specification and further particulars may be obtained (on payment of 10s. 6d.) on application to John Mallinson, surveyor to the Council, Town Hall Skipton, and sealed tenders, endorsed "Hurdles," are to be sent to him not later than June 19.

June 20. Cherbourg.—Supply of ironmongery to the marine services to the estimated value of 12,682 francs. A deposit of 634 francs is required. For particulars apply, Administration of Marine, Cherbourg. Tenders to be sent in by June 20.

PAINTING AND PLUMBING.

June 15. Bournemouth.—Painting at the Sanitary Hospital. Full particulars, forms of tender and specification can be obtained of the borough engineer, F. W. Lacey, at whose office drawings can be seen, provided that the sum of £1 1s. has been previously deposited in respect of the tender. Tenders to be sent in, in envelopes furnished for the purpose, to the town clerk, George William Bailey, before noon on June 15.

June 15. Wallsend.—Cleaning and painting of the Bunde and Carville Council Schools. Particulars and forms of specification may be had on application to George Hollings, borough surveyor, Corporation Offices, Wallsend. Sealed tenders, endorsed "Tenders for Cleaning and Painting Bunde and Carville Schools," to be received by W. V. Mulcaster, town clerk of Wallsend, 28, Sandhill, Newcastle-upon-Tyne, on or before June 15.

June 15. Canterbury.—Works of plastering, repairs, painting, and other works in connection therewith to Br Block, Male, of the Kent County Asylum, Chatham Downs, near Canterbury. The plans and specifications can be seen at the office of W. J. Jennings, architect, and copies of the bills of quantities obtained therefrom, on depositing the sum of £5 5s. Tenders to be delivered to the Asylum, addressed to the Chairman of the Committee of Visitors, not later than 10 a.m. on June 15.

June 16. Bridlington.—Painting the various buildings at the Sanatorium, in accordance with specification, which may be seen at any time during office hours at the office of the Borough Surveyor, Town Hall, Bridlington. The date of completion for this work will be July 30. Tenders, endorsed "Sanatorium Painting," to be sent to A. E. Matthewman, town clerk, Town Hall, Bridlington, not later than June 16.

June 18. Bristol.—Painting, colouring, &c., of certain schools, for the Education Committee. Specifications and conditions of contract may be obtained from Peter Addie at the City Valuer's Office, Council House, on payment of £1 1s. Each tender must be sent in a separate envelope, endorsed with the name of the school to which it refers, and must reach William Avery Adams, secy., Guildhall, Bristol, not later than noon on June 18.

June 18. Portsmouth.—Painting and cleaning certain schools, in accordance with a specification prepared by the Surveyor. Form of tender and all information may be obtained from the surveyor, A. H. Bone, at his offices, Cambridge Junction, Portsmouth. Fair wages clause. Tenders should be delivered at the Committee's Office, Town Hall, Portsmouth, not later than 10 a.m. on June 18.

June 19. London, W.—Painting and other works at the infirmary in the Harrow Road, for the Paddington Guardians. A copy of the specification and form of tender may be obtained at the offices of the architect, E. Howley Sim, Mowbray House, 14, Norfolk Street, Strand, W.C., on payment of a deposit of £1 (by cheque). Fair wages clause. Sealed tenders, endorsed "Tender for Painting the Infirmary," must be delivered at the offices of the Guardians, 313-319, Harrow Road, W., before 5 p.m. on June 19.

June 19. London.—Cleaning, re-painting, re-gilding, &c., of (1) Battersea Bridge, (2) Hammersmith Bridge, (3) Westminster Bridge, for the London County Council. Persons desiring to submit tenders for the work respecting any or all of these bridges may obtain the specifications, bills of quantities, forms of tender and other particulars on application to the chief engineer, Maurice Fitzmaurice, C.M.G., at the County Hall, Spring Gardens, S.W., upon payment to the cashier of the Council of the sum of £1 in respect of the particulars for each bridge. Full particulars may be obtained on application at the County Hall previously to the payment of the fee for the specification, &c. Tenders must be upon the official forms, and the printed instructions contained therein must be strictly complied with. Fair wages clause. Each tender is to be delivered at the County Hall in a sealed cover, addressed to the Clerk of the London County Council, Spring Gardens, S.W., and marked "Tender for Painting, &c., Battersea Bridge," "Tender for Painting, &c., Hammersmith Bridge," or "Tender for Painting, &c., Westminster Bridge," as the case may be. No tender will be received after 10 a.m. on June 19.

June 20. Belfast.—Painting at Belfast Cemetery. Specification may be seen in the City Surveyor's Office. Sealed tenders, endorsed "Painting at Cemetery," to be lodged in the Town Clerk's Office before 11 a.m. on June 20.

June 22. West Hartlepool.—Painting, &c., inside and outside of premises, Hart Road, West Hartlepool, as per specification to be obtained at the Guardians' Office. Tenders to be endorsed "Painting," and delivered to George Kilvington, Union clerk, Hart Road, West Hartlepool, not later than noon on June 22.

June 23. Edinburgh.—Painterwork at various schools. Specifications can be obtained at Mr. Carfrae's office, 3, Queen Street. Estimates, duly marked on outside, must be lodged with the Clerk of the Board on or before June 23.

June 26. Leyton.—Cleansing, painting, repairs and alterations to schools, to be executed during the summer vacation. Specifications, conditions and form of tender for the above may be obtained on written application on or before Monday, June 18th, 1906, to William Jacques, A.R.I.B.A., of 2, Fen Court, Fenchurch Street, E.C., which application must be accompanied by a deposit of £1 (cheques will not be accepted). Sealed tenders (in special endorsed envelopes supplied with the forms) must be delivered at the meeting of the Council to be held on June 26, at 7 p.m. Fair wages clause.

June 28. Ruthin.—Painting and repairs necessary to each of the following Council schools, within the Ruabon Grouped Schools District:—(1) Acrefair Council School, (2) Rhoslanerchrugog Infants' School. Specifications and particulars of the above works can be inspected at the offices of Walter D. Willes, county architect and surveyor, 42A, High Street, Wrexham, or at the respective schools on application. Sealed tenders are to be delivered to Evans & Roberts, secuties, Education Offices, Ruthin, on or before June 28, endorsed on the outside with the name of the school at which the work is tendered for.

ROADS AND CARTAGE.

June 14. Cowpen.—Making-up Newsham Road, Back Harper Street and other back streets (representing a total area of about 3,700 sq. yds.), for the U.D.C. Plans, sections and specifications may be seen and forms of tender obtained at the offices of the Surveyor, Seaforth Street, Waterloo, Blyth. Sealed tenders, endorsed "Tender for Street Work," must be delivered not later than 4 p.m. on June 14.

June 15. Kirkcaldy.—Laying granolithic throughout the burgh. Copies of the quantities and specification obtained upon application at Burgh Surveyor's Office. Tenders to be left with W. L. Macindoe, town clerk, Town Clerk's Office, Kirkcaldy, not later than June 15.

June 15. Dundee. Supply and delivery of 510 tons of whinstone causeway sets, 5in. by 7in. Offerors to state the name of the quarry from which the sets they propose to supply are taken, and price must include for delivery at any part of Dundee Harbour as may be pointed out. Sealed offers, marked "Tender for Causeway Blocks," to be lodged with John Thompson, M.I.C.E., harbour engineer, Harbour Engineer's Office, Dundee, not later than 10 a.m. on June 15.

June 16. Devonport.—Levelling, paving and completing (under section 150 of the Public Health Act, 1875) the following lanes:—Contract 94: Lane between Tamaz and Warleigh Avenues; contract 97: Lane rear of Nos. 40 to 56, Wilton Street (part of). Plans, specification and conditions may be seen and forms of tender and bills of quantities obtained at the Surveyor's office, Municipal Offices, 29, Ker Street, Devonport, on payment of £1 1s. for each set of quantities. Separate sealed tenders, addressed to John F. Burns, borough surveyor, Municipal Offices, before noon on June 16.

June 18. Plymouth.—Making-up and completing, under section 150 of the Public Health Act, 1875, the following streets and lanes:—Beckham Place; Bute Road; Pier Street Ope; Ivydale Road Lane West, No. 2; Ivydale Road Lane East, No. 2. Plans and specifications and conditions upon which forms of tender will be granted may be seen at the office of James Paton, borough engineer, Plymouth, and bills of quantities obtained. Sealed tenders must be delivered at the Municipal Offices, Plymouth, not later than 5 p.m. on June 18.

June 19. Walton-on-Thames.—Supply of 1,200 tons of 1½in. broken granite, delivered as required during the period ending March 31 next, for the U.D.C. Specification and form of tender may be obtained on application to R. Wilds, surveyor, Council Offices, Walton-on-Thames, to whom tenders, sealed and endorsed "Tender for Granite," must be delivered not later than mid-day on June 19.

June 19. Thornhill.—Supply of the following materials, for the U.D.C., for the year ending March 31, 1907:—Best hand-picked furnace slag; best hand and machine-broken furnace slag; slag chippings. To be delivered at such stations within the district of Thornhill, and in such quantities as the Council shall during the above period from time to time order. Forms of tender and specification may be obtained on application to A. Rothra, engineer and surveyor. Tenders, on the form supplied, and accompanied by a sample of each of the materials quoted for, must be delivered to the Clerk of the Council not later than 5 p.m. on June 19, 1906, marked "Tender for Slag."

June 20. Bournemouth.—Making-up Lowther Road, second portion. Full particulars, forms of tender, specification and schedule can be obtained of the borough engineer, F. W. Lacey, at whose office drawings can be seen provided that the sum of £1 1s. has been previously deposited in respect to the tender. Tenders to be sent in, in envelopes furnished for the purpose, to the Town Clerk (G. W. Bailey) before 11 a.m. on June 20.

June 20. Enfield.—Broken granite, for the U.D.C. Supply of 2,500 tons (more or less) of broken Cleve Hill dhu or best blue Guernsey granite, and 1,150 tons (more or less) of broken Leicestershire or other approved granite, to be delivered free in such quantities and at

such times prior to March 31, 1907, as may be ordered by the Council's Surveyor at the several railway stations in the district. Tenders (on forms to be obtained only of Richard Collins, the Council's surveyor at his office), endorsed "Tender for Granite," together with samples as to size and quality of the granite proposed to be supplied (no tender will be considered unless accompanied by samples), to be sent in to T. W. Scott, clerk to the Council, Public Offices, Enfield, not later than noon on June 20.

June 21. North Walsham.—350 tons of granite (broken to a 1½in. ring gauge) and 30 tons of granite chips, the whole thereof to be delivered free to either of the North Walsham Railway Stations in September or October next, for the U.D.C. Sealed tenders, endorsed "Tender for Granite," to be sent on contractor's own form, with samples, to E. J. Simpson, surveyor to the Council, North Walsham, on or before June 21.

June 22. Cleckheaton.—Supply of granite, dress, circular kerbs and sets, for the U.D.C. Forms of tender, conditions and full particulars may be had on application at the Town Hall. Sealed tenders, marked "Tender for —," addressed to John H. Linfield, clerk to the Council, Town Hall, Cleckheaton, to be delivered not later than 4 p.m. on June 22.

June 23. Nantwich.—Carting of road material and other team-work in connection with the maintenance and repair of the highways under its jurisdiction, for the year ending June 30, 1907, for the R.D.C. Contractors may tender for the whole or any of the parishes in the rural district. Forms of tender may be obtained on application at 152, Hospital Street, Nantwich, and all tenders must be made out strictly in accordance with the forms provided or they will be liable to be disqualified. Further information may be obtained from the Council's surveyors, J. R. Whittingham, Stapley, and T. J. Peake, Willaston. Tenders to be sent in, marked "Team Labour," to C. E. Speakman, clerk.

June 23. Bedwellty.—Supply and delivery of limestone broken to pass through a 2in. ring, also limestone screenings for the U.D.C., to be delivered, carriage paid, during the months of December, 1906, and January, 1907, at such rate as shall be required by the Surveyor, as follows, the quantities being more or less:—150 tons of limestone to Whiterose Station, B. & M. Railway; 50 tons of screenings, to Whiterose Station, B. & M. Railway; 150 tons of limestone, to Aberbargoed Station, B. & M. Railway; 250 tons of limestone, to Pengam Station, B. & M. Railway; 50 tons of screenings, to Pengam Station, B. & M. Railway; 350 tons of limestone, to Blackwood Station, L. & N.W. Railway; 50 tons of screenings, to Blackwood Station, L. & N.W. Railway; 100 tons of limestone, to Argoed Station, L. & N.W. Railway; 20 tons of screenings, to Argoed Station, L. & N.W. Railway. Sealed tenders, giving price per ton and endorsed "Tenders for Limestone," to be sent to T. J. Thomas, clerk, Bargoed, signed on or before June 23. Samples to be sent, carriage paid, addressed to J. H. Lewis A.M.I.C.E., Council Office, New Tredegar, via Cardiff. The contractor will have to enter into a contract and bond with two sureties for the due and faithful performance thereof, and pay the sum of £3, being the cost of preparing same, including stamp duties.

June 26. London, E.—Making-up the following streets for the West Ham Borough Council:—Group 1: Pretoria Road, Ladysmith Road, Mafeking Road. Group 2: Beekton Road, Brock Road, Chadwin Road, Chadwin Road East, Cranley Road, Denmark Street, Egham Road, Saloman's Road, Selby Road. Group 3: Durban Road, Springfield Road. Plans may be seen and specification, form of tender and further particulars obtained at the office of John G. Morley, borough engineer, Town Hall, West Ham, E., upon payment of £1. Tenders, endorsed "Tender for Private Street Works," to be sent to F. E. Hilleary, Town Hall, West Ham, E., not later than 4 p.m. on June 26. Fair wages clause.

June 26. Bromley.—Making-up the following road materials:—3 725 cub. yds. of broken stone, i.e., Guernsey granite, Leicestershire granite, Cherbourg quartzite, Penlee elvan or basalt, to be delivered free by rail at the Council's siding at the Bromley North Station (South Eastern and Chatham Railway); 250 cub. yds. of broken surface or pit flints, to be delivered free by rail at the Council's siding as above; 197 cub. yds. of broken surface or pit flints, to be delivered at Bickley Station; 625 cub. yds. of broken surface or pit flints, to be delivered on Barnet Wood Road, Brewery Road, Lower Gravel Road, Princes Plain and Jackson Road as required; 740 cub. yds. of broken surface or pit flints, to be delivered on Turpington Lane, Magpie Hall Lane and Southborough as required; 200 cub. yds. of broken surface or pit flints to be delivered in trucks, free of all charges, at Chislehurst Goods Station. Samples of each description tendered for must accompany the tender. Haulage by traction engine and trucks will not be permitted unless the vehicles are hung on proper springs. Tenders must be made on printed forms to be obtained at the office of the Borough Engineer, Municipal Offices, Bromley, and must be endorsed "Tender for Road Materials," and addressed to Frederick H. Norman, town clerk, Municipal Offices, Bromley, Kent, not later than 3 p.m. on June 26.

July 2. Bedford.—Supply of about 2,100 tons of broken granite for road-making, to be delivered at the Railway Station at Bedford, in such quantities as the Surveyor shall from time to time order during the year ending Sept. 3, 1907. Forms of tender and further particulars as to gauge, &c. can be obtained on application. Tenders, endorsed "Tender for Granite," to be sent to Hedley Baxter, town clerk, Town Hall, Bedford, on or before July 2.

July 2. Sunbury-on-Thames.—Supply and free delivery for the coming season of not less than 400 tons of Bardon Hill (Leicestershire) granite, broken to pass through a 1½in. ring, for the U.D.C.; also for the supply and delivery of not less than 500 cub. yds. of Kentish brown pit flints, delivered at Clark's Riverside Wharf, Sunbury-on-Thames. Further particulars may be obtained of Harold F. Coales, surveyor to the Council. Sealed tenders, endorsed "Granite" and "Flints" respectively, to be delivered to Charles E. Goddard, clerk, Council Offices, Sunbury-on-Thames, before 4 p.m. on July 2.

No date. Letchworth.—Roads. Firms wishing to tender for the construction of further group of roads are invited to apply, enclosing £1 rs. for specification and bill of quantities. Plans may be inspected at the Estate Office, Letchworth.

SANITARY.

June 14. Warminster.—Under-draining the sewage farm at the Marsh, Warminster, which consists of an area of about 20 acres, for the U.D.C. Plans and specifications can be seen and further particulars obtained at the Surveyor's Office, High Street, Warminster, and sealed tender, endorsed "Under-draining," must be delivered to Herbert J. Wakeman, clerk to the Council, Council Offices, Warminster, not later than noon on June 14.

June 14. Ashbourne.—Laying a length of sewer and laying and making a septic tank and filter bed and other works for the disposal of the sewage at Hartington Town Quarter. Specifications may be had on application to J. H. Wheelodon, Poor Law Offices, Compton Street, Ashbourne, and plans may be seen at such office on previous appointment. Tenders must be sent in to W. R. Holland, under cover, addressed "The Clerk, R.D.C., Ashbourne," and marked "Hartington Sewage," not later than 10 a.m. on June 14.

June 14. Aberdeen.—Constructing an outfall sewer from the Aberdeen Poorhouse, to join the existing city sewerage system in Queen's Road, near Hollybank. Plans may be seen in the office of Jenkins & Marr, 16, Bridge Street, who will supply schedules of quantities to intending offerors. Sealed tenders, endorsed "Sewer," to be lodged in proper form with C. B. Williams, inspector of poor, 20, Union Terrace, Aberdeen, on or before 4 p.m. on June 14.

June 15. Kirkcaldy.—Construction of sewers at Dunnikier and Overton Roads. The plans may be seen and quantities and specifications of the works obtained upon application at the Burgh Surveyor's Office. Tenders to be left with W. L. Macindoe, town clerk, Town Clerk's Office, Kirkcaldy, not later than June 15.

June 15. Nottingham.—Erection of a urinal, Pennyfoot Street. Plans may be seen and copies of the bill of quantities and form of tender obtained from Frank B. Lewis, city architect, Guildhall, on payment of a deposit of £1 rs. Sealed tenders, addressed to Samuel G. Johnson, town clerk, and endorsed "Tender for Urinal, Pennyfoot Street," to be delivered at his office, the Guildhall, before 10 a.m. on June 15. Fair wages clause. The lowest or any tender will not necessarily be accepted, and tenders will only be accepted from persons who conform to the conditions of contract as regards paying the local standard rate of wages and complying with the working rules of the Nottingham district.

June 18. London, N.—Construction of sewage filter beds and stormwater beds, open septic and other tanks, together with channels, culverts, pipes, valves and other

works, for the Finchley U.D.C. Drawings may be seen and copies of bills of quantities, specification, and form of tender obtained on application to the Offices of the Engineer and Surveyor, Church End, Finchley, N., on payment of £3 3s. Sealed tenders, endorsed "Sewage Purification Works," and addressed to E. H. Lister, clerk, Council Offices, Church End, Finchley, N., to be sent in by not later than noon on June 18.

June 22. Levenshulme.—Sewering, draining, paving, curbing, flagging, channelling and completing the following streets and passages in the district of the U.D.C. Carril Grove East extension, Mount Street extension, Derby Street extension, Lonsdale Road, Hawthorn Road, passages rear of Clifford Street, Church View, &c., passage rear of Roston and Mercer Streets, passage rear of Roston and Wetherall Streets, passages rear of Lonsdale and Hawthorn Roads, passage rear of 1 to 13, Cromwell Grove, and 17 to 61, Cromwell Grove. Specifications, bills of quantities, and further particulars may be obtained from the Council's surveyor, James Jephson, Guardian Chambers, Tiviot Dale, Stockport, on payment of £2 2s. Tenders, endorsed "Tender for Private Street Works," to be sealed and delivered to J. Ogden Hardicker, clerk to the Council, Northern Assurance Buildings, Albert Square, Manchester, on or before June 22.

June 25. London, S.W.—Construction of underground sanitary conveniences at Station Road, Balham. The specification, drawings, form of contract, and other particulars may be seen and form of tender and copy of bills of quantities obtained at the Surveyor's Office, No. 215, Balham High Road, S.W., between 10 and 4 (Saturdays 10 to 1), on payment of £1 rs. Fair wages clause. Tenders, sealed, and endorsed "Tender for Conveniences," are to be delivered at the Council House, Wandsworth, S.W., not later than June 25.

TIMBER.

June 18. Manchester.—Supply and delivery of timber during twelve months ending June 30, 1907. Particulars and forms of tender on application from Charles Nickson, superintendent, Gas Department, Town Hall, Manchester. Tenders to the Chairman of the Gas Committee, at the Town Hall, by 9 a.m. on June 18.

MISCELLANEOUS.

June 14. London, E.C.—Supply of the following stores, for the Great Indian Peninsula Railway:—Passenger engines and tenders; pig-iron; plate and sheet glass, &c., lorry wheels, axles, &c.; copper plates and rods; galvanized corrugated sheets; locks. Specifications and forms of tender may be obtained at the office on payment of the fee for the specification, which payment will not be returned. Tenders must be delivered in sealed envelopes, addressed to J. I. Berry, secy., Company's Offices, 48, Copthall Avenue, London, E.C., marked "Tender for Passenger Engines and Tenders," or, as the case may be, not later than 11 a.m. on June 14.

June 18. London, E.C.—Supply of the following stores, for the Powell Duffryn Steam Coal Co., Ltd.:—Bar and other iron; bolts, nuts, rivets, &c.; brass fittings; colliers' tools, &c.; ironmongery; girders, channels and rails; nails; steel; steam tubes and fittings; chains; timber, deals, &c.; French pitwood; Swedish pitwood; cement and lime; electrical fittings. Forms of tender and all particulars can be obtained on application to the Stores Manager, Aberaman Offices, near Aberdare. Tenders to be addressed to the directors of the Powell Duffryn Steam Coal Co., Ltd., 101, Leadenhall Street, London, E.C., and posted so as to be received not later than 10 a.m. on June 18.

June 18. Portsmouth.—Supplies to the various schools of sundries required for cleaning and petty repairs. Samples may be seen and form of tender obtained at the Education Committee's Offices. Tenders should be delivered at the Committee's Offices, Town Hall, Portsmouth, at or before 10 a.m. on June 18.

June 18. Chelmsford.—Supplying and fixing at their new reservoir at Long Stumps, 70 yds. of oak fencing 6ft. high, and for 200 yds. of unclimbable wrought iron fencing 4ft. 6ins. high, the specification for which can be seen at the office of the borough surveyor, Cuthbert Brown, 16, London Road, Chelmsford. Tenders, sealed and endorsed outside "Fencing for Reservoir," to be sent to Thomas Dixon, town clerk, 16, London Road, Chelmsford, not later than noon on June 18.

June 19. London.—Supply of following stores for the Secretary of State for India in Council:—150ft. deck spans, bearing plates, spikes. The conditions of contract may be obtained on application to the Director General of Stores, India Office, Whitehall, S.W., and tenders are to be delivered at that office by 2 p.m. on June 19.

June 21. Dudley.—Covering about 700 yds. of pipes at the Workhouse, with good non-conducting material, in accordance with specification to be obtained from the Workhouse master. Sealed tenders, together with sample of covering, to be sent so as to reach Gaius W. Coster, clerk to the Guardians, Union Offices, St. James' Road, Dudley, not later than 10 a.m. on June 21.

June 23. Aarhus (Denmark).—Supply of about 60 tons of bolts and 16,500 tons of cement, to be delivered in accordance with conditions, drawings, &c., which may be obtained on application at the Harbour Engineer's Office ("Havneingeniørens Kontor"), at which office tenders will be received up to 3 p.m. on June 23. A copy of the conditions (in Danish) and drawings may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall Street, E.C.

June 26. London, S.W.—Supply of the following stores for the Southern Mahratta Railway Co., Ltd.:—8,800 safety chains, 9,736 spiral and volute springs, 20 tons copper ingots, as per specifications and drawings, which may be seen at the offices of the Company. The charge for each specification is £1 rs. which will not be returned. Tenders must be marked "Tender for Safety Chains," or, as the case may be, addressed to Edward Z. Thornton, secy., 46, Queen Anne's Gate, S.W., not later than June 26.

A TRIPLE EVENT.

THE HEARTS OF OAK BENEFIT SOCIETY

Opened by H.M. the KING, MAY 26th, 1906.

KING EDWARD VII. SANATORIUM

Opened by H.M. the KING, JUNE 13th, 1906.

S.S. "LUSITANIA"

Launched at Glasgow, JUNE 8th, 1906.

ALL FITTED WITH

WAYGOOD ELECTRIC PASSENGER LIFTS

BY

R. WAYGOOD & CO., Ltd., FALMOUTH ROAD, LONDON, S.E.

Coming Events.

Thursday, June 14.

L.C.C. SCHOOL OF BUILDING, Ferndale Road, Brixton. Prof. Beresford Pite on the domes of the Invalides and the Pantheon, Paris, at 8 p.m.

Wednesday, June 16.

NORTHERN ARCHITECTURAL ASSOCIATION.—Annual Excursion to Beverley.

Monday, June 18.

L.C.C. SCHOOL OF BUILDING, Ferndale Road, Brixton.—Mr. Alan E. Munby on "Experimental Science and what it has done for the Building Trades," at 8 p.m.

Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

DURING THE WEEK ending June 8th ten failures in the building and timber trades in England and Wales were gazetted.

E. H. WALLIS & Co., builders, Fulham. Adj. May 28th. HOLME & GRAY, builders and contractors, Burbage, near Buxton. P.E., Stockport C.C., July 4th, at 10.15.

C. W. CAMPTON, plumber, Southend-on-Sea. R.O. May 28th.

G. T. WILLIAMS, builder and contractor, Wolverhampton. R.O. May 30th.

B. W. BENNETT, plumber, Lambeth. P.E., London Bankruptcy Court, July 11th, at 11.30.

J. J. R. ROBINS, builder and contractor, Farnham. R.O. May 29th.

J. KNIGHT, builder, Beeston. Liabilities £652; assets £183.

JONES & COULSON, builders and contractors, Leicester. Liabilities £499; assets £143.

T. FORGAN & SONS, joiners & contractors, Perth. Liabilities £3,032; assets £1,047.

MADLEY & PERRY, builders, Pengam. Liabilities £373; assets £36.

C. GUYAN, builder and contractor, Bristol. Deficiency £240.

F. W. REEVE, builder, Whitfield. Liabilities £399; assets £329.

EMILY MALLIN, builder, West Bromwich. Liabilities £3,167; assets £1,168.

J. SHAW, builder, Crawley. Liabilities £1,225; assets £660.

ROOFING SLATES:

Velinheli, Penrhyn, and Westmoreland

SLATE SLAB GOODS:

Both Plain and Enamelled.

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THE SAFETY LADDER GRIP.

ENSURES PERFECT SAFETY TO THE WORKMAN ON THE LADDER.

NO NECESSITY TO ENGAGE A MAN TO HOLD THE LADDER IF YOU UTILISE THIS GRIP

THE CONTRACTOR WHO HAS THIS GRIP CAN OBVIOUSLY ESTIMATE TO BETTER ADVANTAGE & RUN LESS RISKS AS REGARDS ACCIDENTS.

WILL GRIP ON ANY SURFACE CAN BE ADJUSTED TO ANY ANGLE

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CANNOT "STRIKE OUT"

BIRKBECK BANK

ESTABLISHED 1851.

Current Accounts, 2% Interest allowed on minimum monthly balances when not drawn below £100.

Deposits, 2½% Interest allowed on Deposit Accounts.

Advances made. Stocks and Shares bought and sold

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For Architects, Builders and Engineers.

TRUE TO SCALE BLACK LINE PRINTS

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W. J. TAYLOR & Co., builders, Walworth. First meeting, London Bankruptcy Court, June 6th, at 12. P.E., same, July 3rd, at 11.30.

T. & C. PANTER, builders and contractors, Pershore. First meeting, 45, Copenhagen Street, Worcester, June 8th, at 11.30. P.E., Worcester Guildhall, June 26th, at 2.

J. COOPER, plasterer, Stockton-on-Tees. First meeting, O.R.'s, Middlesbrough, June 27th, at 3. P.E., Stockton-on-Tees, June 27th, at 10.30.

C. H. DODD, builder and decorator, Halstead. First meeting, Cups Hotel, Colchester, June 18th, at 2. P.E., Law Courts, Colchester, June 18th, at 11.30.

M. REECE, plasterer and contractor, Lambeth. First meeting, London Bankruptcy Court, June 14th, at 1. P.E., same, July 27th, at 11.30.

A. W. BODY, painter and decorator, Swansea. First meeting, O.R.'s, Swansea, June 13th, at 12. P.E., Swansea Town Hall, June 22nd, at 11.30.



A COMPLETE SCHEME OF DECORATION.

This illustration shows a complete scheme of decoration carried out with Hall's Distemper. This Distemper overcomes the difficulty of obtaining a uniform tint on plain walls, and is the most easily manipulated material for stencilling friezes, dadoes, panels, etc., where the softness and delicacy of its tints are seen to great advantage.

Stencils for artistic friezes suitable for halls, drawing, dining, billiard rooms, etc., are now obtainable from the manufacturers. Decorators will find these designs, which are specially prepared for Hall's Distemper, a great aid to artistic effect.

Full particulars can be obtained from SISSONS BROTHERS & Co., Ltd., HULL. London Office: 199^a, Boro' High Street, S.E.

Hall's Sanitary Washable Distemper

THE BUILDERS' JOURNAL AND ARCHITECTURAL ENGINEER.

June 13th, 1906.

SPECIAL SUPPLEMENT:—

A Striking Example of Rapid Re-building after Fire.

RECONSTRUCTION OF A FACTORY BUILDING AT KILBOWIE, NEAR GLASGOW.

ON Thursday, March 1st, 1906, about 5 o'clock in the morning, a fire broke out in the japanning shops of the Singer Manufacturing Co., Ltd., at Kilbowie, near Glasgow. It took seven hours to extinguish it completely. About noon on Thursday a man was running from Dalmuir, an adjoining suburb. A friendly hail from a passer-by warned him that the fire was out and hurry was wasted. "I'll no' walk," gasped the runner, "for if I do McAlpine's will have rebuilt the place before I get there," which goes to show that American humour is getting grafted on to the pawky Scotch variety, and that Messrs. Robert McAlpine & Sons have a wholesale reputation in the locality for speedy work.

The prolonged wail of the siren which indicates the discovery of fire, and the black and twisted *débris* of a few hours later, were serious shocks to the workers at this great factory and to the management.

The destruction of one great department in a works so delicately organized meant complete disorganization. In such case the period of distress likely to prevail would only be limited by the speed with which the building could be reconstructed.

From the point of view of the management of the company such a position was no less serious. The pecuniary loss involved by

the reduction of output can well be imagined when it is remembered that the factory, when working at full strength, turns out the almost incredible number of 22,000 sewing machines per week.

In all, over 10,000 workers are employed in the factory, and the fire threw over 500 out of employment, but fortunately only for three days, as temporary provision was made for the workers in a building which had just been completed and not yet occupied.

The building destroyed by fire was two storeys, of about 30ft. in height, 275ft. long by 103ft. broad. It was roofed with timber trusses in three spans, covered with matchboarding and slates. The couples were supported by the outer walls and by two rows of twenty-six cast-iron columns. The windows were of wood glazed with sheet-glass, and the walls of 18in. brickwork with 4½in. buttresses. The ground floor was formed of concrete covered with cast-iron plates, and the first floor of rolled-steel joists at 3ft. 6in. centres, with 4½in. brick-arching between, haunched with concrete and covered with two layers of flooring nailed to timber joists embedded in the concrete.

The internal furnishings of the ground floor consisted of japanning drying stoves, dipping apparatus, dripping and other benches, which were undamaged by the fire but suffered from water. The first floor was equipped with a series of varnish and transfer stoves, made of timber lined with tin, and all manner of timber benches and

stools. There were also offices screened from the rest of the building by glazed wooden frames, and a network of tin flue-pipes transmitted the heated gases from the stoves to the outside air. The contents of the building included large quantities of oil, varnish and inflammable material used in the process of finishing.

The destruction of stock was considerable. There were about 51,000 sewing machines in the building, and most of them were totally destroyed. An impression of the extent of the fire may be made by referring to the photographs of Figs. 1 and 2, taken on the day of the fire (March 1st) as soon as the flames were extinguished.

With the arrival on the site of the manager of Messrs. Singer a consultation was held with the representative of Messrs. Robert McAlpine & Sons, who were immediately entrusted with the reconstruction. The first thing to be done was to have the *débris* and damaged machines removed and the injured brickwork pulled down. Men were started to work as soon as the materials were cool enough to be handled, and when there was no danger of fire breaking out again. By the afternoon over 100 men were employed, and the following day (Friday, March 2nd) room was found for fifty more. On Saturday 250 men were engaged on the work. By Monday the number was increased to 500, and work was carried on day and night.

As already stated, temporary arrangements were made in another building to carry on



FIG. 1.—THURSDAY, MARCH 1ST, 1906; NOON.

the work of the department thrown idle on the first floor. The ground floor being practically intact and only requiring the alteration of some flue-pipes, it was decided to cover the first floor with a temporary roof to prevent rain and the water from concrete and brickwork from falling on the stoves and machines on the ground floor, and so enable work to be carried on. It was also decided to do away with the cast-iron columns of the first floor and to add another storey to the height of the building. Plans for an entirely fire-resisting building were at once proceeded with. The design adopted for the temporary roofing of the first floor was what is generally known as the "Belfast" truss, as the timber could most readily be got from stock. The construction was so speedily performed that a friend from the States unwittingly inquired for information regarding the "Builtfast" roof. The breadth of the building, 100 feet, was divided into three spans, and the bearers and supports of the

lineal feet, or nearly four miles, of 6in. by 1½in. boards, and 60,000 lineal feet, or nearly twelve miles, of 3in. by 1½in. timber, while 3,400 sq. yds. of matchboarding and 3,500 sq. yds. of felt (or nearly three-quarters of an acre of each) were also used. The first load of timber arrived about 5.30 p.m. on Friday, March 2nd, and the roof was entirely finished by Tuesday, March 5th—smart work for four days.

While the temporary timber roof was being constructed the erection of three three-tower gantries about 35ft. high for steam cranes was pushed forward, and a temporary railway laid along the east side of the work in order to deal with the raising of the materials. Arrangements were also made for the erection of two subsidiary cranes for the erection of the steelwork. The contractors' crushers were kept going day and night for the crushing of the steel slag of which the concrete (termed "ferrolithic" by Messrs. McAlpine) is composed. It is very satisfactory to record that

the temporary centering for the floor erected, and the casing of "ferrolithic" concrete to the floor laid. The shuttering is well seen on photos Nos. 3 and 5. This work was carried out working from south to north. When part was finished the temporary roof was removed and timber joists laid at 18in. centres and filled in with "ferrolithic" concrete. This filling was covered with two layers of flooring, a large portion of the timber being maple in order to stand the heavy wear of traffic. When the steelwork of the second floor was finished, the erection of the steelwork of the roof was proceeded with from north to south and followed by the temporary timberwork and the permanent structural work. The roof is covered with "ferrolithic" and two layers of Seyssel asphalt, but, as will be seen from the photographs, there is a large lantern in the centre glazed with wired glass. The vertical part of the lantern is filled with windows on pivots. For the purpose of ventilation these



FIG. 2.—THURSDAY, MARCH 1ST, 1906. View of first floor of Japanning Building immediately after extinction of fire.

trusses so placed that they did not interfere with the erection of the steel columns afterwards. The tie beam, 35ft. long, was composed of 6in. by 1½in. timbers, while the bow, which had a rise of 2ft. 6ins., was of double 3in. by 1½in. timbers, and the bracing of single 3in. by 1½in. timbers, all unplanned and nailed together with 2in. and 3in. French wire nails. In all about 270 trusses were required, and they were covered with ¾in. matchboarding and felt. The drainage from the valleys was effected by means of light cast-iron pipes hung from the trusses and conveyed through the windows to the existing rainwater conductors, and along the eaves a gutter was placed as near to the wall as possible. The trusses are seen in Figs. 3 and 5.

Here are shown the trusses being removed on March 25th, when the second floor was completed and occupation was wanted. The timber used in this roof was 20,000

over 400 tons of steelwork were delivered and erected within one month. The credit of this speedy work is no doubt partly attributable to the architect, who dealt with American ways and means in his designs, and partly to the fine organization of the contractors.

The two sets of photographs following, on pages 6 and 7, record the weekly progress of the building, and are taken from two different standpoints. The method of procedure in erection may be followed by referring to them with the following explanation. As soon as the temporary roof had been erected over the first floor, the whole floor area was relaid with concrete and a start made with the building of stoves, which may be seen in photos Nos. 3 and 4. Hatchways were cut in the roof, and the columns dropped through the holes so formed and fixed to the existing columns of the ground floor. The steel joisting of the second floor] was then placed in position,

are opened by four sets of gearing. Each set operates one-half of the length of each side, or twenty-four windows with a length of about 120 feet. Despite the length of the range, the gearing works so easily that a child can operate it. The building is fitted with the necessary lavatory accommodation for men and women. The ingress and egress doors are of timber, tin-lined, and self-closing in the case of fire. At the south-west corner a fire-escape is provided for emergencies.

The architect for the work was Mr. Robert Whyte, of Glasgow, and the building reflects the greatest credit on him for his foresight in arranging details so that material could easily be obtained. His instructions were ably carried out by a splendid organization on the part of the contractors, Messrs. Robert McAlpine & Sons.

This is not the first feat of rapid construction which Messrs. McAlpine have carried

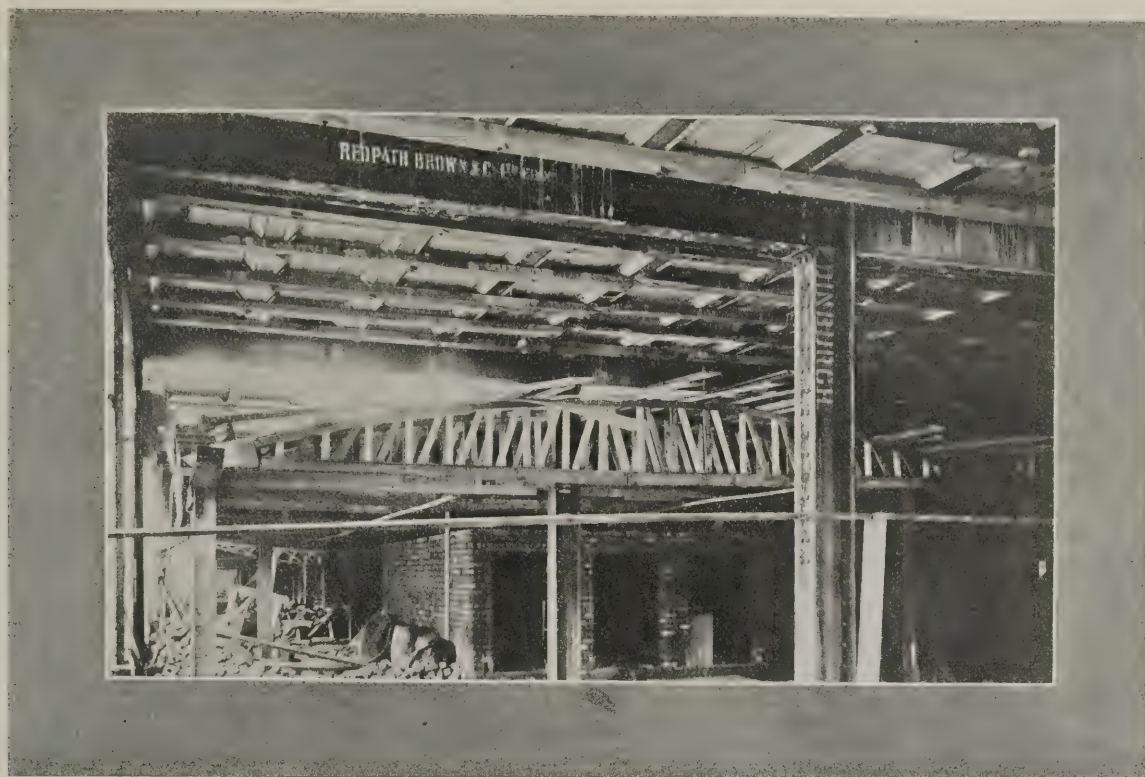


FIG. 3.—MARCH 25TH. View of interior of first floor, showing temporary Belfast timber roof, the boarding of second floor, and the new japanning stoves.

out at the Singer works. The year before last they built a huge fireproof cabinet factory in less than six months, which we illustrated in our issue for December 28th, 1904. This cabinet factory is 80ft. long by 80ft. wide and 90ft. high, in six floors.

It took 7,000 tons of ordinary concrete, 14,000 tons of "ferrolithic" concrete, 4,000 tons of steelwork, 15,000 tons of timber and 8,000,000 bricks.

With such figures, who shall say that there are not contractors in Great Britain capable

of doing as much, if not more, brilliant work that the American contractors, of whose prowess we hear so much? It is interesting to note that Messrs. Robert McAlpine & Sons have opened a London office at 25, Victoria Street, Westminster, S.W.

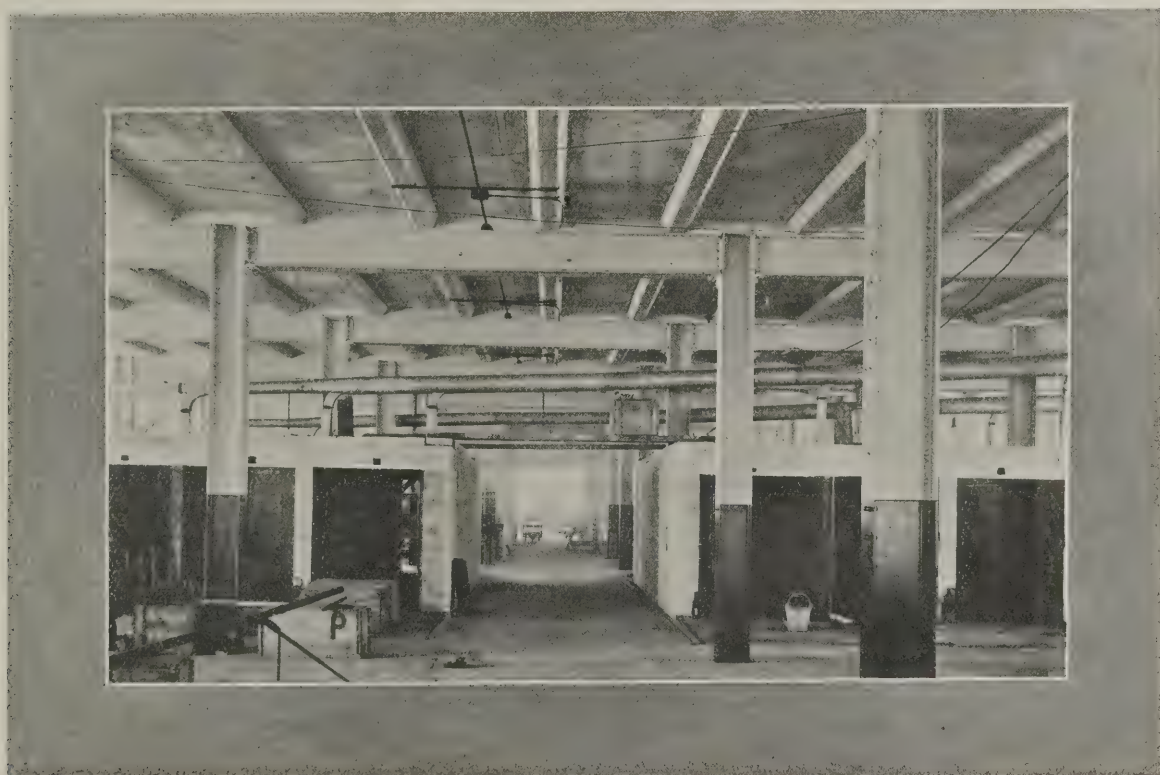


FIG. 4.—APRIL 15TH. Thirty days after fire. View of interior of first floor, showing temporary roof cleared away and all ready for factory to work full swing.



FIG. 5.—MARCH 25TH. View of interior of first floor.

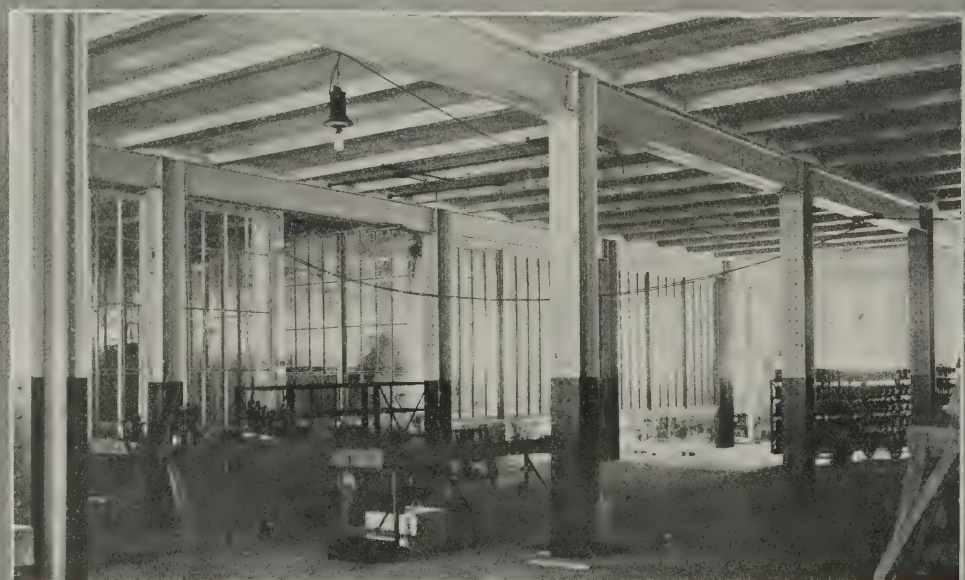


FIG. 6.—APRIL 1ST. Thirty days after fire. View of interior of first floor.

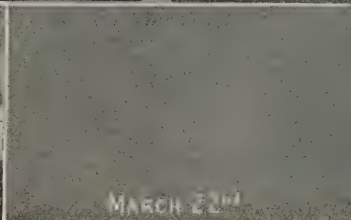


FIG. 7.—MARCH 25TH. View of second floor and roof partially built.



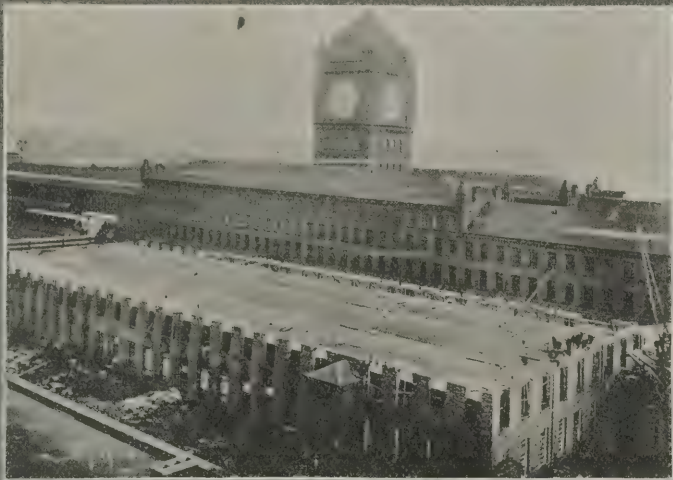
FIG. 8.—APRIL 5TH. View of second floor and roof completed and glazed.

VIEWS SHOWING
WEEKLY PROGRESS
OF THE WORK.



REBUILDING OF THE
JAPANNING SHOP OF THE
SINGER MANUFACTURING
CO., LTD., AT KILBOWIE.
NEAR GLASGOW.

MARCH 8th



VIEWS SHOWING
WEEKLY PROGRESS
OF THE WORK.

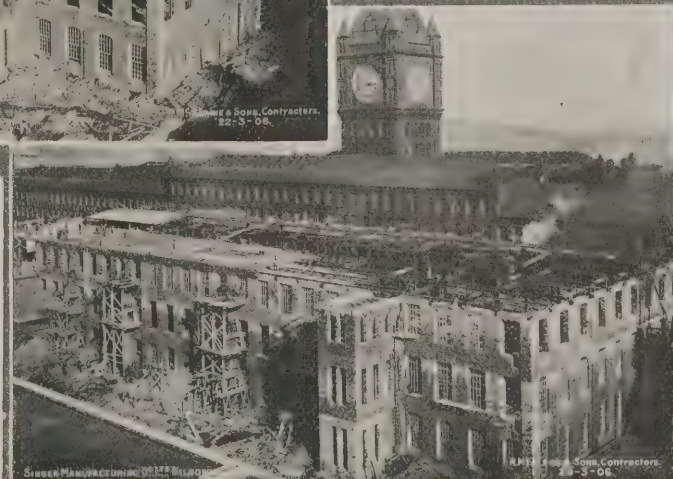
MARCH 15th



MARCH 22nd



MARCH 29th



REBUILDING OF THE
JAPANING SHOP OF THE
SINGER MANUFACTURING
CO., LTD., AT KILBOWIE,
NEAR GLASGOW.

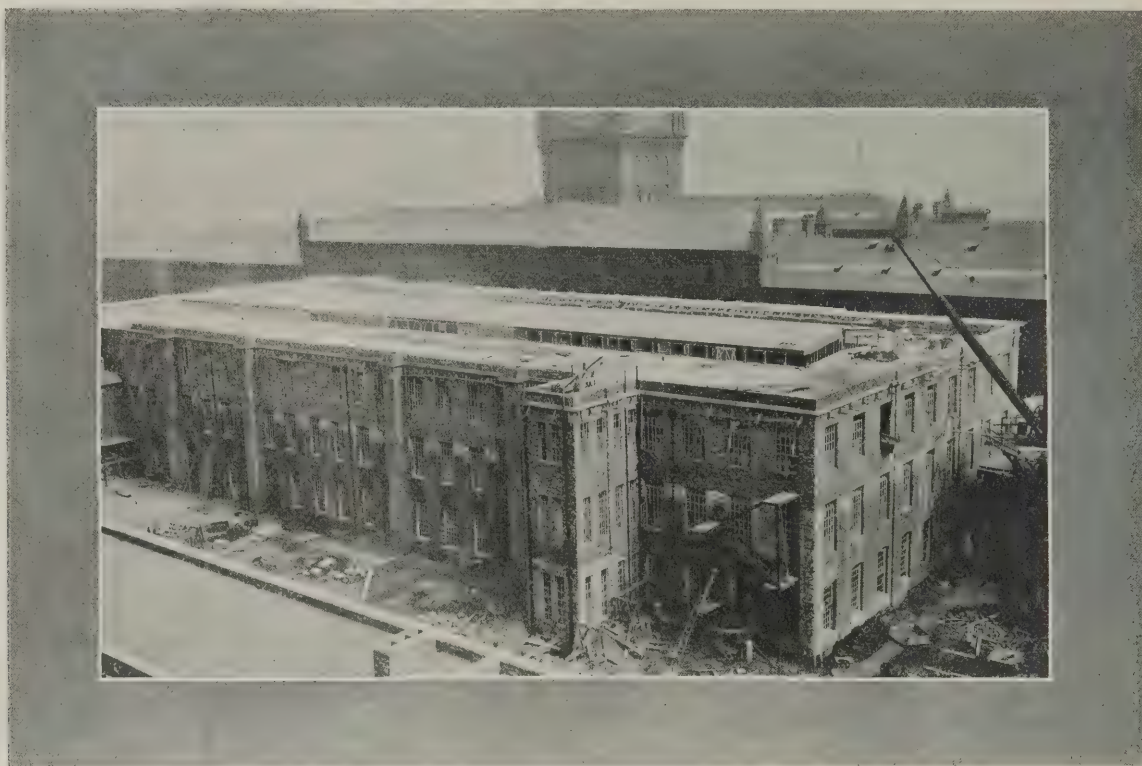


FIG. 11.—Exterior view just before completion.

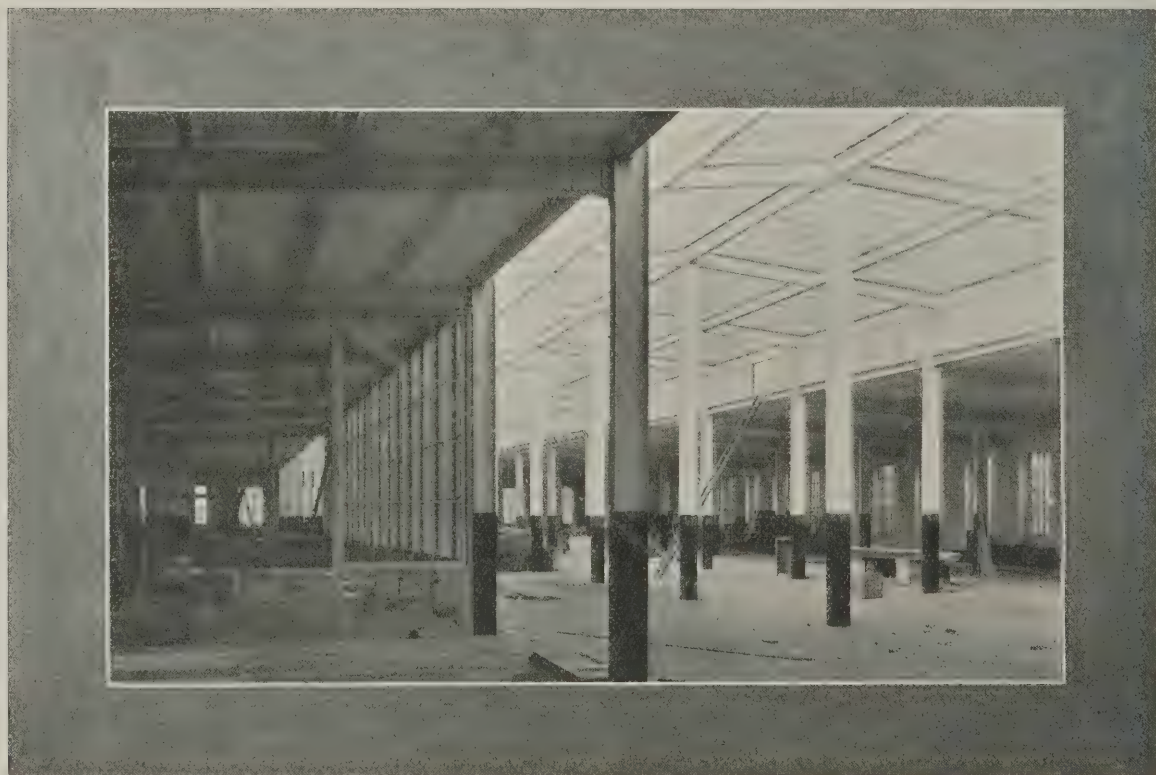


FIG. 12.—Interior view, second floor and roof, completed.

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Barrack Construction. THE discussion which took place in the House of Commons the other evening regarding the construction of barracks works and buildings for the War Office called forth some interesting speeches. It was, of course, natural that Mr. Haldane should quibble with the dictums of Mr. Arnold Forster and *vice versa*, but the general outcome of the debate seems to have been a considerable consensus of opinion that barrack construction up to within the last year or two has been most inefficient. Our readers may recollect that a good deal of discussion took place in our columns some years ago, in which many correspondents gave instances of the absurd mistakes in construction made by Royal Engineers, who were until recently responsible for the design and construction of barracks. There are many good men in the Royal Engineers, but after all they receive an engineering training, and consequently cannot be expected as a whole to be so conversant with building construction as men who receive an architectural training. Politicians may quarrel about the different policies adopted by various governments, but this is not the only cause of the trouble. Policies may have dictated the expenditure of money upon re-construction or the erection of new buildings, but they have had nothing to do with the inefficiency of the construction adopted. This has been solely due to the mistake of entrusting the work to a body of men not trained specially for such work. It will be within the recollection of most that Mr. H. B. Measures, F.R.I.B.A., the designer of the Rowton Houses, which have been such a phenomenal success, was appointed to take charge of a new department which should have to deal with the design of new barrack buildings and the repair of existing ones. There has not yet been time for Mr. Measures to effect any material changes, and the policy of the present Government seems not to embark upon any large scheme of reconstruction, but the repairs that will necessarily have to be carried out will no doubt render the existing places more efficient if left in the hands of an architectural staff.

Mr. Shaw and the Shopkeepers. WE referred last week to the opposition of the Regent Street shopkeepers to Mr. Norman Shaw's fine scheme for the rebuilding of Regent Street Quadrant. We are glad at any rate to see that Mr. Shaw does not intend to compromise. When interviewed by a representative of the "Morning Post," he said: "Of course, my own position is unassailable. The whole thing has been done by the Government, who had approved my design long before this trouble came. The Treasury approval was obtained quite a year ago, though it was officially communicated to the Office of Works only last month, I believe. A tremendous amount of nonsense has been talked about this affair. It is an

interesting fact that those who prepared the original plans for the Piccadilly Hotel, the front of which adjoins the Quadrant, objected to my design, though it actually gave them three feet more plate glass for the shops underneath the hotel than their own plans. With a view of squeezing in as many as possible their shops were to be only 14ft., which I am perfectly certain is far too small. Indeed, it is the subject of complaint now that many of the existing shops in Regent Street are too small. After a good deal of trouble it was arranged that the size of the shops should be increased to 20ft. and that governs the whole design for the rebuilding of the Quadrant. Each bay will have 17ft. width of glass, and surely that is sufficient for any reasonable person who does not ask for glass down to the pavement and up to the moon. The hotel people are getting the shops built as quickly as possible, so that they may be ready for occupation before the hotel is completed, and the way in which those shops let or do not let will be a pretty good test of the value of the objections that have been raised." Mr. Henry T. Hare, F.R.I.B.A., was also interviewed by the same journal, and his opinion on the subject is worth recording; it will generally be endorsed by the architectural profession. He says: "I regard it as mistaken commercialism. Surely the goods in a shop window look very much better in an artistic frame than if they are displayed with nothing but plate glass in front of them. In my opinion the whole idea on which the objections are based in sheer nonsense, and it is quite time that a very firm stand should be taken against any attempt to ruin architecturally the plans for the rebuilding of the Quadrant which have been adopted by the Office of Works and are being carried out. Those who do not realize what Mr. Norman Shaw's buildings will look like when completed may perhaps consider his treatment rather severe; but on the whole it is a very fine piece of architecture. There never was a design, however fine, that was not open to some criticism, but I think we ought to be extremely thankful to Mr. Norman Shaw for the way in which he has produced one harmonious whole with cornices unbroken and the frontage carried, as it will be, over Air Street and Glasshouse Street on piers. It is admitted that Regent Street must be rebuilt, and as far as the Quadrant is concerned it could not be done better than in the way proposed." We hope that the opinions thus put before the public will cause the opposition to cease, because it would be altogether too scandalous if the scheme were abandoned or in any way curtailed simply to suit the whim of a small and unimportant section of the public, whose desire is to see altered for their own ends a design which if carried out as now proposed will be an admirable addition to the architecture of London.



NEW OFFICES FOR NORTH-EASTERN RAILWAY COMPANY, YORK. HORACE FIELD, F.R.I.B.A., AND WILLIAM BELL, F.R.I.B.A., JOINT ARCHITECTS.

This block of new offices for the headquarters staff of the North-Eastern Railway Company has been in course of erection during the past five years. The exterior of the building is now finished, but inside the work of fitting up and decorating is still proceeding; it is expected to be completed by September. Altogether there are 183 rooms, the largest being the board-room on the first floor. Mr. Horace Field, F.R.I.B.A., of London, and Mr. William Bell, F.R.I.B.A., of York, (chief architect to the company), are jointly responsible for the design.

HINTS TO USERS OF POLISHED GRANITE.

By P. W. Abbott.

IN commercial usage the term "granite" includes a number of the Plutonic rocks, ranging from fine-grained diorite at one extreme to coarsely-crystalline iridescent labradorite at the other; but all have a common origin, all have been at one time molten, have slowly cooled and crystallized under extreme pressures, and the basis of all is silica—quartz, feldspar, mica and other silicate compounds. In museums and other collections the labels to the various specimens bear curious polyglot names, difficult to pronounce and spell. These names are not permanent, nor are they always uniform. Geologists, though not to the same extent as botanists and conchologists, are fond of christening their own and other people's babies, and a very small child sometimes bears an astonishingly big name.

This basis of silica gives to granite its unique excellence as a building stone. It is tough, homogeneous and untouched by the acids of the atmosphere. Indeed, most members of the group are insoluble, except by hydrofluoric acid. Owing to crystallization having taken place in huge masses and under high pressures from all directions, granite is free from bedding, and the fractures caused by strains and stresses set up during the cooling and contraction of the

earth's crust do not affect the strength and solidity of the individual masses.

Having a common geological origin, granites from widely different districts are practically indistinguishable, except to the expert, and often he may be unable to fix the locality of a specimen. Grey granite of the Cornish type is found on the Continent and in America. Labradorite, originally discovered and christened in Labrador, forms huge mountains in Norway. The fact that similar grey and red granites are found in the West of Scotland and east of Ireland, in Cornwall and Portugal, is not so striking, for the beds probably are, or have been, continuous. This means that by insisting strictly upon granite from a particular quarry the buyer may be excluding material of an exactly equal quality, strength and colour.

Granite, therefore, is primarily a structural, weight-carrying stone. Its renowned decorative effects are secondary characteristics. This, it is submitted, gives the key to its architectural use. It is hard and intractable, yields only to severe methods of working, does not lend itself readily to ornate treatment, but it is imperishable. It follows therefore that designs suitable to the material should be simple and bold, broad in scheme and in execution. By the inherent fitness of things an architect will no more put on to granite a wealth of moulding and decoration which would be reasonable only in soft stone than he will design a town hall in the

style of a pier pagoda—that is, unless he has a client of extreme generosity, unlimited means and peculiar taste.

A short sketch of the processes of masonry and polishing granite will emphasize this point. To commence with the sawing. In freestone quick-running saws will cut 8 ins. or 9 ins. per hour with half-a-dozen or half-a-score blades. Upon granite about 1 in. per hour with one blade, or $\frac{1}{2}$ in. or $\frac{3}{4}$ in. with two or three blades, is as much as has hitherto been found practicable without damaging the straightness of the cut. With higher speeds the saw blades are apt to buckle, and subsequent hand labour is necessary to make the face true. The masonry of plain faces probably takes eight or ten times as long as freestone, but here pneumatic surfacing machines are useful, especially where the surfaces are not under, say, 6 ft. super. each. Circular work which may be done in lathes is as comparatively costly. In the masonry of moulding the comparison is worse, for there is no machine to correspond with the moulding machines for stone. An attempt has been made to cut granite with a high-speed abrasive wheel, shaped to the desired mould, but hitherto without much success except for very small moulds. The abrasive material either glazes and does not cut, or it cuts the granite and wears itself out of focus at the same time, so spoiling the design and the jointing. Plain surfaces to be polished are, after masonry or sawing,

ground down by heavy iron or steel rings fed with shot, are fined up by similar rings fed with carborundum or emery, and are glossed by feet rings and putty powder. Each face will take perhaps a day and a half for the entire process, the greatest possible care being required to avoid any unequal grinding. The difficulty of securing absolutely true faces is seen particularly in the jointing of stones which have three or more faces polished—pier stones, for instance. With the utmost care inequalities—small, singly, but multiplied by the number of faces—are revealed in the fitting, and paring and repolishing by hand are necessitated. Plain faces, however, are simple by comparison with moulding, especially circular moulding. This is first masoned by hand, then a plaster model is taken from which iron castings are made. The moulded stones are then set before the "sliders," huge pendulum arms from which run rods connected to the castings. As the pendulums swing backwards and forwards the castings are rubbed to and fro along the mould, and the grinding, fining and glossing proceed as in plain faces, but much more slowly, the time required being about three days. The difficulty of securing true joints is also greater, particularly in fine and in circular moulds, and the expense of paring and repolishing is correspondingly increased. A stone with two or more moulded faces of course takes a proportionately longer time, as one face only can be polished at once. Large moulds can rarely be polished in one process, and two or more operations may be necessary. Sunk and undercut work is naturally much more costly, especially when hand-polishing is required. This hand-polishing is the bugbear of granite workers. Small sunk faces, bull-noses, returned ends and other short lengths and surfaces having to be polished by hand run up the cost of the finished job to an almost incredible extent, and to the inexperienced eye there is little to show for the money. Carving of figures, faces, floriated designs or other elaborate work is not generally polished, but is always slow and costly, in spite of pneumatic chisels.

On the other hand, granite has the virtues of its defects. It is costly to work, but its crushing strength is 1,000 to 1,200 tons to the square foot. Once the work is well done it remains good. The arrises and the members of the moulds, not to speak of plain faces, not being affected by the weather, remain perfectly sharp and true, and an architect is spared the mortification of seeing his most cherished conception fading before his eyes. Even the polishing is imperishable, if only the accumulation of soot and more or less acid dirt is periodically removed by cleaning—once or twice a year, even in smoky towns, will almost suffice. No other material is so effective, so durable or so suitable for use in busy thoroughfares. Even dressed granite is far better than any other stone, for it can be cleaned without rubbing away the surface, is impervious to the weather, and, nowadays, is little more costly than good freestone.

From the foregoing brief sketch two or three practical conclusions may be drawn. The first is that if the granite worker is to have a reasonable chance of turning out good work, ample time should be allowed for delivery. As a matter of fact, this is rarely done. The granite is invariably required when the foundations of the building reach the street level, but too frequently this is one of the last of the structural contracts to be settled, and cases are not unknown in which the builder is ready for the granite before all the full-size details are prepared. For a contract containing anything but the plainest work and of 250 ft. super. or upwards, ten to twelve weeks is really little enough time to allow, though by incurring extra expense and by risking the quality of the workmanship earlier delivery may be

given. For jobs containing 1,000 cub. ft. four to six months should be allowed.

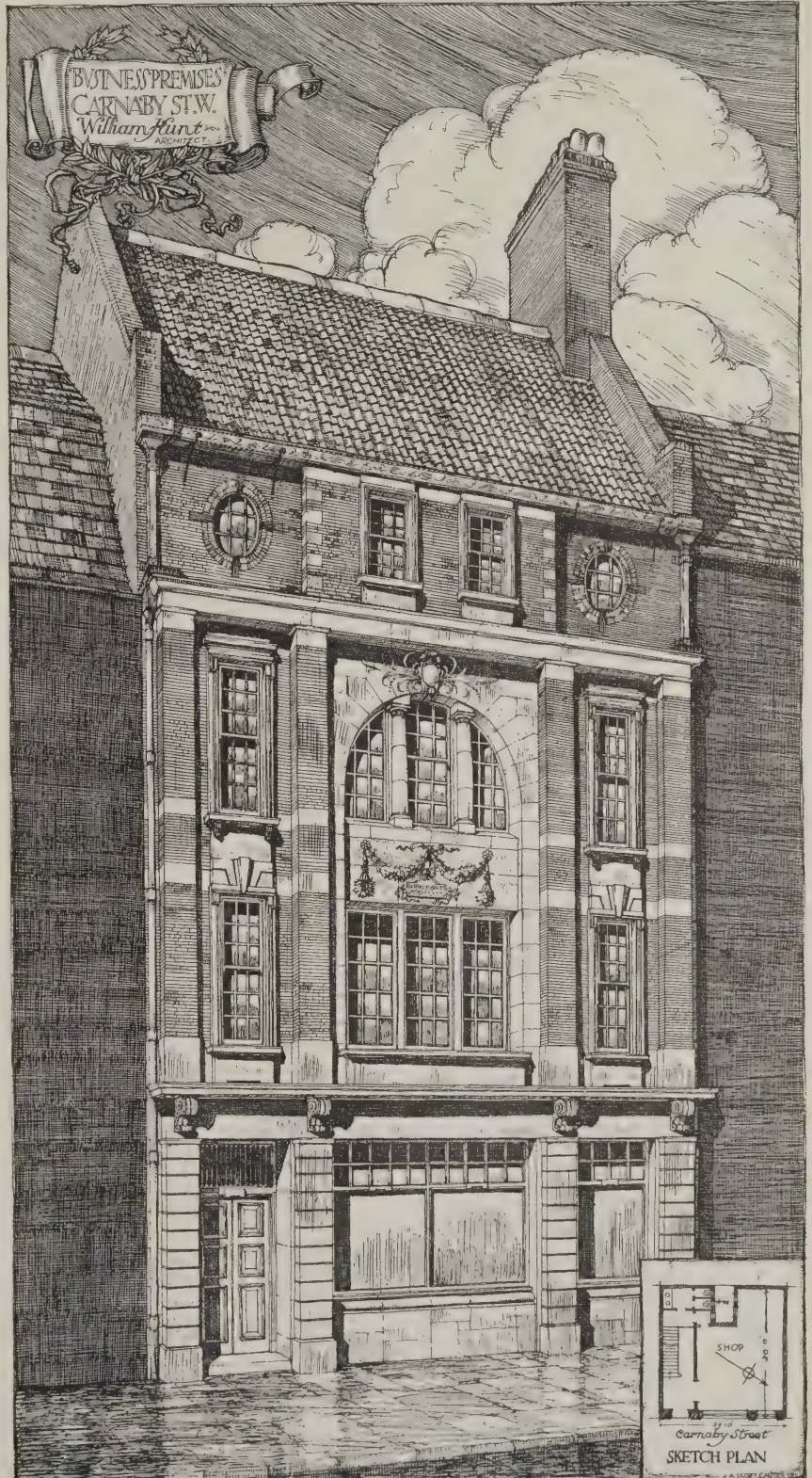
A second point is that drawings or sketches should accompany all quantities. This apparently self-evident rule is by no means always followed, and the poor granite mason, without any sketch to guide him, has to price out such items as—

"ft. run, sunk, moulded and panelled and moulded semi-circular arches, wide, on bed, diameter."

Such quantities alone are almost useless and to tender upon them is pure speculation. Nor are eighth-inch scale drawings adequate, unless helped out by ample full-sized details,

and though the suggestion that sections and plans should accompany all elevations may appear somewhat impertinent, it is justified by painful experience.

Granite masons sometimes incur an amount of obloquy on account of late delivery or other fault, part of which is perhaps richly deserved. No sub-contractor, however, lays himself open to the censure of architect or builder if he can help it, and a better appreciation of the time required for the turning out of satisfactory work in polished granite will help to prevent the delays and misunderstandings which sometimes occur.



This front is to be of Portland stone and zin. Dutch bricks, the roof to be covered with hand-made thick red and brown pantiles, with stone ridge, elm box gutter covered with cast ornamental lead, with wrought-iron brackets and cast-lead heads; the door and shop front to be of oak. The architect is Mr. William Hunt, of Donnington House, Norfolk Street, Strand, W.C.

EXPERIMENTAL SCIENCE AND THE BUILDING TRADES.

ON Monday last, at the London County Council School of Building, in Fern-dale Road, Brixton, Mr. Alan E. Munby, M.A. (Cantab), F.C.S., gave the second of two lectures on "Experimental Science, and what it has done for the Building Trades."

In the first lecture, delivered on June 11th, Mr. Munby dealt with his subject on broad lines, in its relation to pure science. He pointed out that the man of science tried experiments upon matters as yet unknown, not at random, but in accordance with some previously thought-out scheme. The solution of any problem, however, involved much work, often much apparently fruitless work, and this did not end with the experiment, for it was usually only after a careful collection and arrangement of the results of a series of experiments that any real outcome was apparent. A fact was established, and out of that fact grew a theory. A theory was a guess, not a haphazard one, but a careful conclusion, carrying with it at least some probability of truth. The theory had now to be put to the test, by fresh experiment, and if the results were explained by the theory, it stood justified, until at last it was raised to the position of a newly discovered law of nature.

The Inception of New Industries.

How was it that such enormous advances in all natural knowledge had been made during the past century? Not because of mechanical skill; evidence of great powers in this direction were readily obtainable from past ages. Neither was it through fortuitous circumstances, nor owing to the demands of mankind. It was the discovery of natural laws by the man of science, resulting in the technically-trained mind being enabled to find a structure on which to raise new industries. No builder grudged his scaffolding; he knew that although it must be erected to be pulled down, it would pay in the end; and it was equally true that a little time spent on the acquirement of the principles of science with a view to an improved knowledge of materials would do the same. This was taking a purely commercial view of the matter, but the days were gone by when a man studied merely to increase his immediate wage value; the attendance at our technical and trade schools meant much more than this; it meant an awakened interest which made the difference between the man who lived in his work, and wished to probe it to its foundations, and the man who was a mere machine, and whose work was irksome to him, because he shut out from it all the knowledge he could. Lastly, there was the consideration of science from a national standpoint. The work of the laboratory to day bore fruit in the workshop tomorrow, and it was in those countries where pure science received the greatest attention that new industries chiefly arose. Although it would be incorrect to say that there existed no great factories which had flourished in the past on rule-of-thumb methods and long experience, there were few, if any, which could afford to neglect scientific methods at the present day. As one illustration of this we might turn to

The Cement Industry in Germany, steadily advancing by reason of scientific study, and though we had reason to congratulate ourselves upon the able methods employed by home manufacturers, a number of valuable prizes were now being offered in Germany for essays on the chemical actions which take place in the manufacture and use of cement, thus giving a stimulus to research which would probably lead to such an exact knowledge of the necessary composition of cements for various purposes that German cements were not unlikely to appear in the forefront of the market.

The branches of science which chiefly concerned building were physics, chemistry and geology.

Continuing, Mr. Munby dealt with chemical principles, compounds and changes, it being shown that decay in materials was the result of such changes.

At the outset of his second lecture Mr. Munby said that the value of a study of chemistry to the builder was evidenced by the fact that the decay and deterioration which took place in building materials were the result of chemical processes. The chief agents in furthering these changes were air and water, which, however, must act together to produce results. That might be easily shown by keeping one piece of bright iron in perfectly dry air and another in water from which all dissolved air had been expelled by boiling, and air, of course, subsequently excluded by placing the water in a stoppered bottle or other suitable vessel. Nearly all forms of decay were due to the slow chemical combination of oxygen, generally derived from our moist atmosphere, with some part of the material in question, resulting in a splitting up of the substance into simpler compounds, or, as in the case of metals, in the formation of compounds of oxygen (and probably also hydrogen from the moisture) with the metal, forming rust, the process being chemically known as oxidation.

Combustion and Fire Prevention.

The process of oxidation above referred to, like nearly all chemical changes, was accompanied by an evolution of heat, and though this was not usually apparent by reason of the slow nature of the change, which allowed the heat to be dissipated before the temperature could rise appreciably, in certain cases the change was so rapid that the material actually became hot enough to take fire. Fires of this nature had frequently been known to occur in heaps of cotton waste partially saturated with oil, in coal mines due to the rapid oxidation of coal dust, and through a similar cause in flour mills, the combustion indeed in these latter cases being so rapid that an explosion generally occurred.

For combustion, which might be defined as chemical action accompanied by light and heat, three conditions were necessary—(1) something which would burn; (2) something (generally air) in which the substance could burn; and (3) sufficient heat to start the burning. Fire might therefore be prevented by removing the possibility of all three conditions being existent at the same time. The most obvious method of preventing fire was to provide no combustible substance, as for example by the use of steel and concrete. It was, however, equally efficacious, and often more convenient, to prevent or at least hinder the access of air to combustible materials. The use of floors composed of joists laid in immediate contact, and of solid hardwood treads for stairs, depended upon this principle. In like manner the more rapid burning of soft wood was due to its porosity, the pores being filled with or giving access to air. A fire in a building possessing incombustible walls and roof would soon be extinguished if the apertures could be closed, say with tightly-fitting iron shutters, without any need for water, which often did more damage than the fire itself; and this method of prevention could be further aided by placing in the building vessels containing liquified carbon dioxide (which did not support combustion), such vessels being given facilities for breakage by the fire, when their contents would turn into gas of considerable volume.

Dealing with the physical properties of materials, Mr. Munby said that although a solid body did not usually appear to possess any hollow spaces in its interior, yet it was not really absolutely continuous. It con-

sisted of an assemblage of very minute particles, each of which had a certain limited freedom of motion, and between which were spaces, though these were too small to be revealed by the most powerful microscopes. That these particles, or molecules as they were called, must be very small, was evident from the thinness to which certain things could be brought, as, for instances, a soap bubble and gold leaf, the latter being easily obtainable of less thickness than four-millionths of an inch, so that the molecules could not have a greater diameter than this. These molecules were formerly thought to be spherical, but mathematical reasoning indicated that they more probably took the shape of rings of circular section. Since solid bodies retained their shape there must be some force which held the particles together, a property of solids which was termed "cohesion." It was upon the amount of cohesion that the value of many building materials depended. In a few bodies it was almost nil, but usually it was considerable, as in the cement briquette which the lecturer proceeded to put to the test, measuring its cohesion by the pull in pounds required to overcome this force and break it in two.

Heat as affecting Cohesion.

Heat caused or, perhaps more strictly, was internal vibration which made the molecules of a body move through bigger distances and increased their rate of motion. If this were true we should expect materials to swell when heated because the interspaces between the molecules must be thereby increased. This, indeed, was what took place, and the expansion of materials under heat had often to be allowed for in building. A 30ft. steel joist, for example, might easily be $\frac{1}{4}$ in. longer in summer than it was in winter, and with long lengths of materials this consideration therefore could not be overlooked. Perhaps the most striking instance of such expansion would be found in the Forth Bridge, which was about a yard longer in midsummer than in midwinter. This expansion was very simply shown by fixing one end of a rod or tube of metal and placing the other upon a needle, laid on its side, to which a long light pointer was attached. On warming the rod it rolled the needle round by its expansion, which was evidenced by the motion of the pointer. If the heating of a body were carried far enough the cohesion would be entirely overcome and the body melted.

Crystalline and Amorphous Structure.

The molecules of certain substances had the power of aggregating themselves into definite shapes if allowed to collect freely, as when a melted substance solidified or a solution evaporated. Such aggregates were called crystals. Many substances had a crystalline structure which considerably influenced their weathering and cohesive powers. Marble and chalk had the same chemical composition, but their great difference was mainly due to the crystalline character of the former, the interlocked nature of its particles giving it greatly increased strength and powers of resistance to weathering and abrasion. By projecting on to the screen images of several rock sections with the aid of the lantern microscope, the lecturer showed how very different in physical character were many well-known building stones, and although we could hardly show the method of the formation of those having a crystalline structure, which in most cases were formed from molten or highly heated materials, it was possible with the aid of the lantern to show the method of growth of crystals by the evaporation of solutions of substances which crystallized.

Though this interlocking structure often assisted cohesion, it was not inseparable from it. Many substances consisted of rounded grains held together by some actual cementing material. Again, bodies of organic

origin, such as timber, possessed a cellular structure which might be of considerable strength. The breaking down of this structure by decay, causing rot in the timber, might be detected by taking advantage of another physical property of solids. All solid bodies which had a homogeneous structure conducted sound very readily, much more readily even than air. The ticking of a watch could easily be heard through a sound piece of timber 30ft. or 40ft. long, but if it was decayed the change in the material would interfere with the sound waves, which would not be transmitted; and this simple test was often of great assistance in the selection of timber.

R.I.B.A.

The following is the list of officers and council of the Royal Institute of British Architects for the current session, elected at the last business meeting:—

President.

T. E. Colcutt.

Vice-Presidents.

Henry T. Hare

Leonard Stokes

Hon. Secretary.

Alexander Graham.

Members of Council.

Reginald Blomfield

J. J. Burnet

W. D. Caroe

A. W. S. Cross

E. Guy Dawber

William Flockhart

Ernest George

J. A. Gotch

E. A. Gruning

Associate Members of Council.

H. A. Crouch

W. A. Forsyth

Representatives of Allied Societies.

H. Dare Bryan (Bristol)

H. S. Chorley (Leeds and

Yorkshire)

Edmund Kirby (Liverpool)

W. M. Mitchell (R.I.A. of

Ireland)

J. M. Munro (Glasgow)

Representative of Architectural Association.

R. S. Balfour.

868 papers were returned for members of council and 832 for associate members.

OUR PLATES.

Doddings Farmhouse, Bere Regis, Dorset.

THIS farmhouse has recently been built to replace an old house in the last stage of dilapidation. The site was somewhat confined, and regard had to be paid to strict economy. The house is rather larger than would usually be the case, but the value of the farm is considerably augmented by very fine watercress beds, which have been practically entirely formed, and developed by the present tenant, Mr. William Bedford. Advantage has been taken of a particularly interesting brick made

within a few hundred yards of the house by the tenant. These bricks have three or four slight gradations in colour, and the face-work has been built to give play to these variations. Fired headers have been used in the jambs of windows, the chimneys and gables. For the roofs old tiles have been used as far as practicable, and the general aim has been to make the design characteristic of farmhouse work and as simple and unpretentious as possible. The fireplaces are all built with the same local bricks, mixed with roofing tile and with plain red 6in. floor tiles as hearths. In effect care has been taken throughout to minimize the cost of upkeep and to provide the estate with a substantial and comfortable dwelling fitted for and expressive of its purpose. The total cost was £1,004. The builders were Messrs. Parsons & Hayter, of Swanage, whose foreman, Jim Heath, produced a fine piece of brickwork indicative of honest craftsmanship. The work was carried out from the designs and under the superintendence of Messrs. Forsyth & Maule for the late Mrs. Erule Erle Drax, of Charborough Park.

THE TOWERS ON THE NEW GOVERNMENT BUILDINGS.

IN the House of Commons last week Mr. Whitwell Wilson asked the First Commissioner of Works whether he had received any representations respecting the towers which appeared upon the drawings of the new Government buildings facing Great George Street; and whether he was prepared to authorize the construction of any or all of those towers.

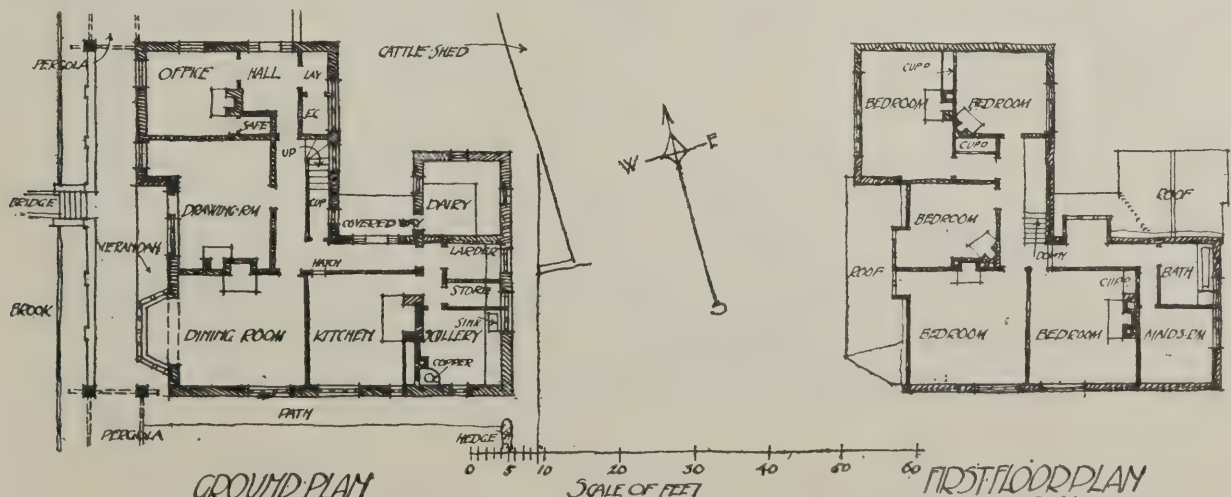
Mr. Harcourt said in reply: "Yes, sir; I received a strong representation from the council of the Royal Institute of British Architects in favour of the completion of the towers on the Great George Street front of the new public offices. I replied to them in the following letter: 'I am much obliged by your letter of the 25th. Though I maintain my own opinion that the proposed very high towers on the Great George Street front of the new public offices are not architecturally or aesthetically desirable, I am not prepared to put my artistic opinions against those of the council of the Royal Institute of British Architects. I have therefore given immediate instructions that the single tower of the building now in course of construction shall be continued and completed on the lines originally laid down by Mr. John Brydon. I need not say that I shall always greatly value any criticism or assistance that the Institute is good enough to afford me in that part of my duties which is connected with architecture.' I may add that I have asked the contractors to see that, as far as possible, the masons to be engaged on this work shall be those who were discharged on its sus-

pension, and the contractors have promised to meet my wishes."

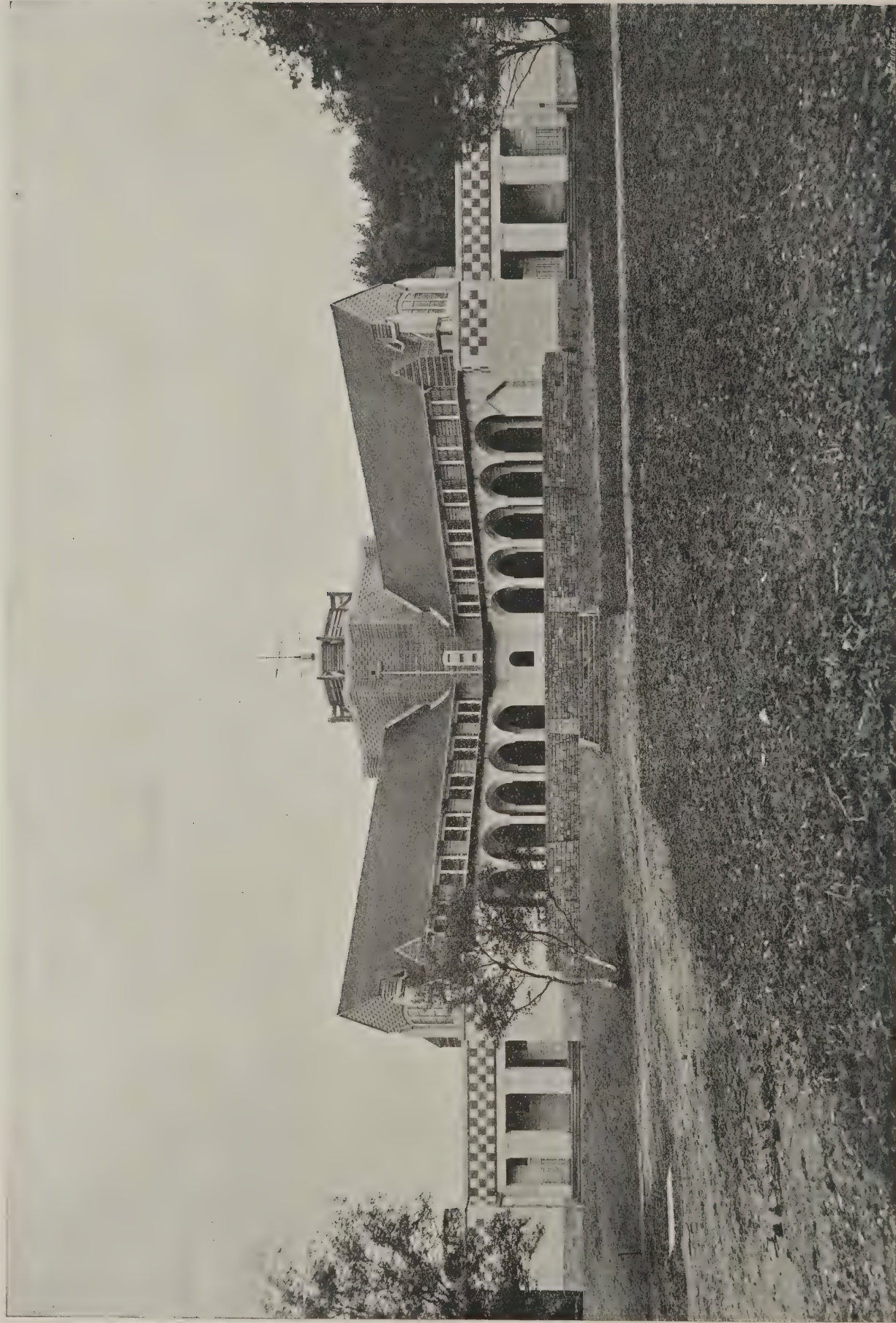
This we consider to be satisfactory. It is highly desirable in all these cases of important Government buildings that the architect's design shall be carried out in its entirety.

A NOTE ON THE KING'S SANATORIUM.

THE King's Sanatorium, near Midhurst, in Sussex, which was opened last week, is a very notable building, both as a piece of brickwork design and as embodying the latest principles in the planning of a sanatorium. In a building of this kind, even perhaps more than in an ordinary hospital, there are a great many points governed by medical or other requirements which have to be taken into account in the planning by the architect. For a sanatorium the ruling requirements are ample sunlight and pure air, and the absence of dust of any kind. The plan of the building at Midhurst is pretty well known to most of our readers, having been published in our columns some time ago. There is nothing of exceptional importance in the north or administration block; it is the south or patients' building, comprising a centre portion with side wings, which forms the chief interest. The bedrooms are arranged on two floors with a well-ventilated corridor running behind, and each has French casement windows opening on to a balcony. All corners are rounded off to prevent the collection of dust, and every precaution has been taken with the furniture to secure the same end, the wardrobes even having rounded tops. The centre block of the patients' building is carried up one floor higher than the wings, and on this top floor will be accommodated those patients of the poorer class who are too ill to leave their beds. Below them, on the first floor, are the bedrooms (14 in number) for the well-to-do patients, who will pay a fee of £8 8s. a week, while the other patients in the wings will be taken at £2 2s. One of the most interesting features of the building is the heating of the dining-hall and of the open-air chapel. This is on the old Roman system, the floor itself, laid with York stone slabs, being heated by steam pipes in channels below. The chapel is of course quite unique and altogether a delightful example of modern design. We give an illustration of it on the next page, from a photograph by Mr. E. Dockree, which illustration is one of thirty given in this month's issue of THE ARCHITECTURAL REVIEW, accompanying an article on the building by the architect, Mr. H. Percy Adams, F.R.I.B.A. The cost of erecting and furnishing the sanatorium has not, we understand, fallen far short of £140,000.



DODDINGS FARM, BERE REGIS, DORSET. W. A. FORSYTH AND H. P. G. MAULE, ARCHITECTS.



THE CHAPEL AT THE KING'S SANATORIUM, NEAR MIDHURST SUSSEX. H. PERCY ADAMS, F.R.I.B.A., ARCHITECT.

NOTES ON COMPETITIONS.

New School at East Wemyss.

In connection with this competition, the conditions of which were criticized in our issue of May 23rd last, some information is forthcoming which, if true, is little short of scandalous. The competition is an open one, and was duly advertised as such, no mention being made of any prescribed boundary for competitors. It is therefore alarming to learn that it is a well-known fact in the neighbourhood of East Wemyss that only from competitors practising in that vicinity will the architect be selected who is to be entrusted with the work. Local architects appear to have satisfied themselves that the competition is sound, in spite of the condition that "the Board does not bind itself to carry out any one of the designs submitted." So far as they are concerned, well and good; but what about non-local competitors? They will find themselves in a helpless position, for the selection of drawings is to be made, in the first place, by the Board, who will afterwards submit their selection to the adjudication of the Scotch Education Department, whose decision will be final. No provision was made in the conditions for a professional assessor, but it has been ascertained that if the Education Department refuse to adjudicate, an assessor will be appointed. In view of the assertions already made, it may readily be assumed what plans will be submitted for his opinion. There is comfort in the hope that the necessity of visiting the site and preparing a block plan for their own use, as required by the conditions, may have precluded many intending competitors outside the local area from preparing a scheme. The comparative insignificance of the building renders this more than probable; even comment were undignified but for the serious question of principle involved. A Scottish competition is, as a rule, an uncertain quantity; it is interesting to know that this one is regarded by local architects as superior in quality to anything that has been hitherto presented in that part of the kingdom.

Birmingham Council House Extension.

The designs of the ten selected architects in this competition are to be sent in by the middle of November, and it is probable that the award will be made in the following month.

Two Resolutions.

At the last business meeting of the Royal Institute of British Architects the following two resolutions were brought forward by Mr. K. Gammell, A.R.I.B.A.:—

"That, in view of the fact that limited competitions are a great injustice to the young and unknown members of the profession struggling for recognition, and also not in the best interests of the promoters, this Institute declares that competitions should not be limited, and that such steps should be taken as may be deemed advisable to discourage public bodies from instituting such competitions."

"That the Institute exert its influence in obtaining the abolition of the growing custom of penalising non-acceptors by retaining their deposit."

In bringing forward the motions Mr. Gammell, without making any personal references, cited four competitions which had been limited, but which, he contended, should have been open—namely, the Queen Victoria Memorial, King's College Hospital, the University College of North Wales at Bangor, and the Luton Secondary School.

Some discussion took place and it was suggested that the matter should be referred to the council: eventually, Mr. Gammell agreed to bring forward the motions at another meeting, in an amended form.

Hove Library.

In the second competition for this library the following recommendation has been made by Mr. John Belcher, the assessor:—1st, Messrs. Percy Robinson and W. Alban Jones, of Leeds; 2nd, Messrs. A. J. Hardwick

and Sydney E. Castle, of Kingston-on-Thames; 3rd, Mr. Lionel U. Grace, of London, W.C. This recommendation has been approved by the library committee, provided the tender for the design placed first does not exceed £9,333. It will be remembered that the first competition was abortive. The premiums in the second competition were £50, £30 and £20 respectively.

Competitions Open.

The following is a list of competitions open:—

DATE OF DELIVERY.	COMPETITION.
June 26	NURSING AND CONVALESCENT HOME AT GLOSSOP, to cost £6,000. Premiums of £20 and £10. Particulars from Mr. T. W. Ellison, town clerk, Norfolk Chambers, Glossop.
" 30	ELEMENTARY SCHOOL AT EAST WEMYSS. Particulars from Mr. A. Watson Taylor, clerk to the School Board, East Wemyss, R.S.O., Fifeshire.
July 2	SECONDARY SCHOOL FOR GIRLS AT AIGBURTH VALE, for the City of Liverpool Education Committee. Limited to architects in Lancashire and Cheshire. Particulars from the Town Clerk, Municipal Offices, Liverpool.
" 4	SCHEME OF SEWERAGE AND SEWAGE-DISPOSAL WORKS AT WARBLINGTON. Premiums of £100 and £50. Particulars from Mr. J. W. Loader Cooper, clerk to the U.D.C., Queen Street, Emsworth.
Oct. 1	ALPHABET COMPETITION. Prizes of £20, £10 and £5. For particulars see "Architectural Review."
" 31	BOURSE AT CAIRO. — Premiums of £250 and £100. International competition. Designs to be submitted to the "Corporation des Agents de Change," Cairo, Egypt.
—	NEW MUNICIPAL BUILDINGS AT STIRLING (to cost £12,000). Premiums of £100. Particulars from Town Clerk, Borough Buildings, King Street, Stirling.

Obituary.

The late Mr. George Low, architect and surveyor, of London, left property valued at £16,000.

The late Mr. Edmund Woodthorpe, F.R.I.B.A., of London, E.C., left estate which has been proved at £10,744.

Mr. W. D. Church, senior partner in the firm of Messrs. Church & Sons, architects, of South Place, Finsbury, died recently.

Mr. William Pattinson, head of the firm of Messrs. W. Pattinson & Sons, contractors, of Ruskington, near Sleaford, died recently, in his seventy-third year.

The late Mr. John Dibble, head of the firm of Messrs. Dibble & Sons, builders, of Birmingham, who died on January 30th, aged 66, left estate which has been proved at £73,782.

Mr. E. E. Scrivener, senior member in the firm of R. Scrivener & Sons, architects and surveyors, of Hanley, died recently in his sixty-eighth year. A great deal of school work was carried out from his designs.

R. San. Inst. Bristol Congress: Programme.

—The preliminary programme of the twenty-third Congress of the Royal Sanitary Institute, to be held in Bristol from July 9th to 14th, has now been issued. The president of the Congress is Sir Edward Fry. In section II., "Engineering and Architecture," presided over by Mr. Edwin T. Hall, V.P.R.I.B.A., papers will be read on "The Construction of Isolated Homes for the aged poor *versus* the Workhouse," to be introduced by Mr. A. Saxon Snell, F.R.I.B.A. There will be seven special conferences, including one of engineers and surveyors dealing with "Rural Road Construction and Maintenance," and another of sanitary inspectors dealing with "The Advantages of Public Abattoirs."

Enquiries Answered.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Correspondents are particularly requested to be as brief as possible.

The querist's name and address must always be given, not necessarily for publication.

Shop Windows.

BIRMINGHAM.—F. N. S. writes: "I am asked to give an estimate for roller shutters to five windows about 12ft. by 8ft. for a jeweller's shop. Please name a good firm who can supply these. My client wants the newest design."

We think that the Kinnear roller shutter, supplied by Messrs. A. L. Gibson & Co., of 19-21, Tower Street, Upper St. Martin's Lane, W.C., will serve your purpose.

Architectural Appointments in the Indian Government.

LONDON.—INDIAN GOVERNMENT writes: "(1) Is there an Architectural Department in connection with the Indian Government? (2) How can I get information regarding same? (3) Are examinations required to be passed in order to gain admission to the Service?"

There are no architectural appointments open to competitive examination in the Indian Government. If you are anxious to get an appointment in the Government Service you should write to the secretary of the Civil Service Commissioners, Burlington House, London, W., asking for particulars of all examinations requiring a knowledge of architecture, when, from the particulars supplied, you will be able to see which examination suits you best. H. Y. M.

Architectural Models.

LONDON.—X. writes: "Please name firms who undertake the preparation of models for light and air cases."

Mr. John B. Thorp, London Drawing and Tracing Office, 98, Gray's Inn Road, W.C.

Buildings to Measure in North Wales.

MACCLESFIELD.—ENQUIRER writes: "Please give me some information about Gothic buildings to measure in North Wales."

The following is a list of buildings containing features suitable for measuring up in North Wales:—St. Mary's, Shrewsbury; Abbey Church, Shrewsbury; Old St. Chad's; Wroxeter; Oswestry; Ruabon; Wrexham, tower and apse (Perpendicular); Guesford, tower (Perpendicular); Northop, tower and effigies; Mold; Cilcain, roof; Llanarmon, monuments and chandelier; Llanfwnog, arcades; Ruthin, roof; Llanrhaidr, window; Efenectyd, wooden font; Llanrwst, Gwydyr chapel, very fine Perpendicular rood loft; Whitchurch (Perpendicular); Conway; Beddgelert, old Priory Church (Early English); Clynog, roof, tower, St. Beuno's chapel; Beaumaris, carving; Llanestyn, font (Early English); Llanvihangel, pulpit; Llanddymnan, sculpture; Holyhead, sculpture; Llangadwaladr, windows; Llanaber (Early English); Llanasa, stained glass; Gualsfield, roof (restored); Newton, old screen in modern church; Llanidloes, roof; Pennant Melangell, screen; Llanmer, roof; St. John's, Chester, double row of triforium arches. H. Y. M.

Plaintiff and Defendant.

SOUTH BANK.—W. S. A. writes: "Plaintiffs' affidavit correct and can bear witness. Defendants' affidavit absurd. Witness in defendants' employ, and threatened by

defendants if he gives such evidence will be instantly dismissed. (1) Do defendants commit themselves disregarding witness's position? (2) Is there any way left for plaintiff to get witness, if he refuses, to swear to an affidavit? (3) If summons is withdrawn, can a new summons be taken out later?"

Your question is not very clearly stated, but I gather that you wish to secure the evidence of someone who is in your opponents' service, and who therefore finds himself in a difficult position. You cannot oblige him to make an affidavit if he does not so desire, but you can serve him with a "subpoena" to appear in court, and so oblige him to give his evidence. Your solicitor is your best guide in a matter of this kind, and you should not do anything without his knowledge and approval.

F. S. I.

Temple of Eleusis; Ornament in Uffizi Gallery.

SUNDERLAND.—R. S. writes: "(1) What is the exact height, in modules, of the column of the Greek temple at Eleusis? This is not given in Spiers' 'Orders' nor in Banister Fletcher's 'History.' Also, where can I get a description of the building? (2) Would a portion of the cast of Roman ornament from the Uffizi Gallery, Florence (illustrated on p. 2, plate 9, of Glazier's 'Manual of Historic Ornament') be suitable for the freehand testimony of study for the R.I.B.A. intermediate examination? If so, what sort of a written description of it should I have to give for the above?"

(1) Of the fragments that remain of the temple, and indeed of the propylæa and tower of Eleusis, there is but little to indicate the dimensions of the various parts of the buildings in which they originally had their place. The capital, base and entablature of the Ionic temple at Eleusis as restored will be found in Spiers' 'Orders' as copied from Mauch, but the exact height of the column is not known. Plate XXI. of Spiers' 'Orders' shows a small complete drawing of this Ionic Order which may be taken as approximately accurate. A short description of this temple and of the propylæa will be found in Spiers' 'Architecture East and West' and in the 'Architectural Dictionary' under Eleusis. (2) A portion of the cast of Roman ornament from the Uffizi Gallery, Florence, referred to above, is very suitable for the Classic Ornament testimony of study for the R.I.B.A. intermediate examination. This should be drawn to a large scale to fill your sheet unless you propose to draw other examples as well. It does not appear to be known from what building the ornament was taken, so you had better write a few notes as to the character of Roman ornament by way of description.

H. Y. M.

Tiled Valleys.

X. X. writes: "We are trying the old method of laying tiled valleys as set forth in your issue for May 16th, but find difficulty at the ridge and eaves. Which is the correct method of laying here, and have you any particulars as to how much the old men hired up?" Tracing sent (not reproduced).

You have chosen a rather unfortunate example for experiment in the old-style tiling, and I can well understand some of your difficulties. Dealing with the points in order:—(a) In the old tilework which I can recall I know of no case where ridges intersect at one level—in every instance one is subsidiary, and runs out against the slope of the higher roof, in which case the junction solves itself quite naturally. The actual ridge-tile of the lower roof is tilted upwards against the higher slope, the plain tiling of which is eased in a gently diminishing swell for three or four courses above same. With a level intersection I do not believe it is possible to produce an entirely satisfactory

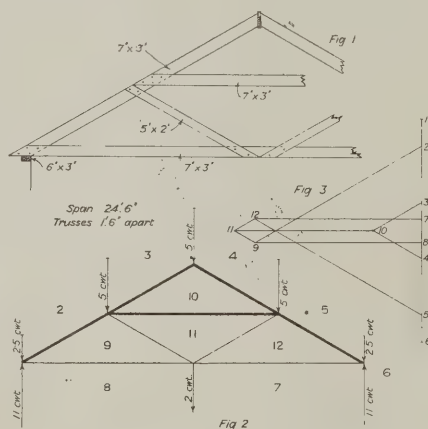
job or to dispense with lead, cement, cutting and other makeshifts. (b) The finish of valleys at the eaves (particularly in such an example as shown on the tracing) does not appear to present any serious difficulty, as this again only becomes awkward when a level eaves-gutter is required round the angle. Even then it is readily surmounted. Perhaps I can best illustrate by referring to examples, of which there are several (executed in stone slating) at Stamford. A good one is the "Bull and Swan" (I think) in St. Martin's. (c) The extent to which the valleys need be fired depends upon the pitch of the roofs—with a flat pitch firing is hardly necessary at all, but with the pitch of 50 degs., which is usual in old work, it is sufficient to start the sweep of the tile courses at about the fifth tile on either side of the valley.

E. G.

Roof for Hall.

Roof writes: "I send plan of a hall (not reproduced) which I propose roofing with 7in. by 3in. spars at 18in. centres, 6½ by 2½ tie-beam bolted to spars, and spars notched to 6 by 3 wall-plate at foot. What is your opinion on the matter? As the hall is a very cheap building I do not want to go to the expense of principal roof if it can be avoided."

The roof proposed is what is known as a close-coupled or couple close roof, and should not be used for more than 18ft. span. As the span in this case is 24ft. 6ins. some other means must be adopted. The pitch of the



roof is not stated, nor the nature of the covering, whether slates or tiles, nor whether a ceiling is to be provided for. Assuming a pitch of 30 degs. and the roof to be slated and a ceiling carried, the construction may be modified as shown in Fig. 1, for which Fig. 2 will be the frame diagram and Fig. 3 the stress diagram. If there is no ceiling, one of the stiffened collar-beam roofs that have been previously illustrated would be more suitable.

HENRY ADAMS.

Our Insurance Schemes.

CARNARVON.—X. writes: "Please let me know whether your insurance scheme holds good in the case of a weekly subscriber, provided he can prove that he purchases your journal regularly. The reason why I ask is that Smith's agent here finds it more convenient to get weekly payments for all newspapers and weekly papers supplied, and lately (since the change of agency) I have paid for my copies of your journal in one cash payment weekly for all papers supplied to me."

So long as you place an order with your newsagent for this journal to be supplied to you regularly throughout the year, it matters not to us, so far as the insurance schemes are concerned, in what way you pay your newsagent for the copies. So long as you are a regular subscriber you are entitled to the advantages of our insurance schemes.

Correspondence.

Professional Assessors.

To the Editor of THE BUILDERS' JOURNAL.

SIR,—A certain section of the younger members of our profession have been and always are clamouring for the appointment of professional assessors.

The question now arises is this, Has the general result of appointing such assessors been of service to the younger, or, worse still, to the unknown, members of the profession, men who probably act as "ghosts" to the so-called eminent architects, the majority of whom are simply commercial men without an atom of artistic taste or ability either to design or to illustrate the buildings they are entrusted to erect?

In my opinion and experience as an artist and a practical architect it has not and never will be of any use to the gifted practitioners if assessors are chosen only from a small circle of men who are either "members of council," vice-presidents of the Institute, or others who are very intimate with well-known members of the Institute.

It has been stated at the Institute that an architect who is not "well known" cannot be clever, and I suppose therefore that Institute assessors act upon this theory, for there is hardly any important competition in which a professional Institute assessor is engaged but results in the recommendation that some well-known or so-called "eminent" architect be employed.

Even we poor Associates, of any experience at all, are well acquainted with the "styles" of various "well-known architects." We know them as well as we know our own handwriting; how one eminent firm harks back to classic temples, while another so-called "well-known architect" bases his designs upon the example of a range of stabling or an old barn with a "Georgian" (save the mark!) pediment in the centre.

How much better acquainted with the styles of well-known architects therefore must the professional assessors be, when they are probably meeting well-known men (who are often competitors) almost daily!

Indeed, in some competitions where certain Institute men are appointed assessors the result is almost a foregone conclusion.

In a recent competition for a public library (which I was not interested in) a well-known member of council of the R.I.B.A. who was appointed by the president as assessor gave the first premium to a personal friend whose designs and elevations, if not the plans as well, were made I believe by the same draughtsman—"a poor ghost" who designed and drew the elevations for some almshouses built by the assessor; indeed, the elevations of both library and almshouses were almost identical.

The only way to give some satisfaction to clever but still unknown or poor men is either to appoint—in competitions—a retired architect as assessor or else to have a small jury—say three members, one only of whom should be an architect, and he not nominated by the president of the Institute, who, as president, of course always nominates as assessor a member of council—the only professional men apparently that he knows.

It is unfortunate that the law of libel prevents many evils being publicly exposed, but in the course of my long experience in the profession I have come across many "Pecksniffs," and these men, thanks to the "free trade" system in architecture, can call themselves "architects," even in some cases "F.R.I.B.A.s."

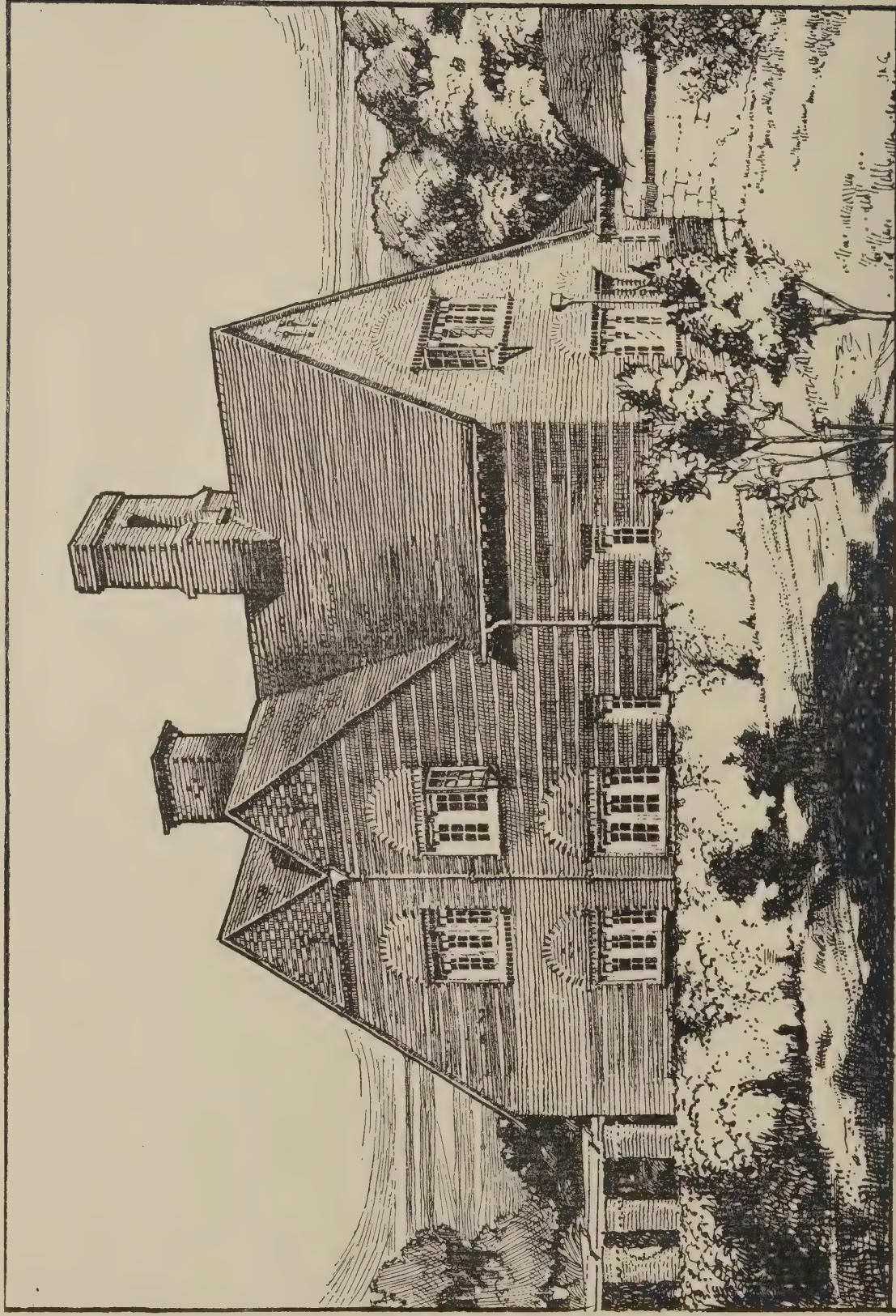
From the results which we hope the Architects' Registration Bill will achieve, the next generation will not know such charlatans and such frauds.—Your truly,

HORACE T. BONNER, A.R.I.B.A.

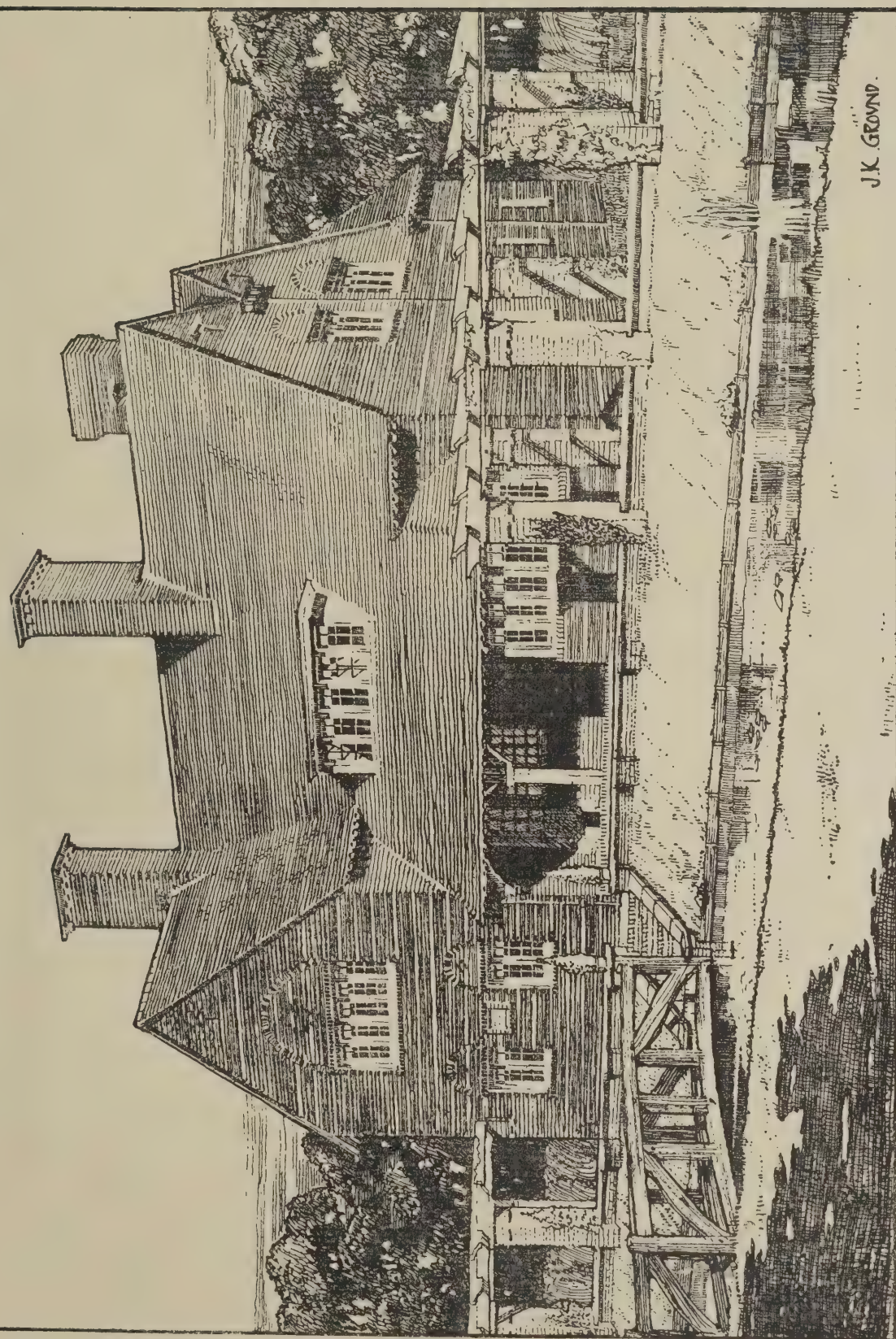
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Supplement to
THE BUILDERS' JOURNAL AND ARCHITECTURAL ENGINEER,
Wednesday, June 20th, 1906



DODDINGS·FARM·BERE·REGIS·DORSET WA FORSYTH·HPG·MAVLE ARCHITECTS



J.K. GROUND.

Change of Address.—Mr. C. E. Mallows, F.R.I.B.A., has removed to Biddenham, near Bedford.

To Include Everybody.—The Council of the Institute is to consider "the practicability of including all architects practising in the United Kingdom within the scope of the Institute"—a resolution to this effect having been carried at the last business meeting.

Manchester Royal Exchange: New Ventilation Scheme.—The Royal Exchange at Manchester has been very much in need of a better system of ventilation. Last year six firms of ventilating engineers were invited to formulate and tender for schemes, Mr. Albion T. Snell, of London, being appointed consulting and advisory engineer. The scheme selected as the best was that submitted by Mr. James Keith, of James Keith & Blackman

Co., Ltd., and the first portion of this scheme is now being carried out by the firm under the supervision of Mr. Snell and the architects of the Exchange. By the scheme now being installed five 54in. Keith-Blackman electric fans for propulsion and extraction will change from five to six million cubic feet of air per hour, which will mean renewing the air of the Exchange once every ten minutes.

Complete List of Contracts Open.

With a few exceptions, news of Contracts Open are not repeated after they have been published once in these columns, so that readers will find particulars in our previous issues of other contracts that still remain open.

Unless expressly stated to the contrary all deposits required for bills of quantities, &c., are returned on receipt of *bona-fide* tenders. The words "Fair Wages Clause" inserted in certain paragraphs signify that persons tendering must conform to a fair-wages clause in the contract, which requires them to pay the rates of wages current in the district.

BUILDING.

June 21. Swansea.—*Building a new church* at Port Tennant, Swansea, for the Rev. W. Evans. The plans and specification can be seen and quantities obtained on deposit of £2 2s. at the office of E. M. Bruce Vaughan, F.R.I.B.A., 21, Dumfries Place, Cardiff, to whom tenders must be sent by June 21.

June 21. Leeds.—*Proposed Secondary School*, Whin gate, Armley. Contractors desirous of tendering are requested to send in their names to W. S. Braithwaite, Architect's Department, Education Offices, Leeds. The notification of a desire to tender should be accompanied by a deposit of £1 1s. Tenders, endorsed "Tender for Secondary School, Armley," are to be sent in to James Graham, secretary for Higher Education, Education Offices, Leeds, not later than 10 a.m. on June 21.

June 21. London, E.C.—*New fog signal house, dwelling, &c.*, on Flatholm Island, near Cardiff, for Trinity House, E.C. The plans may be inspected and forms of tender and specifications obtained either at Trinity House between 10 a.m. and 5 p.m., or on application to the Officer-in-charge, Trinity Store, Cardiff. Applicants when receiving a form of tender and specification will be required to deposit one pound (£1), on producing the receipt for which at the offices of Corderoy, Selby & Corderoy, 21, Queen Anne's Gate, London, S.W., they may obtain the Surveyor's quantities in connection with the work. Tenders, sealed and marked outside "Tender for new Fog Signal House, &c., Flatholm," must be addressed to A. Owen, secy., and delivered at Trinity House on or before June 21, and no tender can be entertained that is not made on the forms provided.

June 21. Port Isaac.—*Alterations* to boys' and girls' hat and cloak rooms, at the Council School, according to plan and specification, which may be seen at the Council Schools, Port Isaac, or at the office of B. C. Andrew, architect to the committee, Biddick's Court, St. Austell. Forms upon which all tenders must be made may be had from the architect or the secretary. Sealed endorsed tenders to be sent to F. R. Pascoe, secy., Education Office, Truro, on or before June 21.

June 21. Whitecross.—*Erecting a new shelter* at Whitecross Council School according to the plan and specification which may be seen at the Council Schools, Whitecross, or at the office of B. C. Andrew, architect to the committee, Biddick's Court, St. Austell. Forms upon which all tenders must be made may be had from the architect or the secretary. Sealed endorsed tenders are to be sent to F. R. Pascoe, secretary, Education Office, Truro, on or before June 24.

June 21. Barry.—*Building a new church* at Barry for the Rev. H. H. Stewart. The plans and specification can be seen and quantities obtained at the office of E. M. Bruce Vaughan, F.R.I.B.A., 21, Dumfries Place, Cardiff. A deposit of £2 2s. must be made. The tenders are to be sent to the architect not later than June 21.

June 21. Darlington.—*Erection of a manual instruction school* at Corporation Road: also for large additions and alterations to the Gurney Pease Schools, Albert Hill. Plans and specification may be seen and bill of quantities and form of tender obtained at the offices of George Winter, borough surveyor and waterworks engineer, Town Hall, on depositing a cheque for £2 2s. Tenders, endorsed "Schools," must be sent to H. G. Stevenson, town clerk, Darlington, not later than noon on June 21.

June 21. Caerphilly.—*Erection of forty cottages* at Caerphilly, for the Castle Building Club. Plans and specification can be seen at the offices of A. O. Evans Williams & Evans, architects, Pontypridd, to whom tenders are to be sent by June 21.

June 21. Shipley.—*Erection of a vicarage house* for the parish of St. Paul, Shipley. Plans may be seen and bills of quantities obtained at the offices of S. H. & F. Healey, architects, 42, Tyrril Street, Bradford, up to June 21, on which date the tenders are to be sent in.

June 21. Trearlaw.—*Alteration and conversion* of the old Trearlaw Schools into a school for girls and infants. Plans and specification may be seen and bills of quantities obtained at the office of the architect, Jacob Rees, Hillside Cottage, Pentre, on the deposit of £2 2s., which will be returned on receipt of a *bona-fide* tender. Tenders must be made out upon the form of the Council, a copy of which may be had from the Architect at the above address. Sealed tenders, endorsed "Tender for Trearlaw Schools," accompanied by the priced quantities, must reach T. W. Berry, Director of Education, Council Offices, Pentre, Rhondda, on or before June 21.

June 21. Ashburton.—*Alterations and additions* to the Council school. Bills of quantities and forms of tender can be obtained in due course upon payment of £1 1s. Applications must be sent to the Architect, 1, Richmond Road, Exeter, not later than June 21.

June 22. Parkgate (Ireland).—*Erection of stable buildings.* Plans and specification can be seen at the Mansel Parkgate, and at the office of Young & Mackenzie, Scottish Provident Buildings, Belfast. Sealed tenders, addressed to the Rev. W. J. McKinnier, A.M., to be lodged with the Architects on or before June 22.

June 22. Yelverton.—*Erection of new Bible Christian chapel* at Yelverton, Devon. Plans and specification may be seen with W. W. Hooper, Heatherleigh, Yelverton, and at the offices of the architect, W. Beddoe Rees, 3, Dumfries Place, Cardiff, from whom bills of quantities may be obtained. Tenders to be sent to Mr. Hooper on or before June 22.

June 22. Aberdeen.—*For the following works:*—Mason and carpenter works for alterations on the bothy, &c., at Milton of Arbutnott (Eddie) Fordoun; carpenter and slater works of covered court, &c., at Kirkton Farm (Webster), Arbutnott, Fordoun; mason, carpenter and slater works of alterations on house occupied by Mr. Peter Davidson at Blindburn, Turnerhall, Ellon; carpenter repairs on the dwelling-house and steading at Mid Bog (Beattie), Fouldland, Insh; drainage works at the carpenter's croft (Walker), Blindburn, Turnerhall, Ellon. Plans, specifications and general conditions can be seen with the tenants, or with Davidson & Garden, 12, Dae Street, Aberdeen, with whom offers are to be lodged on or before June 22.

June 22. Salisbury.—*Alterations* to the operation ward at the Infirmary, the plans and specifications of which can be seen at the offices of the architects, John Harding & Son, 58, High Street, Salisbury. Tenders to be delivered to S. Buchanan Smith, secy., Crown Chambers, Salisbury, before 4 p.m. on June 22.

June 22. Holywell.—*Alterations and extensions* to the County Intermediate School, Holywell, in the county of Flint. Plans and specifications may be seen at the offices of the architect, Samuel Evans, North and South Wales Bank Buildings, High Street, Mold, from whom bills of quantities may be obtained on payment of a sum of £2 2s. Tenders to be made out on forms to be supplied and sent in to F. Llewellyn-Jones, solicitor, clerk to the Holywell County School Governors, Town Hall, Holywell, North Wales, on or before June 22, in sealed envelopes, marked "Tenders for Extensions at Holywell County School."

June 23. Gillingham.—*Erection of a new school* at Hempstead, Gillingham, to accommodate seventy-six children. Drawings, specification and conditions of contract may be seen on application to Charles H. Langley, 66, Gillingham Road, Gillingham. Bills of quantities and form of tender may be had on payment of £1 1s. The time to be allowed for erecting the building is four months. Tenders, duly endorsed, must be delivered to E. T. Atchison, secy., 8, Waterloo Road, Gillingham, Kent, before noon on June 23.

June 23. Shrewsbury.—*Erection of wooden buildings, stages, &c.*, for the Shropshire Horticultural Society's annual show in August. Plans and specification will be supplied on application to Walter Richards, Swan Hill, Shrewsbury, on payment of £1 1s. The work will be divided as follows:—(1) Buildings and hoardings; (2) horse track, stages and fittings; (3) draining; (4) plumbing. Tenders will be received for any or all sections, and must be sent in by June 23 next, addressed "Chairman of Committee," endorsed "Tender for Erections," to the care of Adnitt & Naunton, hon. secs., The Square, Shrewsbury.

June 23. Birkenhead.—*Erection and completion of a post-mortem room*, Livingstone Street. Plans, specification and particulars can be seen and bills of quantities and form of tender obtained on application at the office of Charles Brownridge, M.I.C.E., borough engineer and surveyor, upon a deposit of the sum of £1 1s. Fair wages clause. Tenders, upon the printed form supplied, sealed and endorsed "Tender for Post-mortem Room," to be sent in to Alfred Gill, town clerk, Town Hall, Birkenhead, not later than noon on June 23.

June 23. Good Easter.—*Pair of labourers' cottages* at Good Easter, Essex. Plans and specification can be seen at the office of Frank Whitmore, architect and surveyor, 73, Duke Street, Chelmsford, to whom tenders are to be sent not later than 10 a.m. on June 23, endorsed "Tender for Cottages at Good Easter."

June 25. Ardsby.—*Conversion* of late boardroom into teachers' sitting-room at West Ardsley, Westerton

Schoolhouse. For carrying-out alterations to drainage, &c., at West Ardsley Hill Top School. A plan of the alterations at Hill Top School may be seen, and copies of specifications for both contracts obtained from the Education Offices, Northgate, Wakefield. Separate tenders must be submitted for each school. Sealed tenders, duly endorsed, must be sent to Alexander Angus, Education Offices, Northgate, Wakefield, not later than 10 a.m. on June 25.

June 25. Barnsley.—*Erection of three elementary schools*, to accommodate 360, 300 and 360 scholars respectively, on a site in Racecommon Road, Barnsley. Applications, together with a deposit of £2 2s., to be made to the architect, Ernest W. Dyson, 14, Market Hill, Barnsley, not later than June 25. Fair wages clause.

June 25. Sevenoaks.—*Erection of an isolation hospital* at Otford, Sevenoaks, Kent, for the R.D.C. The drawings, specifications, and conditions of contract, prepared by the architect, M. Maberly Smith, can be seen at the offices of Cleed & Belcher, of 8 and 9, Martin's Lane, Cannon Street, E.C., to whom intending competitors are requested to send in their names before June 15, and from whom bills of quantities, together with forms of tender, can be obtained on and after June 20, on payment of £2. Tenders are to be delivered before noon on June 25, at the office of George F. Carnell, clerk, 130, High Street, Sevenoaks.

June 25. Tylorstown.—*Extending and converting premises* in Tylorstown into two shops for A. I. Loble, East Road. Plans and specification can be seen at the office of A. O. Evans, Williams & Evans, architects, Pontypridd. Sealed endorsed tenders to be sent to Mr. Loble on or before June 25.

June 25. High Usworth.—*Extensions* to the Wesleyan chapel, and for decoration of the interior. Plans and specifications can be seen at the office of the architect, J. Walton Taylor, F.R.I.B.A., St. John Street, Newcastle. Sealed tenders, properly endorsed, are to be delivered to Rev. Theodore Bishop, 11, Regent Terrace, Gateshead, not later than 10 a.m. on June 25.

June 25. Llanbradach.—*Erection of thirty-one houses* at Llanbradach, for the Llanbradach Building Club. Plans and specification can be seen at the office of John H. Phillips, F.R.I.B.A., architect, Clive Chambers, Windsor Place, Cardiff, to whom sealed tenders are to be delivered by June 25.

June 26. Stanleytown.—*Erection of three houses and vestry* at Stanleytown, Rhondda Valley, for the Trustees of the Welsh Calvinistic Methodist Chapel, Pontygaith. Plans and specification may be seen with William Williams, grocer, Cash Stores, Pontygaith, to whom sealed and endorsed tenders are to be delivered before 5 p.m. on June 26.

June 26. Wrexham.—*Erection of a new post-office* at Wrexham. Drawings, specification, and a copy of the conditions and form of contract may be seen on application to the postmaster between 10 a.m. and 5 p.m. Bills of quantities and forms of tender may be obtained at the Office of Works, on payment of £1 1s. Tenders must be delivered before noon on June 26, addressed to the Secretary, H.M. Office of Works, &c., Storey's Gate, London, S.W., and endorsed "Tender for New Post Office, Wrexham."

June 26. Gordontown.—*For the mason, carpenter and slater works of additions* to steading, Gordontown, Auchterless; also for the carpenter and slater work of addition to steading and offices, Bogamma, Auchterless. Plans and specifications may be seen with the respective tenants, and with James Duncan & Son, architects, Turfrit, and attendance will be given at Gordontown on June 23, at 12 o'clock noon, to show the work to intending contractors. Sealed tenders to be lodged with Thomas Fotheringham, Gordon's College, Aberdeen, factor on the estates, or the architects, on or before June 26.

June 26. New Shoreham.—*Repairs* to lych gate at cemetery, painting lamps, &c., and exterior of town hall, for the U.D.C., particulars of which can be obtained of A. W. Nye, town surveyor, Town Hall, Shoreham. Tenders to be delivered to Harold Brown, clerk to the Council, Church Street, New Shoreham, not later than noon on June 26, endorsed "Tender for Lych Gate Repairs."

June 27. Stoke-under-Ham.—*Erection of five cottages* at Stoke-under-Ham. Plans and specification can be seen at W. Terrell's, North Street, Stoke-under-Ham, to whom sealed tenders must be delivered not later than 6 p.m. on June 27.

(Continued on p. 336.)

VILLAS AT HARROGATE.

THE following are some particulars of the semi-detached villas in Springfield Avenue, Harrogate, illustrated on p. 318 of our issue for last week, which particulars were received too late for insertion with the illustration:—The houses have been erected for Mr. R. S. Palliser on a site sloping to the rear to a wooded dell, and with high sloping banks opposite. To economize in the otherwise wasted and unnecessary height in the basement each floor at the back is 2ft. lower than the front portion. Immediately on entering the hall a vista is obtained through the vestibule screen door and conservatory into the dell, which has been a controlling feature of the plan. A balcony to the morning-room, with way down to garden by outside staircase from conservatory, is also designed to make the most of the views at the back. The houses have four reception-rooms, (billiard-room on second floor, partly in the roof), eight bedrooms, the usual conveniences, and separate servants' bathroom and lavatory. The basement is roomy and, owing to the quick slope, about 11ft. high. The elevations are carried out in Borobridge sand stock bricks and Scotten stone, both of local origin, with the upper portion of the walls rough-cast, coloured a light cream, the roof being covered with Lawrence's Bracknell hand-made sand-faced tiles. The dining-room has oak panelling and fitted inglenook fireplace, with polished Hopton Wood stone jambs, "Well Fire" grate and Ruskin pottery tiles. The ceiling is panelled with oak beams and ceiling moulds. The hall and staircase have wood fittings and panelings, and are finished in white and green enamel. Radiators, from a small boiler in basement, are provided on each floor. Mr. Arthur A. Gibson, of 5, Prospect Crescent, Harrogate, is the architect.

Electrical Notes.

Electricity at the King's Sanatorium.

The installation for electric lighting and supply at the King Edward VII. Sanatorium near Midhurst presents an object-lesson in good work. In the engine-room there are three combined sets, each comprising a Willans & Robinson compound high-speed engine capable of developing 48-b.h.p. at 150 lbs. pressure, and a speed of 470 revs., coupled to a compound-wound dynamo by Messrs. Newtons, Ltd., of Taunton, giving 250 volts and 100 ampères, for light and power. Two of these sets are sufficient to supply the maximum demand. The current is taken to a white marble main switchboard, and thence through two feeders supplying a ring main carried through the subways and along the basement corridors, branches being taken from them to supply groups of rooms. The casing has a smooth, rounded outline without corners to prevent any accumulation of dust and dirt. The wires can thus easily be inspected in case of damage, and as the casing is painted to match the decoration of the walls it is scarcely noticeable. There is a complete installation of electric bells, so that each patient can communicate from his own room to the nurse in charge, and in case a patient is confined to his bed he is provided with a telephone attachment to the bell so that he may speak direct to the nurse from his own room. Messrs. Foote & Milne, Ltd., of Westminster, were the contractors for the electric lighting, telephones, &c., while Messrs. Waygood & Co., Ltd., have supplied and erected an electric press-button passenger lift of special design, consisting merely of a platform with sides and back; it has no roof, being supported by cables at the sides. This lift will take 12 cwts.

and has a speed of 100 ft. per minute. Mr. E. R. Dolby, M.I.C.E., was the consulting engineer for the work.

Electric Power on the G.W.R.

Under this head in the current number of "Engineering" some interesting particulars are given of the fitting-up for electric traction of the suburban tracks of the Great Western Railway, *i.e.*, on the northern half of the Inner Circle. This work has been carried out to the plans of Messrs. Kennedy & Jenkin, consulting engineers to the company. A generating station has been erected at Park Royal equipped with 750 kilowatt three-phase generators, built by the Electric Construction Co., Ltd., each driven direct by Bellis & Morcom triple-expansion engines running at 250 revs. per minute. There are also two exciters. High-tension three-phase current is transmitted to the sub-stations at 6,600 volts and 50 cycles per second by six three-cover paper-insulated lead-covered and armoured cables laid underground on the solid system. There are three sub-stations, namely, at Old Oak Common, Royal Oak and Shepherd's Bush. At these most of the current is transformed to 630 volts, which is the pressure adopted on the third rail. The electrical equipment is by the British Thomson-Houston Co. Each car will have four 150-h.p. motors, and will give a speed of 16 miles an hour, inclusive of stops, with a maximum speed of 30 miles an hour.

A.A. Studio.—The final meeting of the studio of the Architectural Association was held on Monday evening, when Prof. Beresford Pite addressed the students. There was a show of work done during the past session. The A.A. Council have decided to close the studio as, in view of the assured success of the day school, they cannot hope the studio will be self-sustaining.



The Edison & Swan

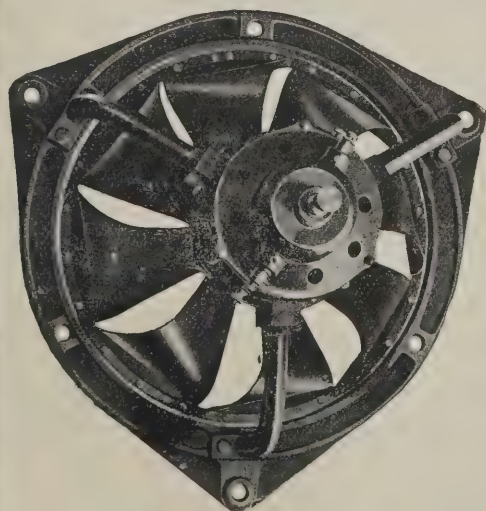


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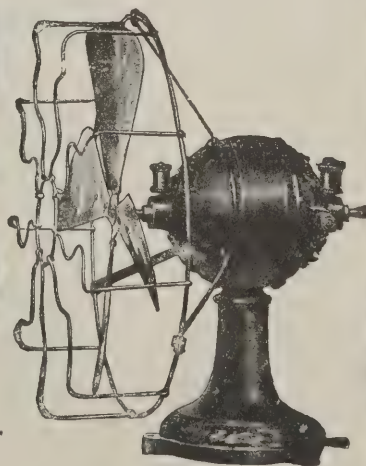


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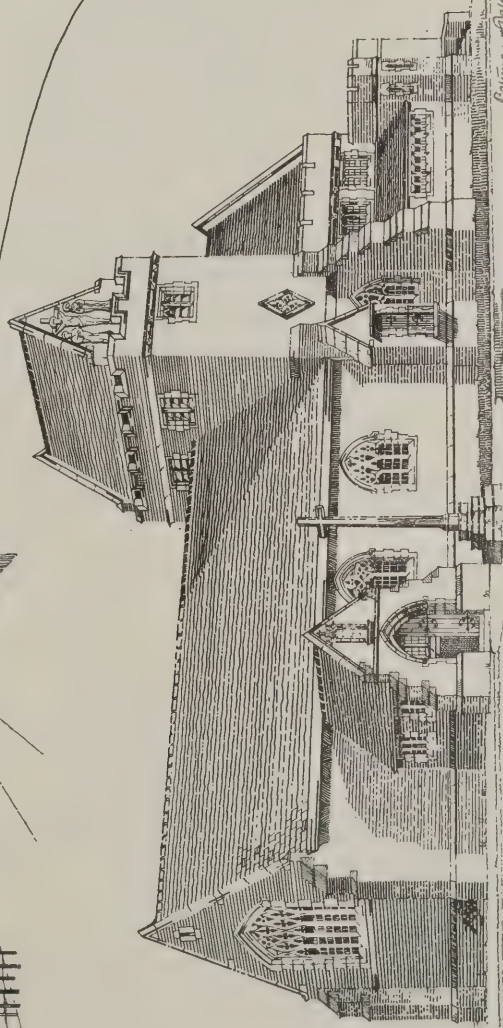
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BLOCK PLAN



VIEW FROM SW

NEW CHURCH FOUR OAKS

This design for a small new church to be erected at Four Oaks, Sutton Coldfield, Warwickshire, was submitted recently in a limited competition, when Mr. W. H. Bidlake acted as assessor. Accommodation for 252 chairs is provided in the nave, and 40 stalls for a choir of twenty under the tower, the vestries being arranged to the east of the chancel and connected therewith by a corridor on the south side. An external pulpit was suggested in addition to the one inside, and the organ to be placed upon a screen instead of in a chamber. A red sandstone was proposed to be used for the wall facing, windows, &c., and Colleyweston stone slates for the roofs. The architects are Messrs. Bateman & Bateman, of 81, Edmund Street, Birmingham.

CONTRACT LIST (continued from p. 334).

June 25. Edinburgh.—Alterations in connection with the forming of isolation rooms in male and female dormitories, Craigleith Poorhouse. The plans can be seen and schedules of quantities obtained on application to R. M. Cameron, architect to the Parish Council, 53, Great King Street, Edinburgh. Sealed tenders are requested to be addressed, delivered, and endorsed to the Clerk, Parish Council Offices, Castle Terrace, Edinburgh, not later than 10 a.m., on June 25.

June 26. Ulverston.—Erection of a house at Newby Bridge, near Ulverston, for Miss Bannister. The drawings and specifications may be seen and copies of the quantities obtained from the architect's offices, Settle & Brundritt, A.R.I.B.A., Ulverston and Barrow-in-Furness, to whom tenders are to be delivered not later than noon on June 26, endorsed "Tenders Newby Bridge House."

June 26. Aberbargoed.—Erection of thirty houses at Aberbargoed, for the Ty-Fry Building Club. Plans, specification and form of contract can be seen and form of tender obtained at the office of D. J. Thomas, architect, High Street, Blackwood, Mon., or at the Ivy Bush Hotel, Pengam, Mon. Sealed and endorsed tenders are to be addressed to the chairman of the Club, T. B. Vendoll, and delivered at the Ivy Bush Hotel, Pengam, not later than noon on June 26.

June 27. Manchester.—Alterations to Litchford and Cooper Fold Farm Buildings, on the Blackley Estate. Drawings may be seen and specification and bill of quantities obtained at the office of the City Architect, Town Hall, upon payment of £1 rs. Sealed tenders, enclosed in the official envelope, to be delivered at the City Architect's not later than 9 a.m. on June 27.

June 27. Inverurie.—For the mason, carpenter and slater work for the undernosed:—Dairy at Brownhills (Mrs. Singers); additions to Muttonbrae Steading; and poultry-house and pig-house at Birns. William Stewart, builder, Inverurie, will meet intending offerors on June 23 at the respective places—Brownhills at 11 a.m.; Birns at 12 o'clock noon; and Muttonbrae at 1 o'clock afternoon—to point out the work and afford any other information required. Plans and specification may be seen either at the places or in the hands of W. Stewart, Inverurie. Offers for the works will be received by Alex. Stronach, junr., & Son, advocates, 20, Belmont Street, up to June 7.

June 27. Ramsgate.—Supply of Portland cement for twelve months. The contractor may estimate that the quantity required will not be less than 100 tons, and probably not more than 150 tons. Specification, form of tender and full particulars may be obtained on application to the Borough Engineer, Albion House, Ramsgate, between 10 a.m. and 4 p.m. Sealed tenders, endorsed "Tender for Cement," are to be addressed to the "Chairman of the Works Committee," and delivered under cover to the Borough Engineer, Albion House, Ramsgate, on or before noon on June 27.

June 28. London, S.W.—Registry of shipping and seamen—adaptation. Drawings, specification and a copy of the conditions and form of contract may be seen on application to J. B. Westcott, M.V.O., H.M. Office of Works. Bills of quantities and forms of tender may be obtained at the same address on payment of £1 rs. Tenders must be delivered before noon on June 28 addressed to the Secretary, H.M. Office of Works, &c., Storey's Gate, London, S.W., and endorsed "Tender for Registry of Shipping and Seamen—Adaptation."

June 29. Eston Junction.—Alterations. Contractors desirous of submitting an estimate for the several works in connection with the proposed alterations and additions to the above-named school may obtain forms of tender and inspect the plans at the school between the hours of 9 a.m. and 4 p.m. Tenders, sealed and endorsed "Tender for Alterations, Eston Junction School," to be delivered to Douglas Smith, secy., County Hall, Northampton, not later than June 29.

June 30. Preston.—Erection of a secondary school for girls in Moor Park Avenue, Preston. Plans and specifications may be seen and blank bills of quantities and form of tender obtained at the Education Offices, Lancaster Road, Preston, on payment of £2 2s. Sealed tenders, endorsed "Tender for Secondary School," must be delivered not later than noon on June 30 to Henry Hamer, town clerk, Town Hall, Preston.

June 30. Glenleam (Ireland).—Construction of an extension to the existing Board pier at Glenleam, Valencia Island. Plans and specification can be inspected at the office of R. Fitzgerald, 25, Denny Street, Tralee, between 10 a.m. and 5 p.m., by whom tenders will be received up to June 30.

June 30. Derby.—Erecting a shed for carts at the Workhouse. Plans and specifications can be seen and bill of quantities obtained on application to F. C. Coulthurst, architect and surveyor, 4, Albert Street, Derby. Sealed tenders, endorsed "Cart Shed" to be delivered to N. Twigg, clerk to the Guardians, Poor Law Offices, Derby, on or before June 30.

June 30. Rhosymedre.—Alterations and improvements to the Congregational Chapel, Rhosymedre, Ruabon. The plans and specification can be seen by appointment with Arthur Davies, 61, Chapel Street, Rhosymedre, to whom the tenders are to be delivered (sealed and endorsed) not later than June 30.

July 2. Plymouth.—Erection of Infirmary buildings at the Plymouth Workhouse, for the Guardians. Builders desirous of tendering are requested to forward their names and addresses to the architects, Thornely & Rooke, 11, The Crescent, Plymouth, on or before July 2.

July 2. Caistor.—Altering the present Primitive Methodist Chapel, schoolroom, and erecting a new building in connection therewith. Specifications and plans may be seen at T. Mairs, Gas Works, Caistor. Tenders are required to be in by July 2.

July 3. Leeds.—Erection of new workshops, cement warehouse, &c., at the Higwains Depot, 155, Kirkstall Road. Drawings may be seen, and instructions to persons tendering, conditions of contract, specification, bills of quantities, form of tender, and form of agreement obtained on application at the depot, and on depositing £3 3s. 10d. for a full set of quantities, or £1 rs. for the quantities for each separate trade. Sealed tenders, endorsed "Tender for

New Workshops, Cement Warehouse, &c.," and addressed to Robert E. Fox, town clerk, must be delivered at the Town Clerk's Office, Town Hall, Leeds, not later than 10 a.m. on July 3.

July 3. Cardiff.—Erection of new offices, stores, stables, &c., at Newtown Goods Yard, Cardiff, for the Great Western Railway. Plans and specification may be seen, and forms of tender and bills of quantities obtained at the office of the Engineer at Newport Station, between 10 and 4. Tenders addressed to G. K. Mills, secy., Paddington Station, London, and marked outside "Tender for Works at Cardiff," will be received on or before July 3.

July 4. London, W.—Erection of receiving wards and porter's lodge at the Workhouse, in the Woodfield Road, W., for the Guardians of Paddington, pursuant to plans and specification to be seen at the offices of the architect, F. J. Smith, F.R.I.B.A., Parliament Mansions, Victoria Street, S.W., between 10 and 5, where all necessary information can be obtained, and also form of tender, upon which alone proposals will be received. Bills of quantities may also be obtained at the offices of the Architect on payment of a deposit of £5 5s. Fair wages clause. Sealed tenders must be delivered at the offices of the Guardians, 313-319, Harrow Road, W., before 10 a.m. on July 4.

July 5. Gosport.—Erection of a new school in Clarence Square, Gosport, to accommodate 330 boys. Plans and specifications may be seen at the offices of the architect, H. Frost, surveyor to the District Council, Gosport, and quantities and forms of tender obtained on payment of a deposit of £5. Sealed tenders, endorsed "Clarence Square School," should be delivered to George R. Walker, secy., Education Offices, High Street, Gosport, not later than noon on July 5.

July 5. St. Keverne.—Erection and completion of proposed residence at St. Keverne, for Dr. E. Levertin-Spry, according to plans and specification, which may be seen by appointment at the proprietor's residence or at the office of Sampson Hill, architect, Green Lane, Redruth, from whom all particulars relating to the work may be obtained. Sealed endorsed tenders are to be sent to the proprietor, St. Kevern, R.S.O., on or before July 5.

July 7. Eastwood.—Erection of a new school at Eastwood, near Southend-on-Sea, to accommodate 160 children, and also for certain alterations and additions to the existing school. Contractors desirous of tendering are required to communicate with S. I. Adams, M.R.S.I., architect and surveyor, Weston Chambers, Weston Road, Southend-on-Sea, not later than noon on June 27, enclosing cheque for £2 2s. Plans and specification may be seen at the offices of the Architect between 10 a.m. and 4 p.m. (Saturdays 10 a.m. to 12 noon) after June 30. Tender, sealed and endorsed "Tender for Eastwood School," are to be sent to J. F. Ingram, secy., Bank Chambers, Weston Road, Southend-on-Sea, by 10 a.m. on July 7.

July 9. Newark.—Alterations and additions at the Union Infirmary, Bowbridge Road, Newark, for the Guardians. Persons desirous of tendering for the alterations and additions thereto are requested to forward their names and addresses and a cheque for £2 2s. as a deposit to A. J. Franks, clerk to the Board, Union Offices, Newark, on receipt of which form of tender and bills of quantities will be forwarded. Plans and specifications may be inspected at the office of the architect, Arthur Marshall, A.R.I.B.A., King Street, Nottingham. The deposit will be returned upon receipt of a bona fide tender upon the form to be supplied. Sealed tenders endorsed "Alterations at Infirmary," must be sent in to the Clerk not later than July 9.

No date. York.—Erection of a new factory about 250ft. by 60ft., together with a corridor and bridge, for Rowntree & Co., Ltd., "The Cocoa Works," York. The foundations, floors, stanchions and staircases to be in reinforced concrete. Plans can be seen and specifications, quantities and form of tender obtained at the Architect's Office, The Cocoa Works, York, on payment of £5 5s.

No date. Magherahamlet (Ireland).—Building a teacher's residence at Magherahamlet, Ballynahinch. Plans and specifications can be seen and full particulars given by Rev. W. Carse, Magherahamlet.

No date. Portadown (Ireland).—Building shop and showrooms, for G. R. Forbes & Co., drapers, Portadown. Plans and specifications to be had from architect, J. W. Walby, Edward Street, Portadown, and 56, Dublin Road, Belfast.

No date. Newport.—Works for W. Hancock & Co. (Ltd.), brewers and wine merchants, Newport and Cardiff:—(1) Pulling down and rebuilding the "Foresters' Arms," at Risca; (2) pulling down and rebuilding the "Rifleman's Arms," at Risca; (3) alterations and repairs to the "Prince of Wales Inn," at Pontypool; (4) alterations and repairs to the "Three Salmons Inn," at Pontypool; (5) repairs to "Green Dragon Hotel," at Chepstow. Plans and specifications may be seen and bills of quantities obtained at the offices of Swallow & Havard, architects and surveyors, Steam Packet Chambers, Dock Street, Newport, Mon.

ENGINEERING.

June 25. Ossett.—Erection of standpipe, 30ft. high, 6in. pipes and meter, at their Service Reservoir, Childswell Lane, Ossett. Tenders, marked "Standpipe," to be sent to the Town Clerk's Office, No. 1, New Street, Ossett, on or before June 25. For particulars apply to E. Illingworth, water inspector, Ossett.

June 25. Edinburgh.—Supply of lead-covered, paper-insulated copper cables for electricity supply conductors for the year ending May 15, 1907. The specification and form of tender can be obtained from the Engineer on payment of a deposit of £2 2s. Tenders must be sent to the Town Clerk, City Chambers, Edinburgh, on or before June 25, and must be endorsed "Tenders for the Supply of Electricity Cables."

June 26. London, S.W.—Reconstruction of the bridges known as Lee Bridge and Lee Green Bridge, carrying Lee High Road over the River Quaggy, both

situate in the metropolitan borough of Lewisham. Persons desiring to submit tenders may obtain the drawings, specifications, bills of quantities, form of tender and other particulars upon application to the chief engineer, Maurice Fitz-Maurice, C.M.G., at the County Hall, Spring Gardens, S.W., upon payment to the cashier of the Council of the sum of £3. Full particulars may be obtained on application at the County Hall previously to the payment of the fee for the specification, &c. Tenders must be upon the official forms, and the printed instructions contained therein must be strictly complied with. Fair wages clause. Each tender is to be delivered at the County Hall, in a sealed cover, addressed to the Clerk of the London County Council, Spring Gardens, S.W., and marked "Tender for the Reconstruction of Lee and Lee Green Bridges." No tender will be received after 10 a.m. on June 26.

June 26. London, S.W.—Supply of the following stores for the Southern Mahratta Railway Co., Ltd.:—8,800 safety chains, 9,736 spiral and volute springs, 20 tons copper ingots, and 6 locomotive boilers, as per specifications and drawings, which may be seen at the offices of the Company. The charge for each specification is £1 rs., which will not be returned. Tenders must be sent in addressed to E. Z. Thornton, secy., 46, Queen Anne's Gate, S.W., marked "Tender for Safety Chains," or as the case may be, not later than noon on June 26.

June 27. Portsmouth.—Supply, delivery and erection of water softening plant, water storage tank, steam, feet and exhaust piping, and sundry iron-work. Specification and form of tender can be obtained at the Town Hall, Portsmouth, on payment of a fee of £2 2s. A copy of the specification may also be inspected (but not obtained) at the offices of the Consulting Engineers, Kincaid, Waller, Manville & Dawson, 23, Great George Street, Westminster, S.W. Tenders must be for the whole of the above work, and no tender for a portion only will be considered. Fair wages clause. Sealed tenders, endorsed "Tender for Contract No. 21," must be forwarded to Alexander Hellard, town clerk, Town Hall, Portsmouth, on or before noon on June 27.

June 27. Birmingham.—Reconstruction of Banbury Street sewer across Paddy's Bank, including a length of about 270 yds. of 3 ft. 6 in. brick barrel sewer in tunnel, and crossing under the Birmingham canal in 42in. cast-iron pipes, including manholes, river outlet, and other incidental works. The plans and specification may be seen, and quantities and forms of tender obtained on deposit of a sum of £2. Fair wages clause. Tenders sealed and endorsed "Banbury Street Sewer," and addressed to the Chairman of the Public Works Committee, must be delivered at the offices of T. Arnall, acting City surveyor, the Council House, Birmingham, on June 27.

June 27. Erdington.—Electrical equipment on the Overhead Trolley System of Tramway No. 1 in the District (2 miles 2 furlongs 930 chains route length) including poles and overhead line equipment for the U.D.C. Contractors desiring to submit tenders for the work should forward their names and addresses to one or other of the joint engineers, Robert Green, of 37, Waterloo Street, Birmingham, and H. H. Humphries, engineer to the Council, Council House, The Park, Erdington, together with a deposit of £5 5s. Drawings may be examined and copies of specification, bills of quantities, and forms of tender obtained upon application to either of the engineers. Sealed tenders, endorsed "Tramways Equipment," are to be delivered to Herbert H. Humphries, engineer to the Council, Council House, Erdington, Birmingham, before noon on June 27, with bills of quantities, which must have every item legibly priced in ink and with the columns added up to the exact total amount of the tender. Fair wages clause.

July 2. Epsom.—Water supply, for the R.D.C. Supplying about 814 yds. of 3in. cast-iron water-pipes and the excavation of trenches, toe carting and laying of the pipes and the fixing of hydrants, &c. Specification of the works can be seen by appointment at the office of F. A. Pratley, the surveyor to the Council, Waterloo Road, Epsom, where full information can be obtained. Tenders, upon prescribed forms (to be obtained on application), must be delivered at the office of the Clerk, addressed "To the Chairman of the Epsom Rural District Council, Lonsdale, Epsom."

July 2. Aylesbury.—Pulling down the existing two old brick bridges and the construction of two new steel girder bridges (over the Grand Junction Canal and mill stream), retaining walls and the kerbing, channelling, metalling, &c., of the roadway between the two bridges, for the U.D.C. The drawings may be seen and copies of the bill of quantities, specification and form of tender obtained on application to W. H. Taylor, engineer and surveyor to the Council, Town Hall, Aylesbury, on payment of £3 3s. Sealed tenders, which must be on the form supplied, should be endorsed "Park Street Bridges," and addressed to Percy A. Wright, clerk to the Council, Town Hall, Aylesbury, to be sent in not later than 4 p.m. on July 2.

July 2. Yiewsley.—Demolishing the old bridge (to foundation level) crossing the Grand Junction Canal at Yiewsley, West Drayton, Middlesex, and for erecting a new structure of 40ft. span in brick, stone and steel in its place, in accordance with plans and specification, which may be seen at the office of H. T. Wakelam, county engineer, Middlesex Guildhall, Westminster, during office hours. Bills of quantities, with forms of tender, may also be obtained on payment of £5. Tenders, endorsed "Colham Bridge, Yiewsley," must be delivered in sealed envelopes to Sir Richard Nicholson, Middlesex, Guildhall Westminster, S.W., on or before July 2.

July 2. Belfast.—Extension of the motor car shed at the Belfast terminus of the Great Northern Railway Co. (Ireland). Parties wishing to tender may see the drawing and specification at the office of W. H. Mills, engineer-in-chief, Amiens Street, Dublin, or copies of them at the office of the District Engineer, Belfast, and can obtain at the said offices lithographed copies of the drawing, specification and form of tender on payment of 10s. (not returnable) per set. Tenders, made out on the forms supplied by the Company and endorsed "Tender for Motor Car Shed," should be delivered to T. Morrison,

secty., Secretary's Office, Amiens Street Terminus, Dublin, not later than 10 a.m. on July 2.

July 2. Dublin.—Construction of about 14 miles of pipe sewers, ejector stations, rising mains, air transmission mains, air-compressing station, together with the supply and erection of various machinery and auxiliary works connected therewith, chiefly in the East Clontarf and West Clontarf Wards of the City of Dublin. The drawings, specification, bills of quantities and forms of tender may be inspected at the office of the City Engineer, City Hall, Dublin, and at the office of the consulting engineer, Mr. George Chaterton, M.I.C.E., 6, The Sanctuary, Westminster, between 10 a.m. and 5 p.m. daily, Saturdays excepted, and a limited number of copies of the said documents may be obtained at the offices aforesaid on payment of the sum of £5 5s. (Crossed cheques only will be received in payment.) No copies of the documents will be sent to contractors until they have been inspected by a representative of the firm. Sealed tenders, and endorsed on the envelope "Tenders for Clontarf Sewerage," must be addressed to the Chairman of the Improvements Committee, City Hall, Dublin, and delivered before noon on June 2. With each tender must be submitted the names of two sureties who will be prepared to execute a joint and several bond for the due performance of the contract in a sum of £10,000. No tender shall be withdrawn or amended (except with the consent of the Corporation) before the expiration of a period of two months of delivery to the Corporation. The work executed under this contract shall be done entirely by local labour, and where this is considered impracticable, the contractor is to apply to the Municipal Council for permission to have the work done by other than local labour, and the Council having considered the statements submitted by the contractor shall by resolution determine whether the work is to be done by local labour or otherwise, and the contractor is to be bound by such resolution. The workshops, factories and other places used by the contractor in the execution of the contract shall be open to inspection at any time during working hours by a duly authorised representative of the trade affected by such contract upon the production of a permit signed by the town clerk or other officer appointed by the Supplies Committee of the Corporation.

July 4. Buntingford.—Construction of new water-works, including the providing and laying of cast-iron pipes, construction of reservoir and engine-house and the provision of pumping machinery at Buntingford, for the R.D.C. Drawings may be seen and copies of the specification, bill of quantities and form of tender obtained at the office of the engineer, John Chadwick, F.G.S., Bletchley, Bucks, upon payment of a deposit of £3 3s. A duplicate set of drawings may also be seen at the Surveyor's Office, Buntingford. Sealed tenders, on the prescribed forms, endorsed "Tender for Water-works," must be received at the office of J. Chalmers-Hunt, clerk to the Council, the Boardroom, Union Workhouse, Buntingford, Herts, not later than noon on July 4.

July 6. Wallasey.—Extension of refuse destructor (not buildings), for the U.D.C., the specification of which and further particulars may be obtained on application to W. H. Travers, engineer and surveyor, Public Offices, Egremont, Cheshire. A charge of £3 will be made. Tenders, enclosed in sealed envelopes, endorsed "Tender—Refuse Destructor," and addressed to H. W. Cook, clerk and solicitor, Public Offices, Egremont, Cheshire, to be forwarded per post not later than July 6.

July 7. Teignmouth.—Laying and jointing of about 17,110 lineal yds. of 6 in., about 1,120 lineal yds. of 6 in., and about 5,850 lineal yds. of 4 in. British Mannesman steel pipes, including haulage of pipes from various railway stations (a separate contract having been entered into for the supply of the pipes), together with the erection of a meter-house and the provision of all necessary sluice, air and other valves, washouts, meters, chambers and incidental works, including the crossing of the tidal river Teign, about one-fourth of a mile in width. Plans may be seen and copies of the general conditions, specification, bills of quantities and form of tender obtained on application at the office of C. F. Gettings, engineer, Town Hall, Teignmouth, on payment of a deposit of £5. Sealed tenders, upon the form supplied, addressed to A. Percival Dell, clerk to the Council, Town Hall, Teignmouth, Devon, and endorsed "Teignmouth Water Scheme, Contract No. 2," must be delivered on or before July 7. Fair wages clause.

July 9. New Zealand.—Tunnel. Alternative tenders will be received at the Office of the High Commissioner for New Zealand, Westminster Chambers, 13, Victoria Street, London, S.W., for the construction of a tunnel 5 miles $2\frac{1}{2}$ chains in length at Arthur's Pass, through the dividing range between Canterbury and Westland, on the route of the New Zealand Midland Railway. They are to be addressed to the High Commissioner for New Zealand, 13, Victoria Street, Westminster, S.W., and marked on the outside "Tender for Arthur's Pass Tunnel—60 months" (or "48 months"). Tenders will be received up till noon on July 9. Specifications, conditions, tender forms and other information may be obtained on application to the High Commissioner upon payment of a deposit of £10. Plans can also be inspected at the High Commissioner's Office.

July 10. Wallasey.—Supply and delivery of alternating current transformers required during the next two years, for the U.D.C. Copies of the specification may be obtained on application to the engineer, J. A. Crowther, at his office, Seaview Road, Liscard. A charge of £1 rs. will be made for each copy of the specification. Sealed tenders on the form provided for the purpose, endorsed "Tender for Transformers," to be delivered to H. W. Cook, clerk and solicitor, Public Offices, Egremont, Cheshire, on or before July 10.

August 7. Lancaster.—Reconstructing and improving the steam-heating arrangements and hot-water service of the County Lunatic Asylum. The committee is prepared to consider tenders from engineers or firms

who are willing to make a survey, free of cost to the committee, and to report on what improvement they would propose to make in the present system. Further information, if required, may be obtained on application to the medical superintendent. Tenders will be received up to the morning of August 7.

Aug. 31. Rio de Janeiro.—Supply of 34 metallic superstructures for bridges on the Central Railway. A deposit of 5,000 milreiros is required. For particulars apply to Intendencia da Estrada de Ferro Central do Brazil, Rio de Janeiro. Tenders to be sent in by Aug. 31.

IRON AND STEEL.

June 26. London, W.C.—Supply and delivery of about 950 tons of 42 in. and other cast-iron pipes and castings, for the Metropolitan Water Board. Forms of tender and contract, with specification, may be obtained and the drawings inspected upon application to the Engineer, at The Firs, Southern Road, Fortis Green, East Finchley, N., between 10 and 4 (except Saturdays). Tenders, enclosed in sealed envelopes, addressed to "The Clerk of the Board, Metropolitan Water Board, Savoy Court, Strand, W.C.," and endorsed "Tender for Pipes and Castings—Staines Reservoirs Communication Works, Contract No. 25," must be delivered at the Offices of the Board not later than 10 a.m. on June 26.

June 30. Sheffield.—Wrought-iron fencing and gates at the Parish Churchyard, Sheffield. Specification and quantities may be obtained at the office of Charles F. Wike, C.E., city surveyor, Town Hall, Sheffield, on payment of 10s., which will be refunded on receipt of a bona-fide tender. Tenders, endorsed "Parish Churchyard Fencing," are to be sent in not later than 9 a.m. on June 30, addressed to "The Chairman and Members of the Improvement Committee, City Surveyor's Office, Town Hall, Sheffield." Fair wages clause.

PAINTING AND PLUMBING.

June 21. Ramsgate.—Painting the Town Hall. Specification can be seen and full particulars obtained on application at the Borough Engineer's Office between 10 a.m. and 4 p.m. Tenders, endorsed "Tender for Town Hall," and addressed to the Chairman of the Watch Committee, are to be delivered at the Borough Engineer's Office, Albion House, Ramsgate, on or before noon on June 21.

June 21. Ramsgate.—Alterations and painting, Italian Gardens, West Cliff. Plans and specifications can be seen and full particulars obtained on application to the Borough Engineer's Office between 10 a.m. and 4 p.m. Tenders, endorsed "Tender for Italian Gardens," and addressed to the Chairman of the Works Committee, are to be delivered at the Borough Engineer's Office, Albion House, Ramsgate, on or before noon on June 21.

(Continued on p. xxii.)

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The "Vortex" Chimney-pot.

This chimney-pot is yet another of the type which aims at preventing draught. It is provided with spiral air passages to create an upward whirling current, while a cone-shaped narrowing at the top reduces the force of wind on the smoke exit, and at the same time increases the strength of the upward current, so preventing the wind getting down the centre flue and causing draught. The "Vortex" chimney-pot is made in red and buff terracotta, and salt-glazed. It is the patent of Mr. William Monks, of 250, Edmund Road, Sheffield, and is in stock at Messrs. J. Parker & Sons, Silver Street Head and Langsett Road, Sheffield; Messrs. Thomas Wilkinson & Sons, Guernsey Road, Heeley; and Messrs. D. & S. Clarke's, Greaseboro' Road, Rotherham.

Anaglypta and Salamander.

The Anaglypta branch of the Wallpaper Manufacturers, Ltd., have just published a large and sumptuously produced catalogue of their "Anaglypta" and "Salamander" decorations. It contains photographic illustrations and dimensioned diagrams of a very large number of patterns. The extent to which these decorations are now used renders such a catalogue of the greatest value, especially as there are notes included giving instructions for fixing, colouring, protection against damp, &c. "Anaglypta" is made of paper pulp which is deposited liquid on to moulds of considerable thickness; it dries to these shapes and retains them without danger of the relief being damaged in affixing to the wall. "Anaglypta" is also made in boards. "Salamander" decorations are made only in boards from pulped asbestos. Both kinds of boards are embossed afterwards. It follows, therefore, that these cannot be made in such high relief as the "Anaglypta" deposited in moulds. The advantages are that repeating designs can be easily and cheaply made, such as borders, friezes, dados, &c. "Salamander" decoration is of course a valuable fire-resistant. We publish illustrations of some good details taken from the firm's catalogue. Fig. 1 shows a ceiling made up of patterns No. 629, a, b, c. This was shown for the first time at the last Master-Painters' Convention at Plymouth in 1905. Fig. 2 shows a small border or frieze 2½ in. in depth, numbered 70 in the catalogue. Fig. 3 is a similar

border 3½ in. deep, numbered 74. There are many other handsome designs in this catalogue which will appeal to all tastes. The designs for ceilings are especially valuable; sketch plans show how they may be fitted to ceilings of any size. The works of the "Anaglypta" branch are at Darwen, and the London office at 71, Southampton Row, W.C.

A new Flooring and Walling Material.

Messrs. J. & H. Patteson are well known as one of the oldest-established firms of marble, granite and mosaic workers in this country: the firm, in fact, was established in 1805 in Manchester, and has done much work for some of the most eminent architects. They have recently published a finely got-up pamphlet showing illustrations of some of the most important work which they have recently executed, together with a long list of such jobs. One good feature in this catalogue is the reproduction of marbles in colour, printed on the cover. These are very close to actual samples and are most appropriate in their position. We notice an

illustration of an Opus Alexandrinum pavement laid at the Hotel Cecil, London. Such work is not very often seen. It is a form of mosaic pavement which makes great demands on the workers, and there are very few firms which could be entrusted to carry out such work well. Messrs. Patteson are one of these. This kind of pavement is a remarkably rich form of decoration, as architects acquainted with ancient examples in Italy and elsewhere know. We are glad to note that it is being revived to some extent. Messrs. Patteson have just taken up two new materials, namely, "Vitalith" and "Segalith." The first is a composition wall-covering and the second a composition flooring material. "Vitalith" is a hard vitreous substance with a polished surface, made from fine aggregates of marble and stone-dust, &c., cemented together with cement of great hardness and durability. It is decorated with colours, either plain or marbled; is waterproof and fire-resisting; can be washed without damage; and can be fixed as sheets or slabs, or plastered *in situ*. It solidifies perfectly within thirty-six hours.



FIG. 1.—ANAGLYPTA CEILING IN HIGH RELIEF.



FIG. 2.



FIG. 3.

ANAGLYPTA OR SALAMANDER ROLLED PATTERNS.

It should have considerable use in hospitals and other buildings where cleanliness is a desideratum, because it can be worked with curves so as to leave no corners for the accumulation of dust; it also renders the apartment proof against rats, mice or other vermin. "Segalith," the flooring material, is laid *in situ*, and is made with a special cement and aggregates such as sawdust, so that it is warm and pleasant to walk upon. It will adhere perfectly to wood or concrete floors, or any other material for the matter of that, and thus can be used to level-up worn floors. This also solidifies perfectly within thirty-six hours. It is just the kind of flooring for hospitals, workhouses and public institutions where cleanliness is desired. Messrs. Patteson's address is at 7, Bayley Street, Bedford Square, W.C. Among works recently executed by them we may mention:—Manchester Fire Station (Woodhouse, Willoughby & Langham, architects); Union Bank, Manchester (Bradshaw, Gass & Hope, architects); Debenham's New Premises in Wigmore Street, London (J. S. Gibson, architect); Blackley Infirmary (Worthington & Son, architects); Children's Hospital, Hull (J. Bilson, architect); Prudential Buildings, Liverpool (Paul Waterhouse, architect); and Bristol Art Gallery (Frank Wills, architect). We take one illustration from the catalogue showing some fine marble decoration carried out by Messrs. Patteson at the Mechanical Engineers' Institute, London, for Mr. Basil Slade, the architect.



MECHANICAL ENGINEERS' INSTITUTE, LONDON. MARBLE WORK BY J. AND H. PATESON. BASIL SLADE F.R.I.B.A., ARCHITECT.

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Angles, M'boro.	do.	6 10 0	6 12 6
Joists do.	do.	6 2 6	6 5 0
Angles, Midlands	do.	6 10 0	6 12 6
Joists do.	do.	6 15 0	7 0 0
Girders plates, Midlands	do.	7 10 0	7 12 6
Angles, Foreign, c.i.f.	do.	6 10 0	6 11 6
Tees do.	do.	6 12 6	6 15 0
Joists do.	do.	6 2 6	6 5 0
Channels do.	do.	6 7 0	6 10 0
Plates do.	do.	7 0 0	7 5 0
Tin, Foreign	do.	175 0 0	176 0 0
Do. English inlets	do.	178 0 0	180 0 0
Zinc, sheets, Silesian	do.	30 0 0	30 10 0
Do. do. Vielle Montaigne	do.	30 0 0	—

TIMBER.

SORT WOODS.

Fir, Dantzic and Memel	per load	2 10 0	5 0 0
Pine, Quebec, Yellow	do.	4 0 0	7 0 0
Do. Pitch, American	do.	2 16 0	5 0 0
Laths, log, Dantzic	per cu. fath.	4 0 0	6 0 0
Deals, Skutskar, Yellow, 5th, 4x11	per std.	9 0 0	—
Do. Nederkalix, Yellow, 1st, 4x11	do.	10 0 0	—
Do. Söderhamn, Yellow, 4th, 4x9	do.	9 15 0	—
Do. Gamleby, White, Unsorted, 3x9	do.	9 0 0	—
Do. Ljusne, Yellow, 4th, 3x9	do.	11 5 0	—
Do. do. do. 5th, 3x9	do.	10 10 0	—
Do. Archangel, White, Dry, 1st, 3x9	do.	11 15 0	12 0 0
Do. do. do. 1st, 3x9	do.	11 10 0	—
Do. do. Yellow, Dry, 2nd, 3x11	do.	15 5 0	—
Do. Quebec, Spruce, 3rd, 3x9	do.	9 10 0	—
Do. do. do. Unsorted, 3x9	do.	9 5 0	—
Do. do. do. do. 2½x7	do.	8 15 0	9 0 0
Do. do. do. do. 3rd, 3x9	do.	11 10 0	—
Do. do. do. do. 3rd, 3x7	do.	10 0 0	—
Do. do. do. do. 3rd, 3x7	do.	9 15 0	—
Do. St. John Spruce, Bright, Unsorted, 1st, 2nd & 3rd, 3x8	do.	8 5 0	—
Do. do. Bright, Unsorted, 1st, 2nd & 3rd, 3x7	do.	8 5 0	—
Do. Ingramport, Yellow and White, Unsorted, 2½x7	do.	8 5 0	—
Battens, Transgund, Yellow, 1st & 2nd, 5x6	do.	8 15 0	—
Do. St. John Spruce, Bright, Unsorted, 3x4	do.	7 10 0	—
Do. Ingramport, Yellow and White, Unsorted, 2½x6½	do.	7 0 0	—
Do. do. do. do. 2x9	do.	7 5 0	—
Do. do. do. do. 2x4	do.	7 15 0	—
Do. do. White, Unsorted, 2x4	do.	8 10 0	—
Do. Räfsö, Yellow, 4th, 2x8	do.	8 10 0	—
Do. St. John Spruce, 1st, 2nd & 3rd, 2x6	do.	7 15 0	—
Do. Kotka, Yellow, Unsorted, 2x4	do.	9 5 0	—
Do. do. do. do. 2x4	do.	9 5 0	—
Do. Fredrikstad, White, Unsorted, 2x4	do.	8 0 0	—

Floorings, Gefle, Yellow, 2nd, 1x7	per square	£ s. d.	£ s. d.
Do. do. do. 2nd, 1x7	do.	0 11 3	—
Do. do. White 3rd, 1x7	do.	0 11 9	—
Do. do. do. 3rd, 1x6½	do.	0 9 0	—
Do. do. do. 3rd, 1x6	do.	0 9 0	—
Do. do. do. 3rd, 1x5½	do.	0 8 6	—
Do. do. do. Unsorted, 1x6½	do.	0 10 0	—
Do. Fredrikstad, Yellow, 2nd, 1x6½	do.	0 10 6	—
Do. do. do. 3rd, 1x6½	do.	0 9 3	—
Do. do. do. 3rd, 1x7	do.	0 9 6	—
Do. do. Yellow and White, 1x7	do.	0 8 6	—
Do. do. Yellow, 1x6	do.	0 9 9	—
Do. Christiania, White, 3rd, 1x7	do.	0 8 9	—
Do. do. do. Yellow, 3rd, 1x5	do.	9 0 0	—
Do. Sandarne, Yellow, 2nd, 1x6	do.	0 11 3	—
Do. Domsjö, White, Unsorted, 1x6	do.	0 10 3	—
Do. Dal, Yellow, 1st & 2nd, 1x5½	do.	0 10 9	—
Do. Stugsund, White, Unsorted, 1x4	do.	0 8 0	—

Tenders.

Addressed postcards on which lists of tenders may be stated will be sent post free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Fetter Lane, E.C. Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Doncaster.—For the erection of eight cottages at Bentley New Colliery, for Messrs. Barber, Walker & Co., of Eastwood, Nottinghamshire. Mr. E. Hall Ballan, M.S.A., F.I.S.E., architect, Doncaster:—

Sprakes & Son	£2,625	0 0
Meanley & Eaton	2,608	0 0
Jenkinson & Burton	2,378	0 0
Cawthorne & Son	2,362	19 10
Dennis Gill & Son	2,300	7 5
W. Barton	2,237	0 0
Carr & Duckitt	2,205	0 0
F. Beasall	2,123	1 4
Walker & Roe*	2,033	16 5
Johnson & Moore	1,999	13 0
F. Bate	1,975	18 8
W. Thomason	1,629	1 0

[Architect's estimate, £2,200.]

* Accepted.

Doncaster.—For the erection of two villas at Bentley New Colliery, for Messrs. Barber, Walker & Co., of Eastwood, Nottinghamshire. Mr. E. Hall Ballan, M.S.A., F.I.S.E., architect, Doncaster:—

Cawthorne & Son	£1,200	16 7
Sprakes & Sons	945	0 0
Jenkinson & Burton	910	0 0
W. Barton	820	0 0
Johnson & Moore	815	16 0
F. Beasall	770	8 2
Carr & Duckitt	761	0 0
Dennis Gill & Son	731	13 11
Walker & Roe*	729	7 9
F. Bate	764	18 10
Meanley & Eaton	671	0 0
W. Thomason	572	0 0

[Architect's estimate, £770.]

* Accepted.

Great Missenden.—For the erection of an artist's studio at "The Brow," for Mr. Julian Phillips. Mr. J. Bruce Merson, architect, 76, High Road, Kilburn, N.W. 1:—

F. G. Rust, Chesham	£512	0 0
Aldridge & Son, Willesden Green	492	0 0
G. Darlington, Amersham	472	0 0
G. Parsons, Prestwood	440	0 0
H. J. Wright, Great Missenden	365	10 0

* Accepted.

London, S.E.—For the construction of a footbridge, for the Deptford Borough Council:—

E. & E. Iles, Wimbledon	£4,823	0 0
Tilbury Contracting & Dredging Co., London, E.C.	3,372	8 7
Boulton & Paul, Norwich	3,125	10 0
Sands & Son, Colwick	2,969	15 0
Shaw & Co, London, E.C.	2,968	10 8
Barry Transport and Engineering Co., London, S.W.	2,955	0 0
H. Woodham & Son, Catford	2,951	1 0
C. Wall, Ltd., London, E.C.	2,870	0 0
Findlay & Co, London, S.W.	2,782	10 6
Kirk & Randall, Woolwich, S.E.	2,781	0 0
Somervail & Co, Dalmy	2,773	10 0
Handyside & Co, Derby	2,714	17 1
W. H. Hyde, Norwood Junction	2,698	0 0
Westwood & Co, Millwall	2,530	0 0
Cross & Cross, 39, Victoria Street, E.C.	2,325	0 0

* Accepted.

Manchester.—Accepted for the whole of the work required in a new office building and alterations to adjoining property in Major Street, Manchester. Messrs. J. H. Burton & J. A. Percival, architects, 150A, Stamford Street, Ashton-under-Lyne:—

Burgess & Galt, Upton Street	£2,790
Alteration to adjoining premises.	
Burgess & Galt, Upton Street	150

[Eighteen tenders received.]

(Continued on p. xxiv.)

Current Market Prices

FORAGE.

	£ s. d.	£ s. d.
Beans ... per qr.	1 15 0	1 16 0
Clover, best ... per load	4 0 0	4 7 6
Hay, good ... do.	3 12 6	3 17 6
Sainfoin mixture ... do.	3 10 0	4 0 0
Straw ... do.	1 8 0	1 14 0

MISCELLANEOUS.

Bricks Stocks, d/d to job	per 1,000	1 14 0	—
Do. Flettons on rail	do.	1 4 0	—
Do. Pressed Wire Cuts, d/d to job	do.	1 16 0	—
Do. Blue brindled wire cuts	do.	1 1 0	—
Do. do. wire cuts	do.	1 5 0	—
Do. do. pressed facings	do.	1 17 6	—
Coke Breeze, into carts at gasworks	per load	0 2 0	—
Do. d/d to job	do.	0 4 0	—
Sand ... per yard	do.	0 7 6	—
Ballast ... do.	do.	0 6 6	—
Granite Chippings ... do.	do.	0 10 6	—
Do. do. ... ½in.	do.	0 11 6	—
Cement ... per ton	do.	1 11 6	—
Lime ... do.	do.	1 4 0	—
Castor Oil, French ... per cwt.	do.	1 10 0	1 2 0
Colza Oil, English ... do.	do.	1 5 9	—
Copperas ... per ton	do.	2 0 0	—
Lard Oil ... per cwt.	do.	2 15 0	2 17 0
Lead, white, ground, carbonate	per ton	16 0 0	—
Do. red ... do.	do.	15 0 0	0 19 0
Linseed Oil, barrels	per cwt.	1 1 3	—
Petroleum, American	per gal.	0 6 3	0 0 6½
Do. Russian ... do.	do.	0 5 3	0 0 6
Pitch ... per barrel	do.	0 8 0	—
Shellac, orange ... per cwt.	do.	9 10 0	—
Soda, crystals ... per ton	do.	3 2 6	3 5 0
Tallow, Town ... per cwt.	do.	1 7 6	1 8 3
Tar, Stockholm ... per barrel	do.	1 5 0	—
Turpentine ... per cwt.	do.	2 9 0	—

METALS.

Standard Copper ... per ton	84 0 0	84 10 0
Do. Strong sheets	do.	99 0 0
Lead, Soft Foreign	do.	16 10 0
Do. English	do.	17 0 0
Do. pipes	do.	19 15 0
Do. sheets	do.	19 5 0
Galvanised Corrugated sheets	do.	12 10 0
Spelter G.M.	do.	27 10 0

CONTRACT LIST (continued from p. xxi).

June 22. Norwich.—*Colouring, painting, white-washing, &c.*, various schools. The whole of the work to be carried out forthwith. Specifications and quantities may be obtained at the office of C. J. Brown, architect and surveyor, Cathedral Offices, The Close, Norwich, between 10 a.m. and 4 p.m., upon payment of a fee of 5s. per school. Tenders to be sent to the architect not later than noon on June 22, endorsed "Tender for Colouring, &c."

June 23. Runcorn.—*Painting* the Infirmary at the Workhouse, Dutton, as per specification, to be obtained at the Clerk's office, 71 High Street, Runcorn. Tenders on the form supplied to be delivered to George F. Ashton, clerk to the Guardians, 71, High Street, Runcorn, not later than June 23.

June 25. Paisley.—*Execution of the plumber work* of the New District Asylum at present being erected at Dykebar, near Paisley, for the Renfrew District Lunacy Board. Plans may be seen in the office of T. Graham Abercrombie, architect, County Place, Paisley, and copies of the specifications and schedules may be obtained from the Clerk on payment of £2 2s. for each schedule. Sealed tenders, marked "Renfrew District Lunacy Board—Tender for Plumber Work," must be lodged with J. Caldwell, jr., clerk, County Buildings, Paisley, not later than noon on June 25.

June 26. Plymouth.—*Painters', carpenters', and masons' work*, required to be done at certain of the scattered homes for the Guardians. A specification of the work required may be seen at the office of the clerk on application between 10 a.m. and 4 p.m. Tenders, setting out separately the cost of the work to be done at each of the homes mentioned in the specifications, must be sent to W. Adams, clerk to the Guardians, 13, Princess Square, Plymouth, not later than noon on June 26, endorsed "Tender for painting, carpentering, and masonry."

June 27. Canterbury.—*Painting, repairs* and other works in connection therewith at the Borough Asylum. The specification can be seen at the office of W. J. Jennings, architect, Canterbury. Tenders to be delivered to the Asylum, addressed to the Chairman of the Committee of Visitors, not later than 10 a.m. on June 27.

June 28. Edinburgh.—*Painter work* at George Heriot's School, Heriot-Watt College, and Trust Offices. Specifications and schedules of measurement may be obtained from John Anderson, superintendent of works. Marked tenders to be lodged with Peter Macnaughton, S.S.C., clerk, 20, York Place, Edinburgh, on or before 10 a.m. on June 28.

June 28. Chesterfield.—*Cleaning and colouring.*—The Hipper Street and St. Helen's Street Council schools, the work to be done during the month of August next. Specifications and forms of tender may be had from C. J. Kerslake, secretary, Education Offices, Fodlambe Road, Chesterfield, to whom tenders should be delivered not later than June 28.

June 28. Prestwich.—*Painting, paperhanging, &c.*, at the Guardians' Offices, Cheetham Hill Road, Manchester, where copies of the specification can be obtained. Tenders, endorsed "Tender for Painting," to be addressed to Edward W. Ogden, clerk to the Guardians, Union Offices, Cheetham Hill Road, Manchester, and delivered not later than 10 a.m. on June 28.

July 2. Chapel-en-le-Frith.—*Painting, varnishing, &c.* at the High Peak Hospital, Chintley, painters, decorators, &c., carrying on business within the hospital district, which comprises the urban districts of Fairfield and New Mills, and the rural districts of Chapel-en-le-Frith and Hayfield. Specification may be obtained of J. B. Boycott, clerk, Union Offices, Chapel-en-le-Frith, to whom tenders, marked "Hospital Painting," must be sent by July 2.

July 2. Ecclesfield.—*Painting and distempering* required to be executed at the High Green Provided School. Persons wishing to tender are requested to make application to the Divisional Clerk for specification. Tenders should reach W. Hague, divisional clerk, Education Offices, Ecclesfield, not later than July 2.

No date. Leyland.—*Painting* the outsides of sixty-two houses and motor works at Leyland, near Preston. Specification may be obtained from I. Bowman, chartered accountant, 17, Cooper Street, Manchester, or J. Tomlinson, Church Road, Leyland.

ROADS AND CARTAGE.

June 21. Luton.—*Paving* and other works of private improvement in Frederic Street, Beech Road and Oak Road, in accordance with the respective plans and specifications prepared by the Borough Surveyor. Separate tenders for each street, endorsed "Street Improvement," to be sent to George Sell, town clerk, Town Hall, Luton, by 4 p.m. on June 21.

June 21. Nottingham.—*Carting* required in the macadamising of Haydn Road. Form of tender can be obtained on applying to the City Engineer, Guildhall. Tenders to be delivered to the City Engineer by 6 p.m. on June 21.

June 23. Edinburgh.—*Laying of cement-concrete footpaths.* Drawings may be seen at the office of G. Somervell Carfrae, C.E., 1, Erskine Place, Edinburgh, from whom a copy of the specification, schedule, and form of tender may be obtained. Tenders, marked "Footpaths," to be lodged with A. Penry Francis, town clerk, 2, London Street, Edinburgh, on or before June 23.

June 26. Lewes.—*Hiring of steam-rollers and scarifiers* for use upon the main roads during the year ending March 31, 1907, for the East Sussex C.C. Particulars and form of tender can be obtained on application to F. J. Wood, A.M.I.C.E., county surveyor, County Hall, Lewes, to whom tenders, endorsed "Tender for Steam Rolling," are to be addressed and delivered on or before June 26.

June 26. Pontefract.—*Supply of 800 tons of broken whinstone or granite and 500 tons of broken dross.* Specification and form of tender can be obtained at the office of John E. Pickard, borough surveyor, Municipal Offices, Pontefract, to whom sealed tenders, endorsed

"Road Material," accompanied by sample, must be delivered not later than 4 p.m. on June 26.

June 27. Runcorn.—*Supply of about 500 tons of zin. and about 500 tons of 1½ in. broken stone for road metal*, to be delivered in such quantities as may be required; to be Penmaenmawr stone, or stone similar in nature and equal in quality, and to be broken into cubes of the above-named sizes, for the U.D.C. Tenders to state the price delivered at the following places in Runcorn, namely:—Stone Croft, Top Locks, and Crane Wharf, Halton Road; and to be accompanied with samples of the metal to be supplied. Tenders to be sent to E. Marshall, secretary, Town Hall, Runcorn, not later than June 27, and to be endorsed "Tender for Road Metal," and addressed to the Chairman of the Highways Committee. Forms of tender may be obtained on application to the Surveyor.

June 27. Uxbridge.—*Works of drainage, construction of manholes, levelling, herbing, channelling, retaining walls, metalting, and other appurtenant works* in the following roads, all situated in the parish of Uiewsley, Middlesex, close to West Drayton G.W.R. Station, for the R.D.C.:—(1) Tavistock Road; (2) Wimpole Road; (3) Winnock Road; (4) Dock Road; (5) Padcroft Road; (6) Fairfield Road. Drawings may be seen and specifications, bills of quantities and forms of tender obtained at the office of J. Freebairn Stow, engineer and surveyor, Surveyor's Office, Corn Exchange, Uxbridge, on a deposit of £5 5s. Sealed tenders, endorsed "Uiewsley Works," must be delivered at the Surveyor's Office not later than 4 p.m. on June 27.

June 27. Dartford.—*For the following works*, for the Metropolitan Asylums Board:—(1) Repairing, tarpaving and other work at Darenth Asylum, Dartford, Kent. (2) Repairing and remaking certain roads at Joyce Green Smallpox Hospital, Dartford, Kent. Each in accordance with drawings and specification prepared by W. T. Hatch, M.I.C.E., M.I.M.E., engineer-in-chief. Drawings, specification, conditions of contracts, and form of tender for each work may be inspected at the office of the Board, Embankment, E.C., and obtained upon payment of a deposit of £1 each. Tenders, addressed as noted on the forms, must be delivered at the office of the Board not later than 10 a.m. on June 27.

June 27. Barnet.—*Supply of 600 tons and upwards of zin. broken granite* of approved quality (the description to be stated in the tender), delivered in trucks, carriage paid, at High Barnet Station, at the rate of 200 tons per week, for the U.D.C. Delivery to commence on Monday, August 20th next. Also for 500 tons of clean, coarse gravel, and about 450 tons of hoggins, in trucks, carriage paid, at High Barnet Station, as may be required. Tenders, sealed and endorsed "Granite," "Gravel," or "Hoggins," to be addressed to H. W. Poole, clerk, and delivered at the Council's Offices, 40, High Street, Barnet, on or before June 27.

June 28. Greenwich.—*Supplying and landing* at the Council's depot, Banning Street, East Greenwich, 6,500ft. super. of 2½ in. and 6,500ft. super. of 3 in. tooled York stone. Specifications, particulars and forms of tender can be obtained at the Borough Engineer and Surveyor's Office, Town Hall, Greenwich Road, S.E., between 10 and 4 (Saturdays between 10 and 12). Tenders, which must be made on the forms to be supplied at the Town Hall, must be sealed up and endorsed "Tender for York Stone," and must reach Francis Robinson, town clerk, Town Hall, Greenwich Road, S.E., before noon on June 28.

July 2. Arundel.—*Supply and delivery of 500 cub. yds. of unbroken, clean, hand-picked flints.* Forms of tender and conditions may be obtained on application to E. F. Farrington, borough surveyor, Town Hall, Arundel, to whom sealed tenders on the form provided, marked "Tender for Flints," must be delivered not later than noon on July 2.

July 2. Doxford.—*Hire of three steam rollers*, two fitted with scarifiers, to be used on a portion of the main and district roads, for the R.D.C. Conditions of contract to be obtained upon application at the office of F. Clerk, clerk to the Council, Bishop's Waltham, to whom sealed tenders, endorsed "Tender for Steam Rolling," are to be sent not later than July 2.

July 6. Brighton.—*Supply of 1,000 tons of granite spalls.* The specification and form of tender may be obtained on application at the office of the Borough Surveyor at the Town Hall, Brighton. Sealed tenders, endorsed "Tender for Granite Spalls," must be left at the office of Hugo Talbot, town clerk, Town Hall, Brighton, before 6 a.m. on July 6.

July 21. Lewes.—*Supply of 600 tons of zin. broken granite*, 250 tons of coarse granite screenings, and 500 tons of broken surface-picked flints. Forms of tender and specification may be had and any further information obtained at the Borough Surveyor's Office, Town Hall, Lewes. Sealed tenders, endorsed "Tender for —," must be left at the office of Montague S. Blaker, town clerk, Town Clerk's Office, Lewes, on or before July 21.

SANITARY.

June 21. Harefield.—*Extension of the sewer* in Watford Road, Harefield, for the Uxbridge R.D.C. Plan and specification may be seen at the office of the Surveyor any day between 8 a.m. and 5 p.m. Tenders, endorsed "Harefield Sewers," are to be delivered at the office of J. Freebairn Stow, Surveyor's Office, Corn Exchange, Uxbridge, Middlesex, not later than 4 p.m. on June 21.

June 21. Durham.—*Construction of a sewer* at Gilesgate, in the city of Durham. The works consist of laying about 1,200 yds. of 12 in. and 6 in. pipe sewers, with the necessary manholes, flushing chambers, &c. Plans and conditions of contract may be seen and bills of quantities, specifications, and forms of tender obtained on payment of £2 2s. on application to the engineer, Harry W. Taylor, A.M.I.C.E., St. Nicholas Chambers, Newcastle-on-Tyne. Sealed tenders, endorsed on envelope "Gilesgate Sewers," are to be sent to F. Marshall, town clerk, Durham, on or before June 21. It is particularly requested that none but thoroughly experienced master contractors, amply provided with the necessary plant, will tender for this work. Two approved sureties, to the

amount of one-third of the contract sum, will be required for the due performance of the contract.

June 23. Willenhall.—*Sewering, levelling, metalting, paving, herbing and channelling, and making generally* of West Street and a portion of Field Street, for the U.D.C. Drawings and specification may be seen and bill of quantities and form of tender may be obtained for the respective contracts at the office of T. Edgar Fellows, C.E., engineer and surveyor, Town Hall, Willenhall, on deposit in each case of £1. Sealed tenders must be delivered to Rowland Tildesley, clerk to the Council, Town Hall, Willenhall on or before noon on June 23, endorsed "West Street" or "Field Street," as the case may be.

June 25. Penarth.—*Construction of humbling bays, manholes, flushing tanks, and about 580 lineal yds. of stoneware pipe sewers*, varying from 6 ins. to 12 ins. in diameter, for the U.D.C. The 12 in. sewer is about 200 lineal yds. long and will be in tunnel. Plans and specification may be examined and bills of quantities obtained from the Surveyor. Sealed tenders, endorsed "Sewers," must be delivered not later than noon on June 25 to Edgar J. Evans, A.M.I.C.E., surveyor, Council Offices, Penarth.

June 27. Edinburgh.—*Works* required in the execution of proposed clean water drains at Trinity Hospital. Schedule of quantities and form of tender can be obtained on applying to the Borough Engineer, Police Chambers, who will also exhibit the general conditions of contract. Plan, section and detail drawings. Tenders must be sent to Thomas Hunter, W.S., town clerk, City Chambers, Edinburgh, not later than 10 a.m. on June 27, marked "Tender, Blinkbonny Drainage."

June 27. Ramsgate.—*Supply and delivery of glazed stoneware pipes, junctions, &c.*, for the ensuing twelve months. Forms of tender and full particulars can be obtained on application to the Borough Engineer at his office. Tenders, endorsed "Tender for Pipes, &c.," addressed to the "Chairman of the Works Committee," are to be delivered at the Borough Engineer's Office, Albion House, before noon on June 27.

June 27. Kearsley.—*For the following works* for the U.D.C.:—Construction of sewers in Cemetery Road and Bridge Street; construction of sewer in Fletcher Street; construction of sewer in Back Fletcher Street. Plans and specifications may be seen and forms of tender obtained on application at the Council Office. Tenders, endorsed "Cemetery Road and Bridge Street," "Fletcher Street," or "Back Fletcher Street," as the case may be, to be delivered to H. Martin, clerk to the Council, Council Offices, Kearsley, Farmworth, S.O., not later than noon on June 27.

June 27. Bootle.—*Reconstruction of a lavatory, &c.*, in the Town Hall. Plans may be seen and bills of quantities obtained at the office of the Borough Engineer. Tenders, sealed and endorsed "Town Hall Lavatory," to be delivered at the office of J. Henry Farmer, town clerk, Town Hall, Bootle, not later than 9 a.m. on June 27.

June 28. Penycroft.—*Providing and laying* about 210 lin. yds. of 6 ins. diameter stoneware and cast-iron pipe sewers, about 1,130 lin. yds. of 6 ins. diameter stoneware pipe sewers and effluent carriers, the erection of a bacterial filter, sewage distributing outlets, manholes, lampholes, flushing tanks, ventilating columns and other appurtenant works, for the Llantrisant and Llantwit Fardre R.D.C., in connection with the sewerage of Penycroft. Drawings and specification may be seen on application to Gomer S. Morgan, surveyor, School Street, Pontyclun, from whom bill of quantities and form of tender may be obtained, on or before June 22 upon payment of £1. The Surveyor will meet the contractors on the ground at 1 p.m. on June 22. Tenders must be delivered to W. Spickett, clerk to the Council, before 10 a.m. on June 28.

TIMBER.

June 21. London, W.—*Supply of 70 fathoms of best Baltic yellow deal ends*, to be delivered at the Workhouse, Fulham Palace Road, Hammersmith, W., not later than August 12. Forms of tender may be obtained at the office of E. J. Mott, clerk to the Guardians, Guardians' Offices, 129, Fulham Palace Road, Hammersmith, W., and must be returned, sealed and endorsed "Tender for Firewood," not later than 10 a.m. on June 21.

MISCELLANEOUS.

June 26. Heywood.—*Supply of stores and materials*, including timber, picks, spades, iron, steel, oil, waste, tallow, Portland cement, lias lime, coal, brass taps and fittings, iron pipes, lead service pipes, sluice valves, fireplug casings, valve casings, and other stores, for a period of twelve months ending June 30, 1907, for the Heywood and Middleton Water Board. Specification, form of tender, and all other information may be obtained on application to James Diggle, C.E., water engineer, Water Board Offices, Heywood. Fair wages clause. Sealed tenders, endorsed as specified, to be sent in to G. G. Bouchier and F. Entwistle, clerks to the Board, Heywood, not later than June 26.

June 30. Rotherham.—*Supply of the following stores and materials* required by the Tramways Department during the twelve months ending August 31, 1907:—Oils and grease; tools, hardwood, brake blocks; cast-iron brake blocks; paints and varnishes; brass castings; nuts, bolts and screws; river sand, &c. Forms of tenders, specification and further particulars can be obtained upon application to the Tramways Manager, Tram Depot, Rotherham. Fair wages clause. Tenders, endorsed "Tramways Stores," to be sent to W. J. Board, town clerk, Town Hall, Rotherham, not later than June 30.

June 30. Droylesden.—*Supply of the following materials*, for the U.D.C.:—Granite sets, griststone sets, chippings, pitch and oil, earthenware pipes and gulleys, bricks, Portland cement, lime. Full particulars and forms of tender may be obtained from Charles Hall, surveyor to the Council, 10, Ashton Road, Droylesden. Tenders, endorsed "Tender for —," must be sent to W. Richards, clerk to the Council, Council Offices, Droylesden, not later than June 30.

Bankruptcies.

(Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; A.J.—Adjudication.)

DURING THE WEEK ending June 15th twenty-three failures in the building and timber trades in England and Wales were gazetted.

G. CROUCH, builder, Birmingham. R.O. June 7th.

H. ARDEN, contractor, Exeter.

CUNNINGHAM & Co, contractors, Fleet. Adj. June 1st.

J. J. R. ROBINS, builder and contractor, Farnham. P.E., Guildford Town Hall, July 3rd, at 1.

J. WHITE, builder and contractor, Eastbourne. Adj. June 7th.

J. B. HENCHER, builder, Worcester. First meeting, 45, Copenhagen Street, Worcester, June 22nd, at 11. P.E. Worcester Guildhall, July 10th, at 2.

C. W. CAMPION, plumber, Southend-on-Sea. First meeting, 14, Bedford Row, W.C., June 20th, at 3. P.E., Shirehall, Chelmsford, July 4th, at 10.

A. H. ATKINSON, builder and contractor, Hull. First meeting, O.R.'s, Hull, June 20th, at 11. P.E., Hull C.C., June 25th, at 2.

C. SHUTTLEWORTH & Co. painters and decorators, Bradford. First meeting, O.R.'s, Bradford, June 20th, at 3. P.E., Bradford C.C., July 18th, at 10.

T. & C. PANTER, builders and contractors, Drakes Broughton. Gross liabilities £2,252; assets estimated at £477.

Glasgow Architectural Association.—At the annual business meeting held last week Mr. James Lochhead, A.R.I.B.A., was re-elected president and Mr. James M'Kissack and Mr. Alex. Wingate were re-elected vice-presidents.

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TENDERS—cont. from p. xxi

Doncaster.—Accepted for the erection of a house at Vincent Road, for Mr. Thomas Gill, of Sunny Bar, Doncaster. Mr. E. Hall Ballan, M.S.A., F.I.S.E., architect, Doncaster:—

Dennis Gill & Son... .. £800

Longwith Bassett.—For the erection of a mixed school at Longwith Bassett, near Mansfield, for the Derbyshire Education Committee. Mr. H. Tatham Sudbury, architect, Estate Offices, Ilkeston:—

Haskard, Rudkin & Beck, Leicester £3,560 0 0
G. G. Middleton, Workop ... 3,325 0 0
H. Chattle, Derby... .. 3,260 0 0
G. Haynes, Bolsover ... 3,249 8 0
W. Ford & Sons, Derby ... 3,117 0 0
Maule & Co., Nottingham ... 3,199 0 0
A. Earnshaw, Ilkeston ... 3,172 0 6
J. Greenwood, Mansfield ... 3,149 0 0
A. Eastwood & Sons, Warsop ... 3,120 0 0
C. Vallance, Mansfield ... 3,090 0 0
H. Vickers & Son, Nottingham ... 3,067 0 0
Lund & Swan, Ecdington ... 3,019 0 0
D. Roberts, Ilkeston ... 2,989 0 0
J. & J. Warner, Mickleover ... 2,966 0 0
Lee & Kirk, Chesterfield ... 2,965 0 0
F. H. & J. W. Moore, Shirebrook ... 2,900 0 0
Harris & Hunt,* Ripley ... 2,850 0 0
* Accepted.

Market Harborough.—Accepted for alterations and additions to the workhouse, for the Guardians. Messrs. Coates & Johnson, architects, Bank Buildings, Market Harborough:—

T. Hickman, Market Harborough ... £1,660

St. Fagan's.—For the erection of a residence at St. Fagan's, near Cardiff, for Mr. Robert Forrest, J.P., St. Fagan's. Mr. H. Snell, M.S.A., architect, Penarth:—

J. Moffatt & Sons, Birmingham ... £8,300 0 0
J. Wood & Sons, Worcester ... 8,265 0 0
S. Shepton & Sons ... 8,075 0 0
W. Sapcote & Sons, Birmingham ... 8,050 0 0
W. T. Morgan ... 7,900 0 0
Collins & Godfrey, Tewkesbury ... 7,830 0 0
A. Escourt & Sons, Gloucester ... 7,823 0 0
E. Turner & Sons ... 7,768 0 0
W. Cowlin & Sons, Bristol ... 7,599 0 0
W. Thomas & Co. ... 7,537 3 9
W. Bowers & Co.,* Hereford ... 7,184 0 0
* Accepted. (Rest of Cardiff.)

Seaford.—For the erection of a house. Mr. J. Steward Taylor, architect, Seaford. Quantities by Mr. H. Curtis Card, F.S.I., Q.S.A.:—

D. Lee ... £2,249 11 7
Hudson & Co. ... 1,995 0 0
W. Wilkinson ... 1,777 15 0
G. Godfrey ... 1,776 5 0
J. Martin ... 1,660 0 0

Cook & Sons ... £1,588 0 0
Page & Son ... 1,560 0 0
Godfrey Brothers,* Seaford ... 1,496 10 0
* Accepted.

Watford.—For the erection of a residence, with stabling in the Rickmansworth Road, for Mr. S. H. Timms. Mr. Daniel Eames, architect, 8, Wigganball Road. Quantities by Mr. J. B. Colwill, 60, Gladstone Road, Watford:—

Watkins ... £1,295
Judge ... 1,250
Clifford & Gough ... 1,247
J. & G. Goss ... 1,223
C. Eames ... 1,176
A. & C. Saw ... 1,150
Clark Brothers* ... 1,117
* Accepted.

West Hartlepool.—For infirmary extension and new laundry to be erected within the Union grounds, for the Guardians. Mr. John J. Wilson, architect:—

Laundry. Pavilion.
H. C. Howe ... £1,510 0 0 ... £2,875 0 0
A. Stephenson ... 1,487 6 6 ... 2,593 4 5
J. Howe & Co. ... 1,440 0 0 ... 2,910 0 0
W. M. Thompson ... 1,403 2 3 ... —
Nicholson & Thistle ... 1,402 1 6 ... 2,805 9 5
C. T. Watson ... 1,402 0 6 ... 2,949 7 3
Watt Brothers ... 1,384 14 11 ... 2,804 15 4
E. M. Tweddle ... 1,315 0 0 ... 2,631 14 6
Brazil & Whitton ... 1,285 17 10 ... 2,688 7 8
J. A. Tweddle* ... 1,233 0 0 ... 2,580 0 0
* Accepted.

Wisbech.—For the erection of a house, for Mr. G. F. Glenny, Messrs. George Baines & Son, architects, 5, Clement's Inn, Strand, London, W.C.:—

Kerridge & Shaw, Sturton Street, Cambridge ... £1,651 5 8
* Accepted.

Coming Events.

Wednesday, June 20.

BUILDERS' FOREMEN AND CLERKS OF WORKS' INSTITUTION.—Half-yearly Meeting of the Directors at 8 p.m.

Thursday, June 21.

CHEMICAL SOCIETY.—Ordinary Meeting at 8.30 p.m.

Saturday, June 23.

EDINBURGH ARCHITECTURAL ASSOCIATION.—Visit to Gosford House, Longniddry.
NORTHERN ARCHITECTURAL ASSOCIATION.—Students' Sketching Club Excursion.
ARCHITECTURAL ASSOCIATION.—Visit to Gomshall, Surrey.



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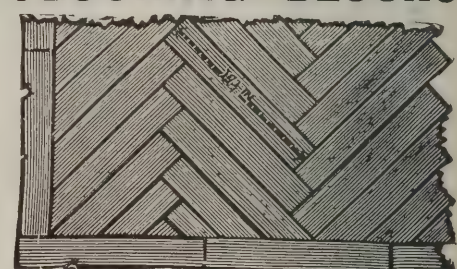
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17½ x 3 x 1½	6 9	6 3	



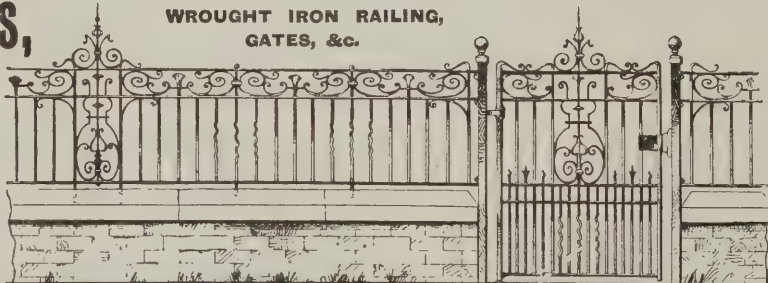
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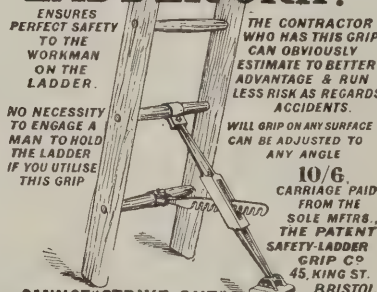
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THE BUILDERS' JOURNAL

AND ARCHITECTURAL ENGINEER.

June 20th, 1906.

CONCRETE AND STEEL SUPPLEMENT (MONTHLY).

EARLY USE OF REINFORCED CONCRETE.

IN the first number of this "Concrete and Steel" supplement Mr. Thomas Potter, in dealing with the history of the use of concrete, gave a good deal of information regarding the early use of reinforced concrete. We have, however, collected together from various sources further information on the subject with the object of forming a record, and also in the hope that it will lead to a better understanding of the development of this now important branch of construction.

The term reinforced concrete in a wide sense would include all forms in which concrete is strengthened by other materials. It would, indeed, embrace the Roman concrete where tiles were used as facing to walls and a permanent centering to vaults and domes, or wooden laths and timbers used to stiffen plaster walls as in half-timber work, but we only propose to trace the history of concrete reinforced with iron, and it should be more particularly confined to the use of iron in small sections where the concrete takes part of the stresses.

Fox & Barrett's Floor.

Fox and Barrett's floor was described by Mr. Potter in the article above referred to. It was patented in 1844, but it was first invented by Dr. H. H. Fox in 1833, and used in that and the succeeding year in the erection of a lunatic asylum, Northwoods, at Frampton Cotterell, near Winterbourne, Gloucestershire. Cast-iron joists were used, fixed 18 ins. apart. Laths were laid between and plaster squeezed in; lime concrete was then filled in between. Fox & Barrett's floor was used at St. Mark's College, Chelsea; Guy's, the Foundling and Brompton Hospitals, Balmoral Castle, the Wiltshire Lunatic Asylum and many other buildings.

In 1840 M. Louis Leconte, a Frenchman resident in London, patented in England a system of using iron flitch plates in connection with wood, and transverse iron rods connecting the whole, filled in with a plaster-of-Paris concrete. He appears to have used a form of metallic lathing, which also helped to support the concrete until it set.

In the second edition of Fairbairn's book "On the Applications of Cast and Wrought Iron to Building Purposes" (published in 1857-8), he describes how floors were constructed in Paris with iron bars placed on edge and rods running between, upon which plaster-of-Paris concrete was deposited. Figs. 1 and 2 show these floors, and the following is Fairbairn's description:—

A system of fireproof flooring has been in use for some time on the Continent, and indeed has been partially employed in this country. In France two principal systems have been introduced, called respectively the *Système Vaux* and the *Système Thuasné*, from the names of their inventors. In the *Système Vaux* it will be seen that the beams for supporting the flooring consist of simple plates of wrought iron, split and bent at the end to obtain a firm holding in the wall. These are bound together by tie-rods, which are crossed by other rods supporting the ceiling. In the *Système Thuasné* wrought-iron flanged joists have been substituted for the plates, and a different method of attaching the tie-rod is employed. The beams . . . vary in depth, thickness and length, according to the width of the room and the length of the span. At first they were placed at distances of 1 metre apart = 3 ft. 3½ ins.; but that distance was found to be inconvenient, not giving sufficient strength and rigidity to the floor; and hence they are now placed at about 2 ft. asunder. The usual manner of forming the ceiling is to force upwards against the bottom of the iron

joists flat boards, which answer as a centering, and then to fill up the spaces between the joists and tie-rods to a depth of 2½ ins. or 3 ins. with a coarse grout of plaster-of-Paris.

Mr. H. H. Burnell described these floors, however, in a paper read before the Royal Institute of British Architects in January, 1854, with illustrations. He stated that the Vaux system came into general use in the spring of 1852. Mr. G. R. Burnell had, however, in a paper read before the same body in 1849, referred to Vaux's system. It may be mentioned that square rods were used in both systems, which is not clearly shown in the diagrams. The floors of the New Louvre were built on the Vaux system.

In 1852 Robert Mallet obtained a patent for using wrought-iron joists, with arched plates resting between, upon which concrete was deposited.

The Inventor of Reinforced Concrete.

In 1854 Mr. W. B. Wilkinson, "a plasterer and manufacturer of artificial stones," of Newcastle-on-Tyne, took out a patent for fire-resisting construction in which the fundamental principles of modern reinforced concrete construction are embodied. Not only does this patent cover the reinforcement of floor slabs with crossing iron bars, but it shows how to reinforce concrete girders or beams to sustain these floor slabs. It is plain from the patent specification that Mr. Wilkinson clearly understood the subject, and had practically investigated the principles involved. His was no blind leap in the dark, and it seems that he must be acclaimed as the real inventor of modern reinforced concrete, where the metal is only introduced to strengthen the concrete in tension, designed on a scientific basis. This patent also is the first to suggest the construction of tubular partitions with keyed joints. He founded the firm of W. B. Wilkinson & Co., Ltd., of Newcastle-upon-Tyne, which is well-known for its work in plain and reinforced concrete to-day. We are informed by this firm that some years ago a fire unfortunately occurred at their offices and destroyed all the old books and papers, so that the particulars of early contracts (of which many important ones are known to have been carried out in the 'sixties and 'seventies), executed by the firm. As this patent is of such interest we publish the following abstract. The illustrations have been redrawn, so as to bring out the essential details more clearly than the original drawings in the specification do. We would draw particular attention to the way in which the tension members are inclined upwards towards the supports following the bending moment, the continuity of beams over supports, the separation of the ends of the tension members and twisting round rods to

avoid pulling out; and in the case of the arched floors the short lengths of iron introduced at the abutments—all of which are to be found in latest practice. The following is an abstract of Wilkinson's patent specification (dated October 27th, 1854, and sealed April 3rd, 1855):—

In constructing the floors of dwelling houses or warehouses, formed during the progress of the building with ceilings of an arched form, the walls of the building are to be carried up to the requisite height for the first floor; a centering is then to be firmly fixed over the whole area intended to be floored and boarded with narrow strips, leaving a small space between each, if the ceiling be for a dwelling house, and very slightly nailed, to keep them in position. The material to form the floor and ceiling is composed of crushed bricks, metallic scoria, or other hard substances (which, however, must be free from soil or other extraneous matter), and Portland or other cement of equal quality. These materials may be mixed together in the proportions of three parts of crushed hard-burnt bricks and scoria, sifted through a riddle of about 2 in. mesh, one part of hammer-broken stones or bricks, or other hard substances, reduced to about the size of zins. diameter, one part of the same material hammer-broken and reduced to about the size of a quarter brick; the whole is then to be well incorporated. The three parts of zin. scoria and burnt bricks are then mixed with water, to which are afterwards added two parts of the coarser material, the whole being well worked together with the cement to produce perfect adhesion. This mixture when ready is thrown on to the centering, and beaten in solid, the coarser portions in the haunches and the finer parts towards the crown of the arch. As the larger portions of the broken bricks, &c., would not lie conveniently over the crown of the arch, where the thickness is much less than at the haunches, a number of strips of hoop iron laid on edge are imbedded in the mass across the crown of the arch, at distances of about 2 ft. asunder, or at greater or less distances, according to the desired strength of the floor, and reaching the full length across the floor or floors, the under edge of the same being set at or near the crown of the centering, so that in this low position the strips may act with more power as tension rods to the floor. The concrete is filled up to the desired level, and if for dwelling houses or warehouses for the storage of light goods, it may be trowelled smooth and finished in cement, or laid with boards. If a wood floor is desired, strips of wood may be imbedded or dovetailed into the cement, to which strips the flooring boards are nailed. When the first floor has been formed, it must be protected from injury by being covered with thin deals, laid on a stratum of sifted sand, which will assist in keeping the concrete moist for a longer period than if it were exposed to the free action of the air, slow drying adding greatly to its strength and durability. The centering should not be removed until the concrete has become sufficiently set, which will be at the expiration of about a month, the walls of the next storey having been built in the meantime to act as an abutment to the arch. The rest of the floors as well as the roof may be constructed in a similar manner, care being taken to give a sufficient rise to the middle of the roof, to throw off the wet into a channel or gutter at the front and back; or, if preferred, a slated roof may be put on the top in the usual manner. The floors formed in the manner herein-before described will admit of brick partitions being set upon them in positions where a wooden floor would not admit of. The peculiar construction and arrangement of these partitions will be hereinafter more particularly described and referred to. The stairs may be of stone, or of the same material as the floors, which will be considerably cheaper and as good.

For warehouses the arch and supporting walls are made of additional strength. When ceilings of arch form may be objected to, and when it may be necessary to execute works with despatch, as in putting in new floors to old buildings, in place of the method herein-before described a flat platform of wood is to be erected to the ceiling line, and the floor to be composed of plaster, air-slacked lime, cut hay, and ashes and breeze in certain proportions, and wire rope (which may be procured second-hand in considerable quantities), or iron in other forms in a state of tension, hollow bricks, field drain pipes, coke in lumps, &c., being introduced, if desired, to lessen the weight. A floor of this construction is shown on the

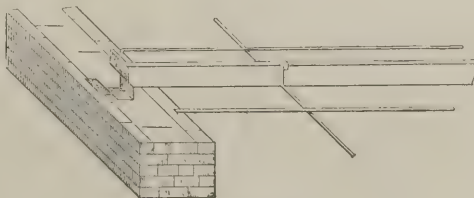


FIG. 1.—Système Vaux.

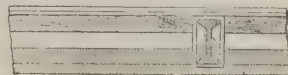


FIG. 2.—Système Thuasné.

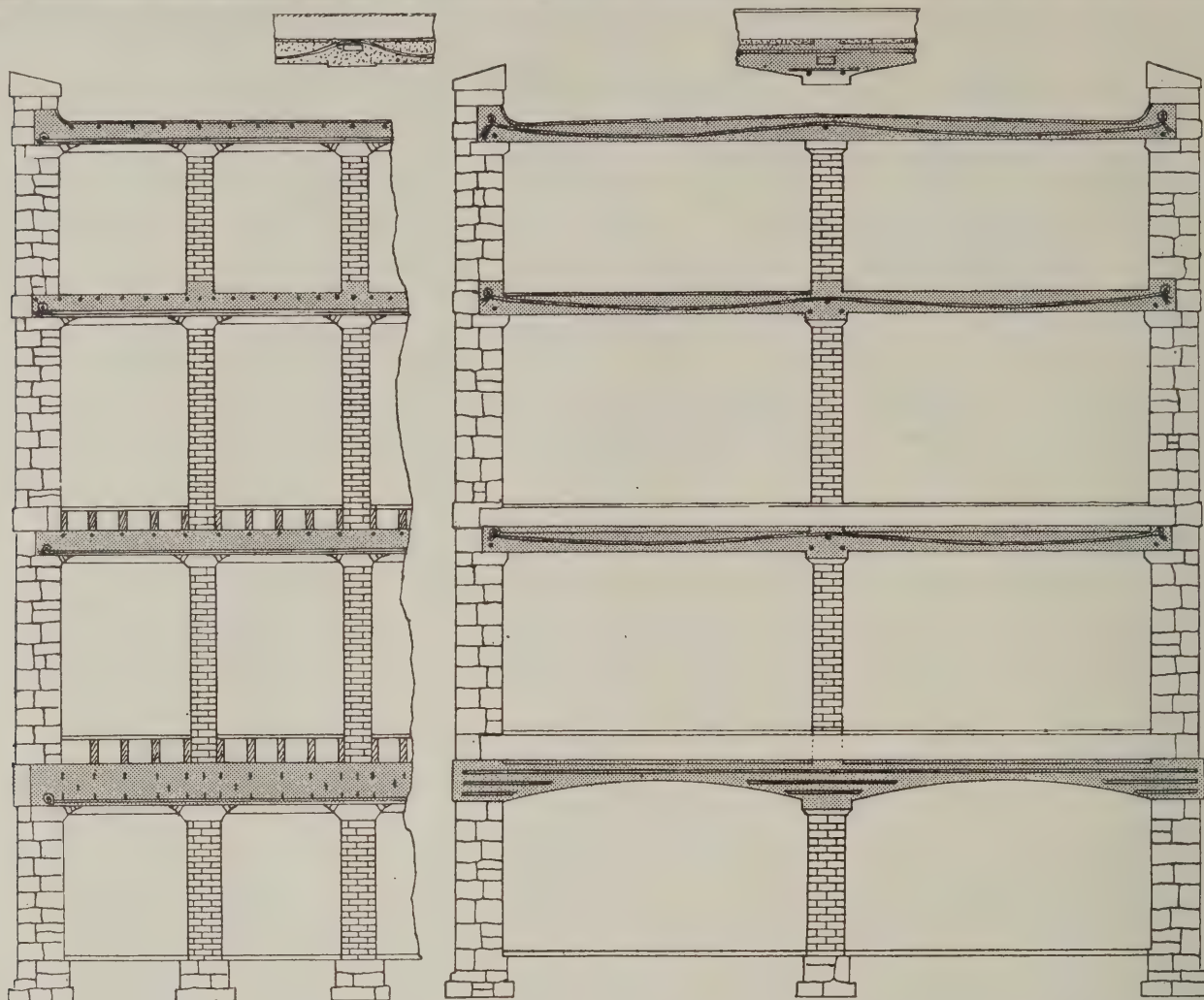


FIG. 3.—WILKINSON'S 1854 SYSTEM OF REINFORCED CONCRETE.

drawings. The wire rope is secured at its extremities at each line of support by imbedding it in the mixture or concrete while in a soft state, and forming the ends into loops, or by opening out the strands and hirling them in various directions, which renders it so secure as not to be drawn out under any force short of the breaking weight of the rope. In ordinary dwelling houses I propose placing such wire ropes about 9 ins. apart, and to have a full depth of floor of one-sixteenth the span; so that for a span of 16 ft. I should have a flooring of 1 ft. in depth, the breaking weight of which is calculated at 2½ tons per superficial yard. . . . Fig. 4 represents the fireproof partition hereinbefore referred to, the beam supporting the same. . . . In lieu of the ordinary lath and plaster, these partitions are composed of Paris plaster alone, or of plaster-of-Paris and air-slacked lime, cast in blocks of a cellular form. The cavities or cells run horizontally, and the blocks are dovetailed together at the joints, and united with strong gauged plaster-of-Paris and lime, putty, or air-slacked lime; they are set fair and dressed with scrapers, forming a surface suitable either for paint or paper. This partition may be used on ordinary wooden floors, and is not more heavy or expensive than lath and plaster partitions. In some cases this partition may be supported on a beam composed of wire ropes, plaster, cut hay, &c., as shown.

J. L. Lambot's Patent.

The following year, 1855, we find a M. J. L. Lambot, stated to be of Carces, Department of Var, France, and 32, Essex Street, Strand, London, taking out a full patent in France, and a provisional patent dated February 13th in this country. As this latter is short we will give the full description, which is as follows:—

"A building material to be used as a substitute for wood in naval and architectural constructions, and also for other domestic purposes where dampness is to be avoided. I make this substitute of a network or parallel set of wires, or metallic bars or rods, imbedded or cemented together with hydraulic or other cementing matter, so as to form beams or planks of any suitable size."

This is probably the inventor referred to by L. J. Mensch in "Reinforced Concrete Constructions," an American book published in 1904, in the following words:—"The first reinforced concrete structure which came

to public notice was exhibited at the World's Fair in Paris in 1855. It was a small row-boat built by a Mr. Lamont (*sic*), of a shell of cement mortar 1½ ins. thick, and reinforced by a wire netting. It is still in service in a pond in Miraval, France."

François Coignet.

In the same year M. François Coignet, of Paris, took out patents in both France and England. Whereas the French patent only dealt with the making of concrete from hydraulic limes and various aggregates, the English patent included reference to the construction of reinforced concrete floors. It was not until 1858 that he obtained the extension of his French patent which describes this system of reinforced concrete.

The paragraph referred to in his English patent, dated November 26th, 1855, is as follows:—

This new description of floorings is established by laying on the walls to support the flooring a certain number of iron stop planks, parallel one to another, and reposing on the walls by their ends, so as to be completely supported by the whole thickness of the wall. The number and strength of the said iron planks is in proportion to the pitch and to the area of flooring to establish; for instance, for a flooring of 15 ft. to a side, or 225 sq. ft., I have employed three iron planks 4½ ins. deep, of which 3 ft. weighed about 22 lbs.; but instead of iron planks I can establish iron rods placed at convenient distances apart one from the other, and traversing through and through the four walls supporting the flooring, so that these iron rods cross symmetrically one another and look somewhat like a chess-board. These rods, being in the shape of a screw and having a nut at each end, will prevent the walls from losing their perpendicularity. Should the flooring have a great span and a large area, strong iron beams would be placed at convenient distances, and the iron planks and rods would rest on the beams.

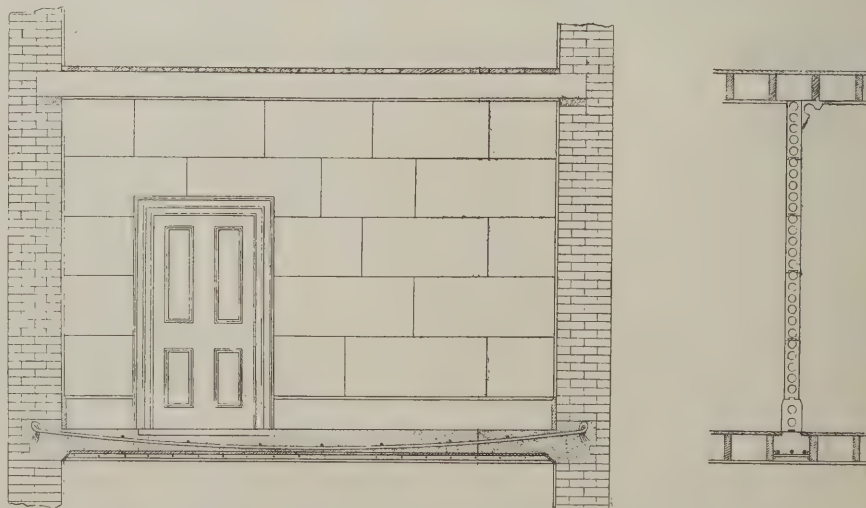


FIG. 4.—WILKINSON'S 1854 HOLLOW PARTITION AND SUPPORTING BEAM.



FIG. 6.—HYATT'S PATENT FLOOR WITH SHEAR MEMBERS.

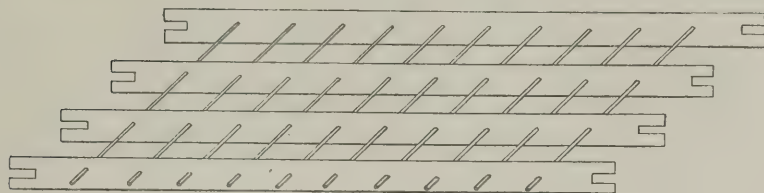


FIG. 5.—ONE OF HYATT'S PATENT FLOORS.

M. Coignet then goes on to describe the placing of the centering and the filling in of the concrete.

Dennett's Floors.

In 1857 Mr. C. C. Dennett took out his patent for a fireproof floor, which has become familiar as carried out in many important buildings by Messrs. Dennett & Ingle. Mr. Dennett provided in his patent for strengthening the crown of concrete arches, resting on walls or joists, by embedding lamina of wood or iron therein.

M. Allen and F. Ransome.

In 1862, Mr. Matthew Allen, a builder of Finsbury, took out a patent. His system was to use 3in. by ½in. bars fixed on the walls, 2ft. apart, and crossed by ½in. rods also 2ft. apart.

Mr. Frederick Ransome in 1865 provisionally protected the strengthening of slabs, bearers, &c., by moulding the concrete round hoop iron.

Monier System.

In 1867 Monier took out a patent in France. M. Monier has been acclaimed as the pioneer of reinforced-concrete, but we see that he was antedated by several others. Even in 1867 Monier had not realized the possibility of using his invention for structural work. The 1867 patent is for strengthening concrete flower-pots with a wire mesh. It was not until 1873 that he took out an extension of the patent to cover its use for reservoirs, bridges, &c. In 1879 Monier exhibited his system in the Antwerp Exhibition, where Herr G. A. Wayss noticed it and bought the German patents. Experiments were carried out, the system thoroughly studied, and its use pushed with vigour.

Hyatt's Researches.

Between 1873 and 1881 Mr. Thaddeus Hyatt, an American, took out between thirty and forty patents for reinforced-concrete constructions. He carried out a series of experiments, and Kirkcaldy tested a number of beams for him in 1877. The results of these experiments he published in 1877 in a book printed for private circulation. We reproduce several illustrations from this book of test beams and the forms adopted practically by him. It will be noticed from Figs. 7 to 11, that not only did Mr. Hyatt invent beams with double reinforcement, but adopted inclined reinforcements and also vertical reinforcements to take the shear, which are rigidly attached to the bottom tension members. Fig. 11 shows a beam with only four vertical stirrups or hangers, but others of the same size were tested with ten.

Mr. Hyatt, it may be mentioned, was the inventor of the "Lens" pavement lights, which, after getting largely adopted in the United States for basements, he introduced in this country. To advertise his reinforced concrete system he built large works for these pavement lights in Farringdon Road, London, at a cost of £20,000, but the building was

some time ago reconstructed and his floors removed. Mr. Hyatt's firm still has an office a few doors away. The construction adopted in the building referred to is shown in Figs. 5 and 6. The former shows "the ceiling holders" which were slipped over the flanges of the joists, with the crossing wires "which form an entangling meshwork to hold the concrete." Fig. 6 is described as dispensing with the floor joist, "flat tie-irons being substituted for the joists; the concrete in this case becoming the compressive member of the beam or slab. Numerous buildings were erected on his system in the United States, but it did not make much headway here.

Mr. Hyatt proved that the expansion of concrete and steel was the same at even high temperatures. A system of calculation was also suggested, but the data determined regarding the proportions, strength and modulus of elasticity of the concrete were insufficient for adequate treatment.

Ransome.

Mr. Ransome, of the United States, introduced his system of reinforced concrete with twisted rods about 1880.

Stuart's Granolithic.

About this time Mr. Stuart, a Scotch plasterer, who founded the present firm of Stuart's Granolithic Stone Co., Ltd. was also introducing rods to reinforce concrete in tension. In fact this firm was one of the first to carry out reinforced concrete on an extensive scale in this country.

It is now close on eighteen years since Messrs. Stuart began an extensive series of experiments for floors and beams in concrete, reinforced with steel rods. Before this steel rods had been employed in their paving. It

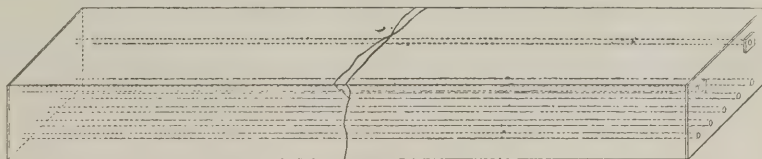


Fig. 7.

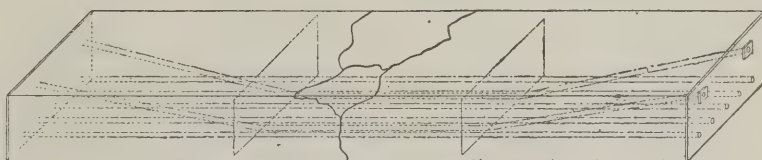


Fig. 8.

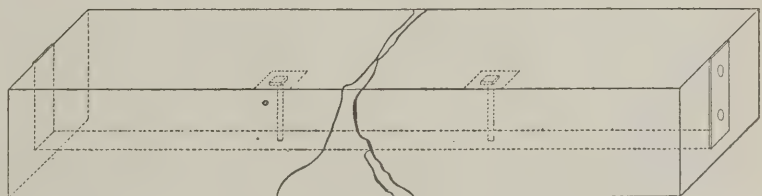


Fig. 9.

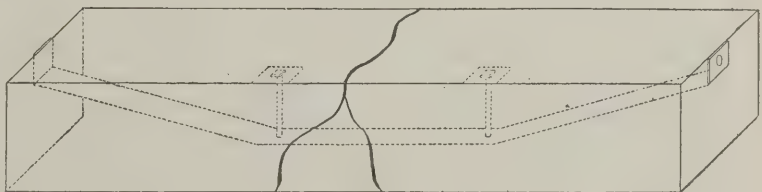


Fig. 10.

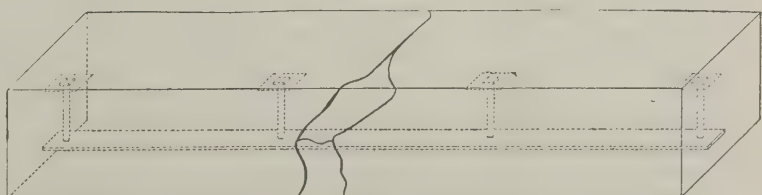


Fig. 11.

FIGS. 7 TO 11.—BEAMS TESTED BY KIRKCALDY FOR THADDEUS HYATT IN 1877.

is not, however, more than fifteen years since they applied the combination of small steel rods and concrete to floors and beams with large spans for buildings of magnitude. These buildings, after a lapse of many years, show no depreciation whatever so far as the floors are concerned.

The following are a few of the buildings where Messrs. Stuart carried out reinforced concrete work, arranged in chronological order:—Sanderson's factory, Chiswick; Mar Lodge, Braemar, for the Duke of Fife; Selwyn College, Cambridge (under Sir A. Blomfield, architect); Straker's premises, Whitefriars; Walsli's huge drapery establishment, Sheffield; Nottingham Borough Asylum; C. Jenner & Co.'s premises, Edinburgh; Belgrave Mansions, in the West End of London; Birmingham Technical School; Horton Asylum (under Mr. Hine, architect); Rauby Asylum, Sleaford; and Cowen's Paper Factories, Upper Thames Street, and at Penicuik, Midlothian. These are many years old, and all the floors there are ferro-concreted. Sanderson's factory was done probably fifteen or more years ago, and was promoted by a mere boy: an architect who had the courage of his convictions, young Ernest Sanderson, who died before the job was very far advanced, being completed by Mr. Catherwood, architect, of London.

Expanded Metal.

In 1884 Mr. Golding, an American citizen, patented expanded metal. At first this was only used as lathing for plasterwork, but in time it was manufactured of heavier gauge and used in various well-known ways.

The first Reinforced Concrete Column.

Messrs. Lee & Hodgson took out a patent in 1885 which is interesting as apparently the first idea for a column or pillar of concrete reinforced with metal. The construction described in the specification and illustrated, consists of spirally coiled metal, crossing so as to form a trellis. If necessary, straight bars were placed vertically to stiffen the framework. The columns were to be constructed solid or hollow.

Lindsay's System.

In this same year, 1855, Mr. W. H. Lindsay patented his system of reinforcing the concrete between floor-joists with rods, a system that has been extensively employed by Messrs. William Lindsay & Co., of 23, Queen Anne's Gate, Westminster.

The Present Coignet.

M. Edmond Coignet, son of the M. François Coignet above referred to, stated his ideas regarding reinforcement of concrete in 1888 before the French Society of Civil Engineers, and he read a paper on methods of calculation with M. Tedesco before the same society in 1894, which was practically the starting point of modern theory.

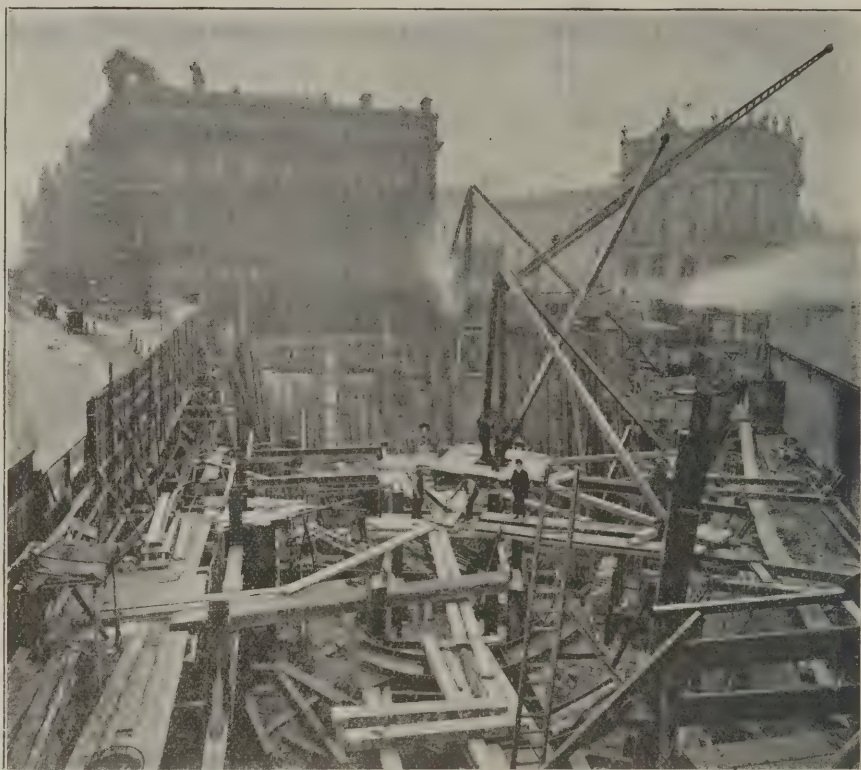
Cottancin and Hennebique.

Mr. R. J. P. Cottancin patented his well-known system in both France and England in 1891, and M. François Hennebique, an engineer then resident in Brussels, took out his patent in 1892. The latter system is dealt with elsewhere in this issue.

The rest is modern history.

Reinforced Concrete Foundation Work, &c.

It is interesting to note that the following works have just been completed on the Coignet system of armoured concrete for the new premises for Messrs. J. C. & J. Field, Ltd., at Rainham, Essex:—Foundation beds for three Galloway boilers, foundation beams for two buildings, large coal bunkers, foundations for shaft and economizers, and also two small bridges. The architects are Messrs. Scott, Hanson & Fraser, of London, and the contractors are Messrs. W. King & Son, of London. Armoured concrete has proved most valuable for these foundations amongst the multitudinous things that have to be taken into account in drawing up a scheme of construction.



GENERAL VIEW OF WORK AT "MORNING POST" BUILDING, LONDON. MEWES AND DAVIS, ARCHITECTS. WARING WHITE BUILDING CO., LTD., CONTRACTORS.

THE "MORNING POST" BUILDING.

In our first "Concrete and Steel" Supplement we published a photograph and sectional diagram of the concrete retaining wall which has been constructed at the new "Morning Post" building now in course of construction in Aldwych, London. We also published a

few particulars regarding this steel-frame building, the architects of which are Messrs. Mewes & Davis, the contractors being the Waring White Building Co.

We now give a view looking down the excavation and showing the manner in which the timber was put in, in short lengths as the work of excavation was done. It was of course most important that no subsidence should occur, and the photograph shows the exceptional care which was taken to avoid anything of the sort.

Present Condition of the Building.

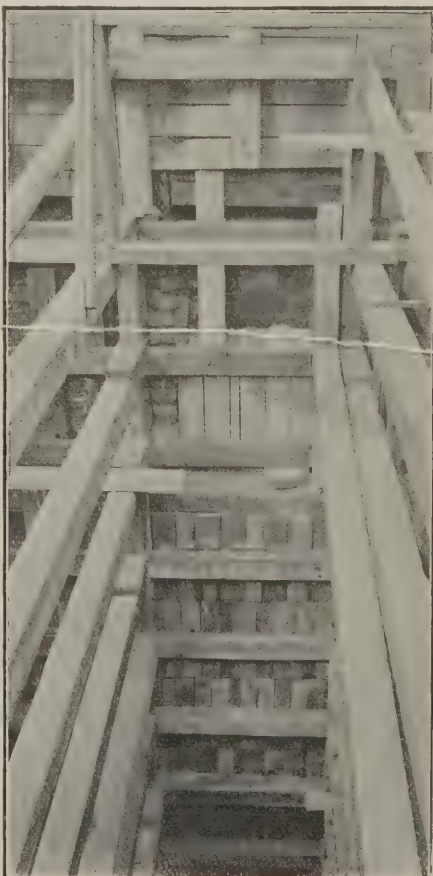
We also publish three photographs taken on Friday last showing the present state of the construction of this building. The general view of the site, published on this page, shows the retaining wall completed and the intermediate mound of earth being rapidly removed.

The Steelwork.

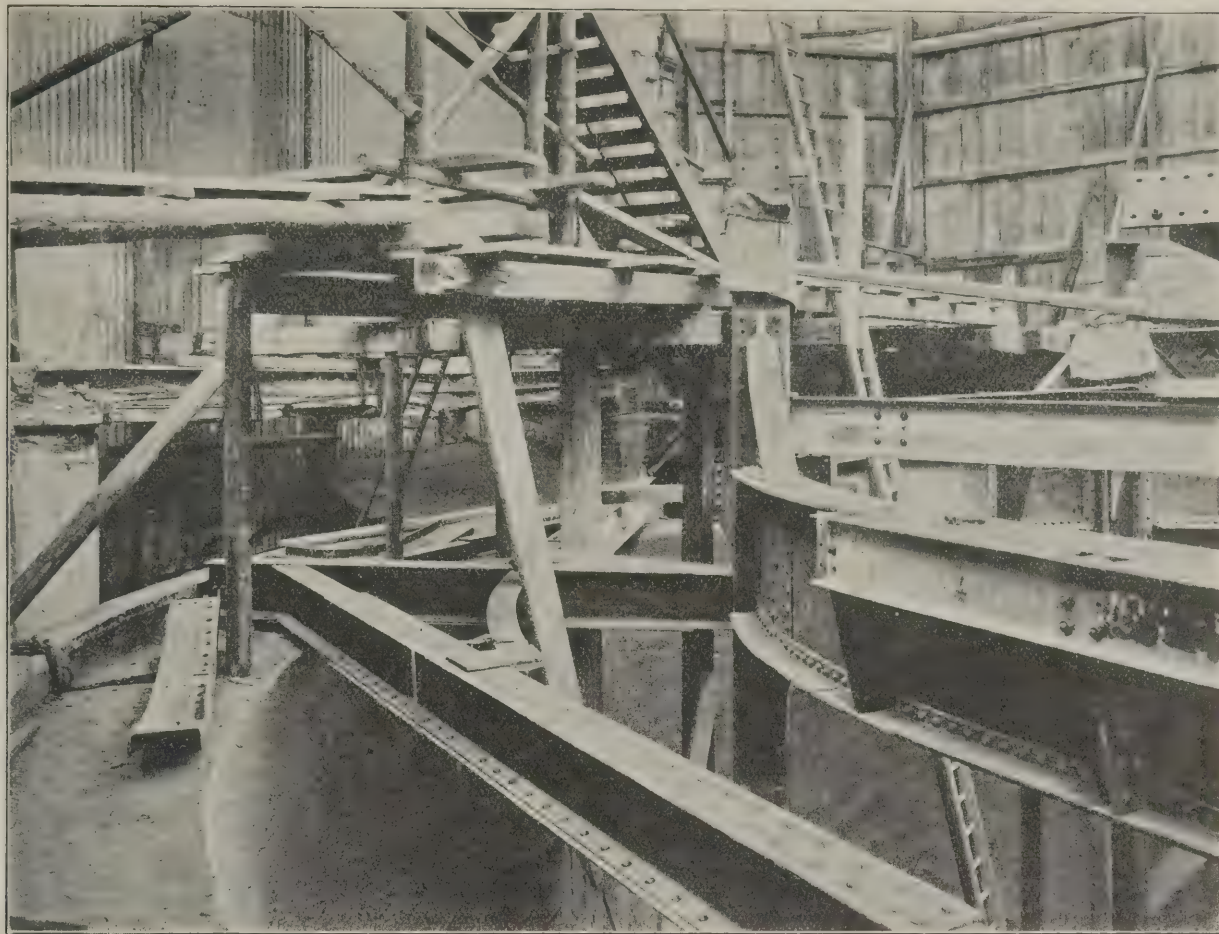
At the end of the site nearest the Strand it will be seen from views on the next page which were taken of this portion that the steelwork is rapidly rising. These detailed views also show the retaining wall at this corner. One of the views shows the large circular girders which are an important feature of the work. There are a considerable number of these, as the building comprises several storeys, and there are three circular corners.

It is not often that circular girders are used and the design of these is interesting. We shall publish further particulars and illustrations later on. It may be mentioned, however, that the usual plan is to run out cantilevers over a straight girder, the former supporting the circular front wall. This is an easy method of dodging the difficulties entailed in the design of a circular girder. The details of the connections, shown in our views, are also deserving of study as examples of economical design.

We shall publish some of the steelwork detail drawings later, for which Mr. S. Bylander is responsible. Mr. Bylander, it will be recollected, was the engineer who designed the steelwork of the Ritz Hotel, Piccadilly.



VIEW LOOKING DOWN EXCAVATION SHOWING TIMBERING AT "MORNING POST" BUILDING.



Detail of Curved Girder, with Beams resting on Retaining Wall.



View looking towards Strand Corner, showing Curved Girder and Retaining Wall.

STEELWORK OF THE NEW "MORNING POST" BUILDING, CORNER OF STRAND AND ALDWYCH, LONDON.

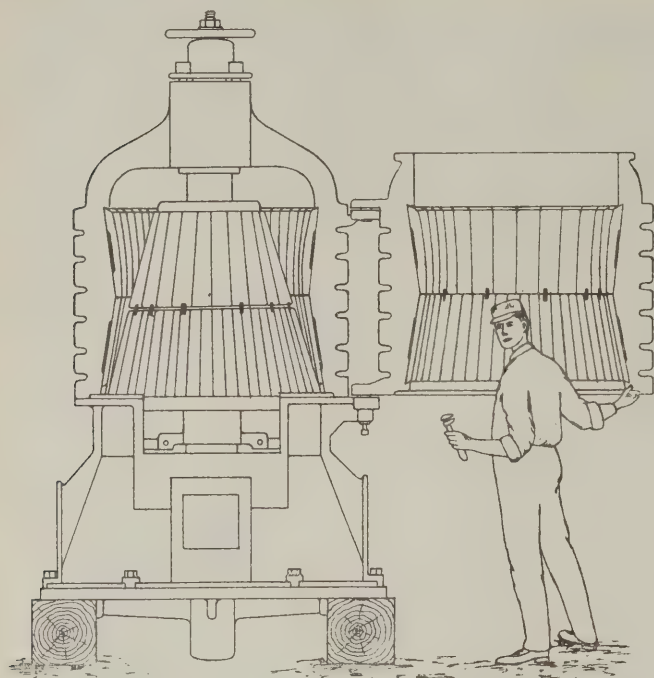


FIG. 1.—ROTATING STONE CRUSHER.

CONCRETE MACHINERY.

By Prof. Henry Adams, M.I.C.E.

Stone Breakers.

WHEN stone is required for the aggregate in concrete, or for ballasting a railway, or for road metal, it is necessary that it should be crushed to a convenient size. This is sometimes done by hand-labour, but if a large quantity is required a considerable saving will be effected by using one of the many varieties of stone-crushing machines, either of the rotating or hammer action pattern. Fig. 1 shows a stone crusher of the rotating pattern, one of the outer jaws being open to show the internal arrangement for crushing, the arrangement being very similar to the domestic coffee-grinding mill but on a very much larger scale. The lumps of stone are put in at the top and, coming in contact with the revolving ribbed cones, which are fixed to a central shaft, are crushed smaller as they descend, and finally the stone emerges

from the bottom, broken as fine as required. It is important that the aggregate for concrete should be of a varying size: for general foundation work the largest pieces should not exceed $1\frac{1}{2}$ ins. in any dimension, while for fireproof floors 1 in. should be the maximum, some experts preferring that it should not exceed $\frac{3}{4}$ in. It should be graduated from the maximum down to, say, $\frac{1}{4}$ in., and the finer material, freed from dust, may be used in place of sand in sufficient quantity to fill the voids. Fig. 2 shows a "hand-hammer action" stone-breaker. Every revolution of the crank shaft *r* causes the lower end of the movable jaw *D* to advance towards the fixed jaws *C 1, C 3* about $\frac{1}{8}$ in. at the bottom. Hence if a stone be dropped in between the convergent faces of the jaws it will be broken by the next succeeding knap, which is given 250 times per minute; the fragments will then fall lower down and be broken again, and so on until they are small enough to pass out at the bottom, the distance between the jaws

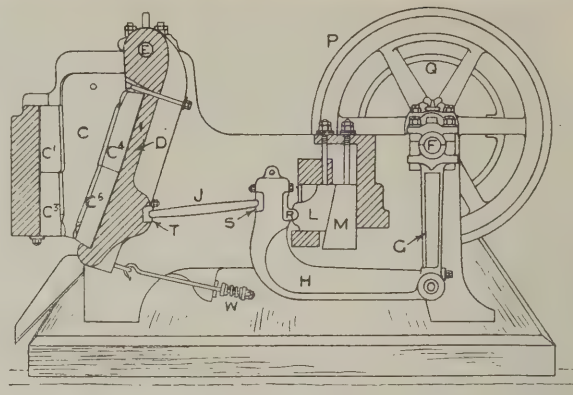


FIG. 2.—SECTION OF STONE BREAKER.

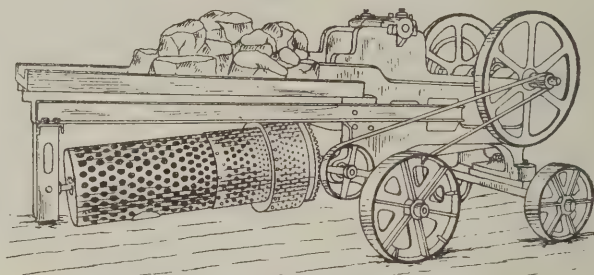


FIG. 3.—ELEVATION OF STONE BREAKER.

at the bottom limiting the size of the fragments. The distance (and consequently the size of the fragments) may be regulated at pleasure; a variation to the extent of 1 in. may be made by raising or lowering the wedge *M*, which moves the toggle block *L* forward or back. Further variation may be made by substituting a longer or shorter toggle plate *J* as required. The machine is driven by a belt on the pulley *Q* or the flywheel *P*, keyed on the crank shaft *r*, which makes 250 revolutions per minute; on this crank shaft is the connecting rod *G*, the lower end of which is connected to the frictionless lever *H* by means of the shaft *O*, and is fulcrumed at the point *R*, this lever being again connected by the toggle plate *J* with the movable jaw *D*. *C 1, C 3* are the fixed jaws against which the

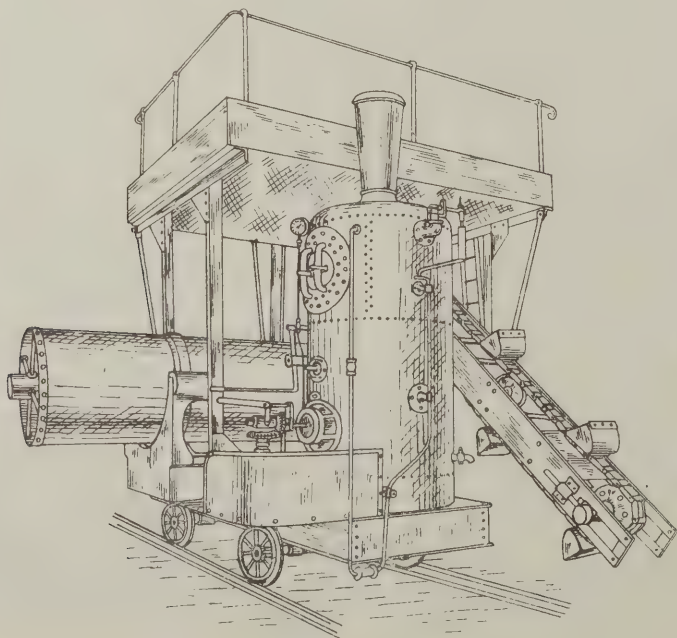


FIG. 5.—CONTINUOUS CONCRETE-MIXER.

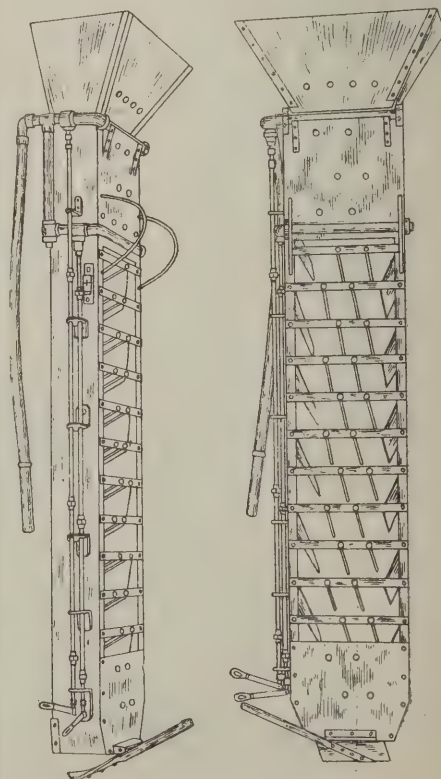


FIG. 4.—GRAVITY CONCRETE-MIXER.

stones are crushed, these being held in place by side plates c, which fit in recesses in the interior of the frame on each side. The movable jaw d is supported by shaft e, which forms the pivot upon which it vibrates. w is a steel spiral spring, which is compressed by the forward movement of the jaw and aids its return. T, s, r are renewable steel bearings. The jaws c 1, 3, 4, 5 are reversible (top to bottom). The connecting rod and the lever are made of solid crucible cast steel. Fig. 3 shows the external arrangement of the machine, with a slightly inclined perforated revolving cylinder, down which the stone passes when crushed. These perforations are smallest near the top end of cylinder, to allow the small stuff to drop through while retaining the larger and coarser material, which passes lower down the cylinder, then finally through larger holes.

Concrete-mixers.

The mixing of the ingredients for making concrete was at one time performed entirely by hand-labour, but in recent years many different forms of concrete-mixers have been introduced with a view to economy and the production of concrete of less varying qualities. The machines may be divided into two classes—(1) gravity mixers (Fig. 4), in which bars and plates are arranged so as to retard the passage of the ingredients while travelling from top to bottom, causing them to become completely mixed by the time they reach the bottom; and (2) mechanical mixers, which are again sub-divided into (a) "continuous" mechanical mixers, which require a constant feed and give a continuous delivery, and (b) "batch" mechanical mixers in which a given quantity of material is placed in the machine at one time, mixed and delivered, and the mixer is then ready for another charge. An illustration of a continuous concrete mixer is shown in Fig. 5, the ingredients being raised into position by means of a bucket elevator and passed into the revolving horizontal cylinder, which has blades fixed to the central shaft; these blades revolve at a different speed to the cylinder, and so prevent the concrete from clinging to the sides. The water is carried along the horizontal shaft and sprayed on to the contents of the cylinder while in motion, and the concrete when mixed is discharged from the end of the cylinder. An American "batch" concrete-mixer is shown in Fig. 6, the ingredients are placed in the drum, on the inside of which steel scoops and deflecting blades are riveted as shown in Fig. 7, which is a sketch of part of the interior, and as the drum revolves these scoops and blades turn the materials over somewhat similar to a man with a shovel. When thoroughly mixed the steel shoot is lowered and the contents of the drum slide down into the barrow or cart underneath. In English "batch" mixers the materials are fed into a revolving drum in which are arranged blades and scrapers. The ballast is raised to the required position by means of a bucket elevator, and the water is measured in a tank provided with a ball-cock. The whole machine is portable and is raised above the ground sufficiently high to allow small wagons to pass underneath to receive the charge of concrete when mixed. As the concrete-mixer cannot always be in the exact position required for the concrete when finished, it is important that the method of transporting the mixed material should be as rapid and easy as possible. The illustration (Fig. 8) shows a concrete cart capable of holding 6 cub. ft. of concrete, and when full and running on planks this cart may easily be hauled by one man. The carts are made of steel, and when used in conjunction with the American concrete batch-mixer they may be filled very rapidly. Under certain circumstances the concrete may have to be raised or lowered from one position to another, and when this is the case dumping

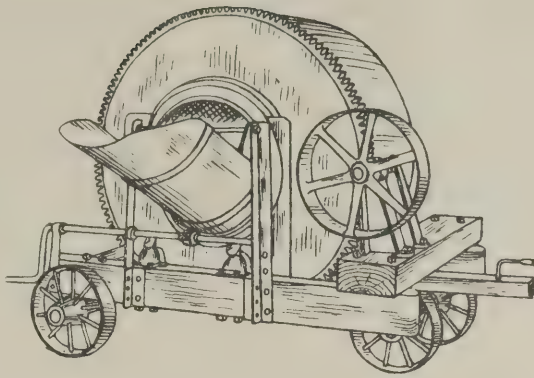


FIG. 6.—AN AMERICAN "BATCH" MIXER.

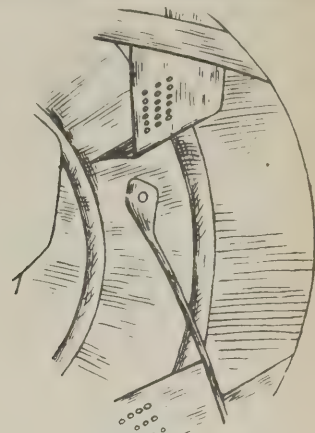


FIG. 7.—INTERIOR OF DRUM.

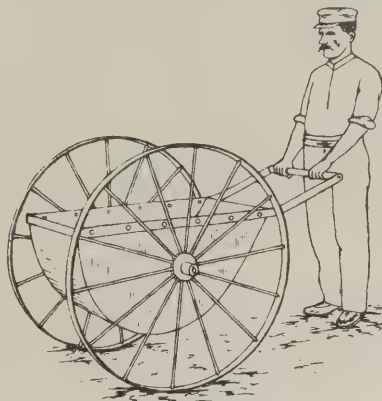


FIG. 8.—CONCRETE CART.

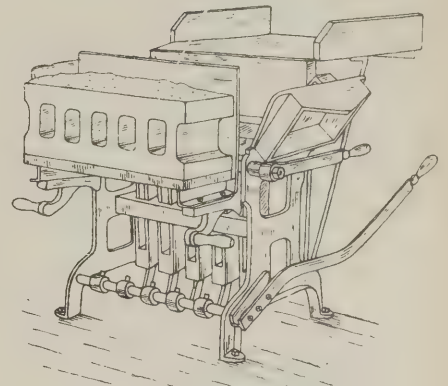


FIG. 9.—CONCRETE BUILDING BLOCK MACHINE.

buckets fitted to cranes may have to be used.

Concrete Block Machines.

Of recent years many attempts have been made to introduce concrete building blocks, somewhat similar to terra-cotta blocks, to take the place of the ordinary bricks in building, and for this purpose machines as shown in Fig. 9 have been invented which are capable of making a considerable number of similar blocks in a day. They may be made hollow or solid. By changing the moulds blocks of various patterns may be obtained, and the surfaces to be exposed when erected can be made to suit the taste of the architect. There is, however, some uncertainty as to the strength of these blocks, as they result from the pressing of dry materials with only enough water added to give them the consistency of moulding sand, so that the full strength of the cement cannot be developed. Some improvement is obtained by "curing" the blocks, or keeping them moist for a considerable period. For such work as landings, stairs, &c., the concrete freshly mixed in a moist state is frequently pressed in zinc-lined wooden moulds made to the necessary shape, but the chief drawback of this method is the time and space required for storage while the concrete is maturing. For building groynes and sea walls the concrete blocks are made solid of a large size, weighing 2 cwts. and upwards, and are often filled by hand in wooden moulds with the face upwards, in which flints are embedded while the material is soft so that an ornamental appearance may be obtained.

The new Chapel in St. Paul's Cathedral which was dedicated last week is on the right as the visitor enters the great west door, and was originally the Wellington Chapel. The entire work was carried out under the superintendence of Mr. Somers Clarke, architect to the Dean and Chapter.

A REINFORCED CONCRETE NEWSPAPER OFFICE.

WE publish two further working drawings for the reinforced construction of the annexe to the "Dundee Courier" building now approaching completion in Dundee. These should be compared with the drawings reproduced in our first "Concrete and Steel" Supplement, where also a general description of the work is given. These two drawings now reproduced show the framing plan of the first floor with details of the beams. The drawings are self-explanatory.

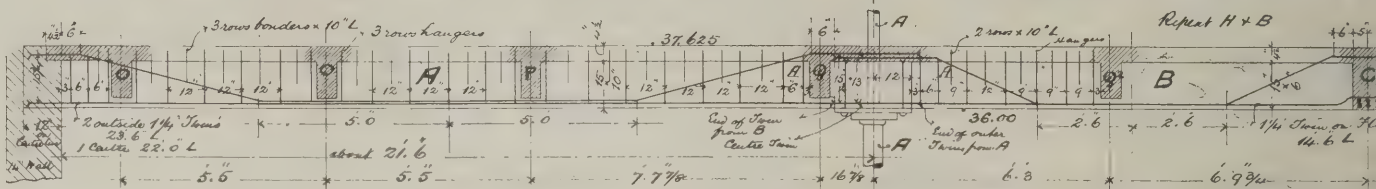
Messrs. Patman & Fotheringham, Ltd., of 100 and 102, Theobald's Road, W.C., have secured the following rebuilding contracts:—Fowkes Buildings, Great Tower Street, E.C.; Seaman's Mission Hall, Tilbury Dock; "Lyric Tavern," Shaftesbury Avenue, W.C.; large mansion at Cookham Dene, Bucks; 57 and 59, Great Portland Street, W.

A Large Reinforced Concrete Chimney is to be erected for the Associated Portland Cement Manufacturers (1900) Ltd., at their Knight, Bevan and Sturge Works, Northfleet, Kent, by the Weber Steel-Concrete Chimney Co., Ltd., of Westminster. Its total height from base of foundation to top will be 247ft., the diameter of flue 8ft. 6ins., and the foundation 18ft. square. The weight of the chimney, including the base, is 868 tons. A similar chimney, the first reinforced concrete chimney in this country, is now being built at Messrs. Abram Lyle & Sons' (Ltd.) sugar refinery at Plaistow Wharf, Victoria Docks, which has a total height of 261ft., a diameter of flue of 20ft., and a base of foundation of 25ft. square. The cement is being supplied by the Associated Portland Cement Manufacturers. Both of these chimneys are designed to withstand a wind-pressure equivalent to a velocity of 110 miles per hour.

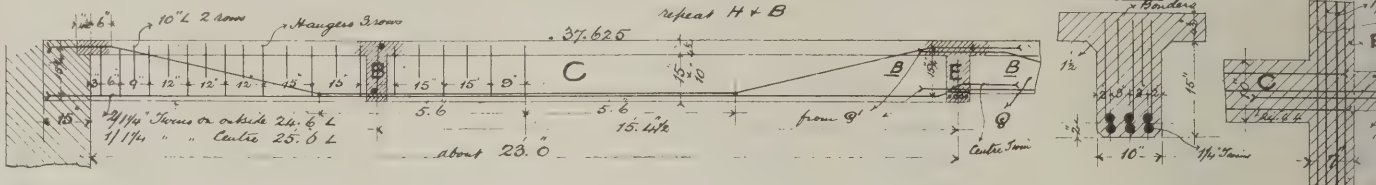
Annexe Dundee Courier Wells system of Reinforced Concrete
Beam A 15" x 10 Beam B 15" x 6 1 to each 1 1/2" x 4" at Junction of Floor with all Beams

— Beam A 15×10 Beam B 15×6 1 to each —

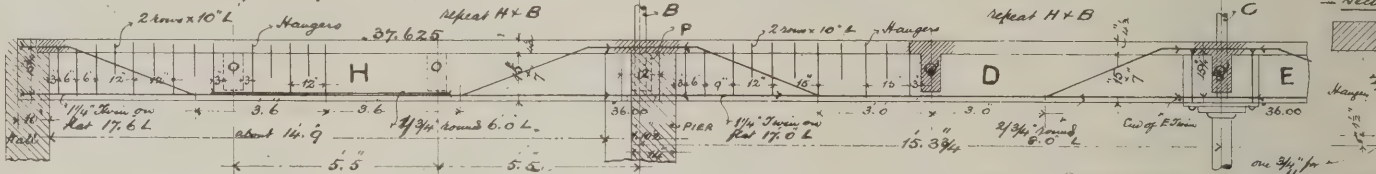
1 1/2" splay at Junction of Floor with all Beams



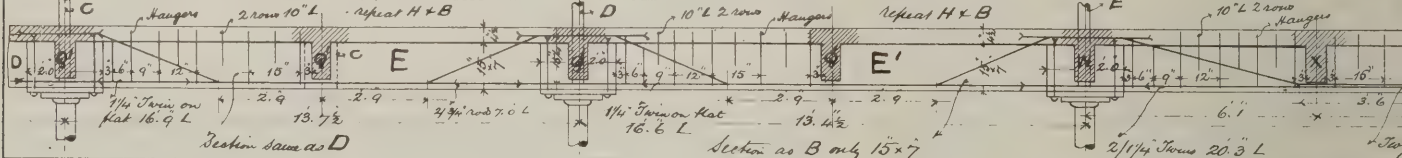
Beam C 15" x 10" No. 1



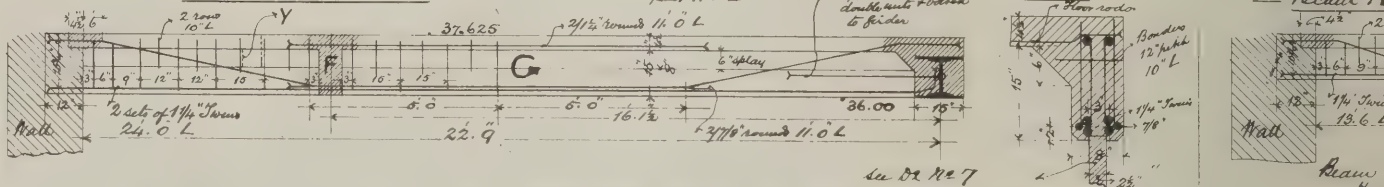
Beam D 15' x 7" No. 1 Beam H 15' x 7" No. 1



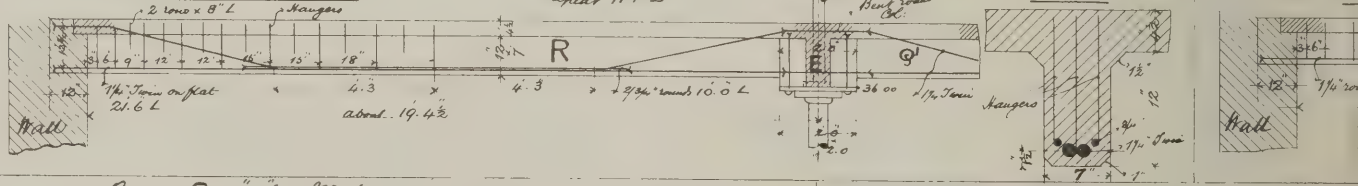
Team E 15²7 E' 16²7 & F 15²7 No 1 to each.



— Beam C 15" x 8" No. 1 —

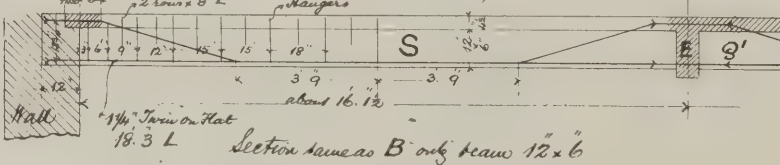


— Beam R 12" x 7" No. 1 —



Beam S 12" x 6 No. 1

Repeat H & B.



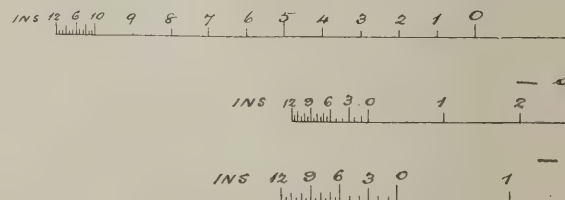
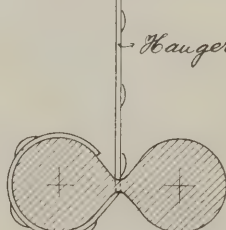
Beam U 10"x6 No. 1.

Hand-drawn technical drawing of a beam with various dimensions and labels. The drawing includes a side view of the beam with a total length of 13'0" and a width of 12". The beam is labeled "all lengths 9' pitch" and "2 7/8" x 5 ft L". The beam is supported by a "Beam D" which is "about 10' 4\"/>

— 1 1/4" Twin on Edge —
Hanger



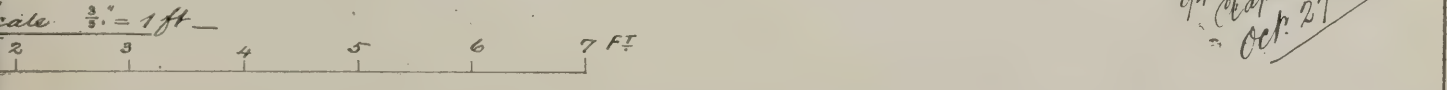
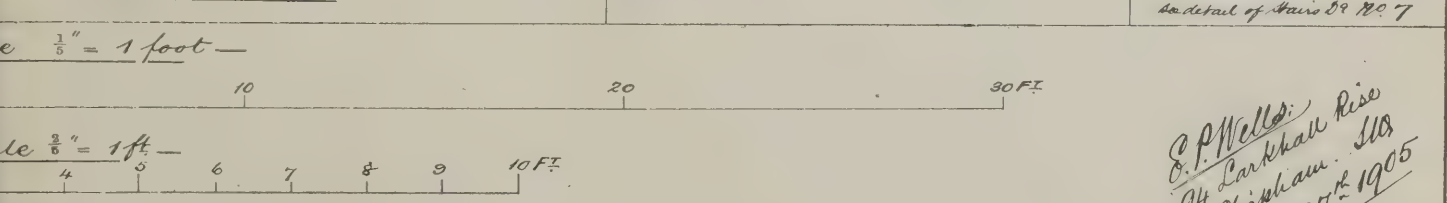
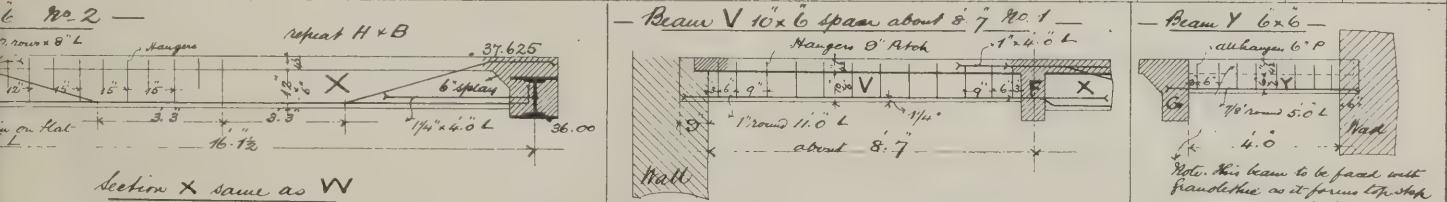
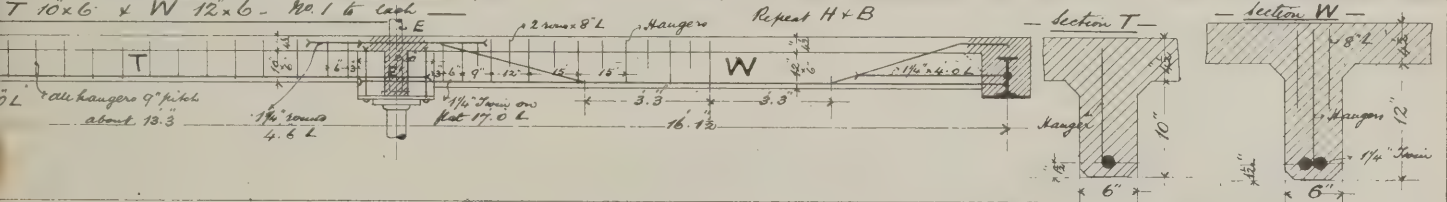
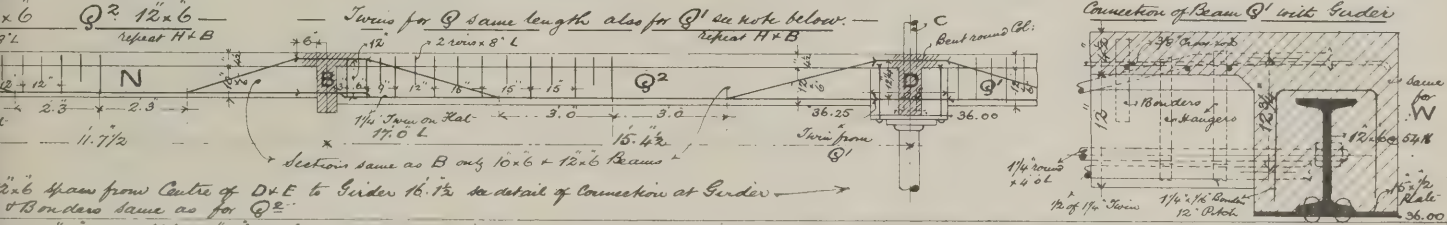
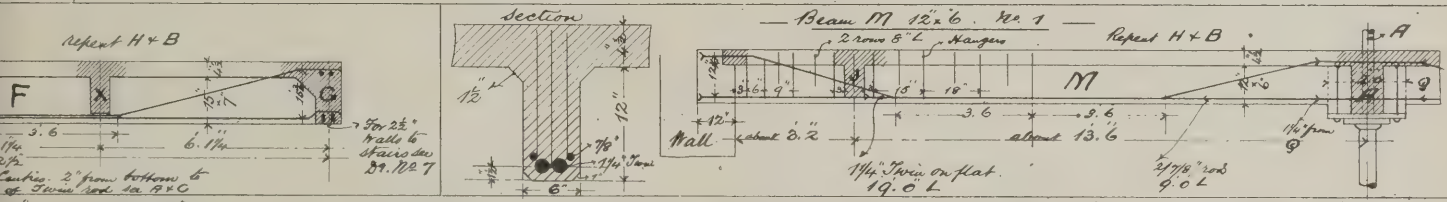
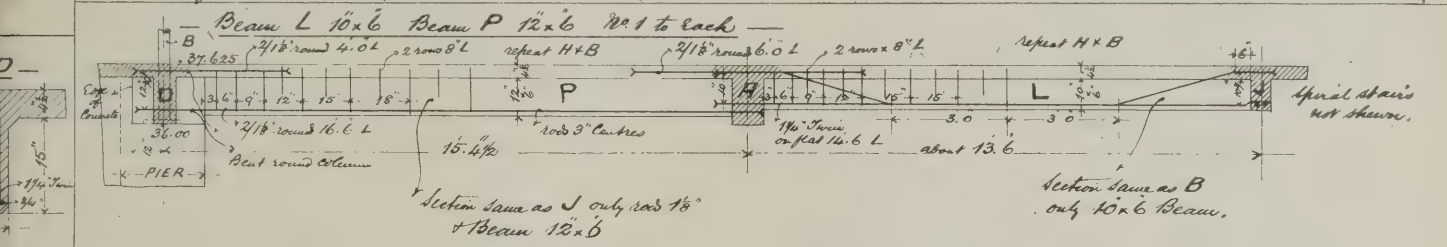
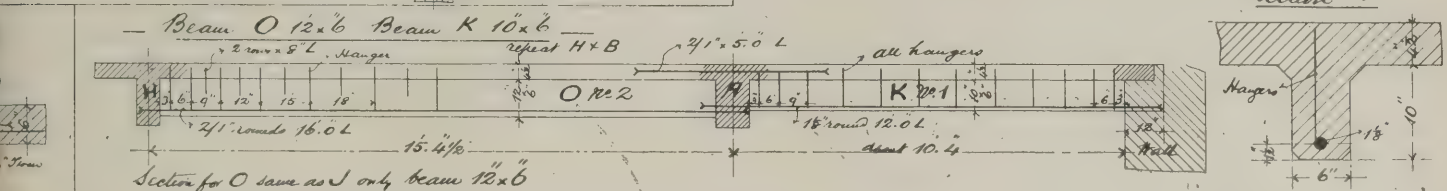
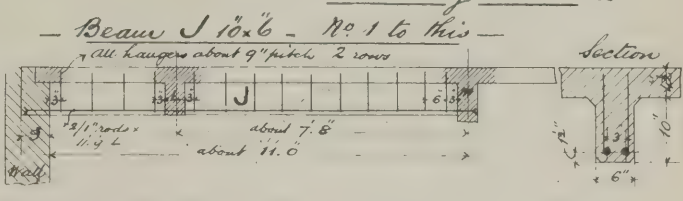
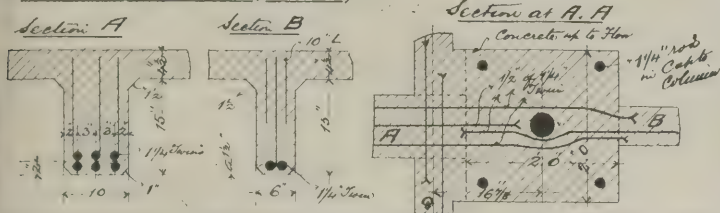
— 1 1/4" Twine on Hat —



1st Floor Beams &c

Drawing No. 6

All Beams with 1" slope Chamber



E. P. Wells
94 Clarkham Rise
Clapham. S.W.
Oct. 27th 1905

SHEAR STRESSES In Beams of Steel and of Reinforced Concrete.

By Prof. Robert H. Smith,
A.M.I.C.E., M.I.M.E., M.I.E.E., &c.

(Continued from p. 6, No. 589.)

WE take next a stress law which is in itself independent of strain or elastic laws, but the application of which to beams depends entirely upon whether the elastic modulus remains the same or varies throughout the section. In Fig. 2 is sketched a small

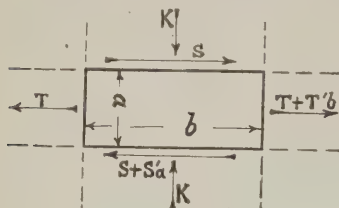


Fig. 2.

rectangular portion of the beam similar to that in Fig. 1. The tension τ varies along the horizontal, i.e., along the line of τ itself, and its rate of variation per inch of length is called τ' , so that at the right-hand end of the rectangle its intensity is $\tau'b$ greater than at the left-hand end, and the difference of the two opposite pulls at the two ends upon the area $a \times$ unit thickness perpendicular to the view shown, equals $\tau'ab$. If there be no mass acceleration this must be balanced by other stresses, and cannot be balanced by any difference between the K 's on upper and lower surface because these are wholly vertical. The $\tau'ab$ must be balanced by the $s'ab$, where s' is the rate per vertical inch of the variation of the shear stress acting over the horizontal surface $b \times$ unit thickness. In equating these the product ab cancels from each, and leaves the very important stress law

$$s'_v = T'_h$$

where the suffix v indicates a vertical variation and the suffix h a horizontal variation, each being per inch distance between successive horizontal and vertical sections. The same law applied to the horizontal variation of s gives

$$s'_h = K'_v,$$

the s'_h being increase of s towards the right and K'_v a downward decrease of the compression x .

Thus so soon as we know how τ , the tension, varies along horizontal lines, we can calculate how s , the shear, varies across a vertical section.

Distributed Loads Assumed.

Consider two vertical sections only a short distance b apart, and over this short distance let the load on the beam be distributed; that is, let there be no sharply concentrated load applied inside this short distance b . This is an easy supposition, since no load can by any physical possibility be sharply applied in the mathematical sense of the term: it is necessarily distributed over at least some short length of the beam. Then, if F be the total shear force on either vertical section, rb is well known to be the difference between the two total bending moments on the two sections.

Now, however, the steel and concrete may be relatively disposed across the section of a reinforced concrete beam, there is never any sudden change in this relative disposition of the two materials from one vertical section to another close to it—except at the ends of metal bars. We may assume that these metal ends are not located in places other than where there is an excess of strength and where minute estimate of the risk of breakage is unnecessary. It follows that the normal stresses combining to yield the bending moment are similarly distributed over such neighbouring sections, and that the bend-

ing moment $M = \mu T_m \frac{I}{H}$, where T_m is the

upper or lower surface stress and H the whole section depth, μ a numerical coefficient the same for both sections, and I the moment of inertia of the section properly calculated in view of the different materials occupying different parts of it. I is proportional to H^4 unless there be sudden change in the ratio of steel to concrete sections or sudden change in the proportions of the outline of the total section. If the change in $\frac{I}{H}$ between two

neighbouring sections be nil, or be neglected, we may write the difference of the two moments $rb = \mu T'_m \frac{I}{H} b$, where T'_m is the rate per inch horizontal at which T_m varies. This gives at top or bottom surface

$$T'_m = \frac{FH}{\mu I}$$

and at any level

$$s_v = T'_h = \frac{\tau FH}{\mu I}$$

where τ is the ratio between the tension τ at any point of the section to the surface tension T_m , this ratio being the same for similar points in neighbouring sections. Here $\frac{FH}{\mu I}$ is the same all over any one vertical section, and this equation gives the means of investigating the distribution of the shear over each such section so soon as we know the distribution of normal stress on it. Thus a preliminary to the calculation of the shear stresses is a correct estimate of the distribution of the normal stresses.

Up to this point all that has been formulated is equally true for heterogeneous and homogeneous material; the mixture of materials makes no difference to any of the above results. For instance, the small depth a in our diagrams Figs. 1 and 2 may cross from concrete into steel, or from cement mortar into a bit of hard rag-stone, or into a bit of brittle or crumbly cinder.

Assumption of Plane Sections Foolish.

In all the engineering text-books expounding the ordinary elementary elastic theory of beam bending it will be found stated that this theory is based on the assumption that sections which are plane in the unstrained condition remain plane in the bent condition, and this base hypothesis is found repeated in all the recent applications of theory to reinforced concrete. These latter in American books are terrifying in the ghastly masses of algebraic symbols piled up recklessly on this base foundation. This assumption is often even stated to be that these transverse sections remain everywhere perpendicular to the bent and curved neutral axis. No more amazingly foolish statement of hypothetical basis can be conceived. Because every student of the subject who has gone beyond his $wL = \frac{3}{8} T B H^2$ knows that, according to the theory supposed to be so based, the shear strain varies rapidly across each section from zero to a maximum. A shear strain means a deviation from perpendicularity between sections which were perpendicular before straining. If the shear stress were equally distributed over the section, then the section would still be plane, but it would no longer be perpendicular to the neutral axis. But as the shear strain is known to vary across the section, therefore the deviation from perpendicularity to the longitudinal fibres varies, and therefore the section is not plane but curved. The curvature is, of course, small; but all the strains, corresponding to very heavy stresses, are equally minute. The curvature is of the same order as that of the neutral axis. The most amazing part of this psychological phenomenon is the extraordinary fact that in the development of the beam-theory not once from beginning to end is the smallest, not

even the most remote and indirect, use made of this assumption which is said to be its basis.

Curve after Bending.

The curve assumed after bending by each originally flat cross-section is a somewhat complicated one; but those assumed by two neighbouring sections close to each other are similar, the one is almost a repetition of the other, differing only very slightly in the scale of its horizontal ordinates, that is, in the amount of tilt out of perpendicularity to the neutral axis. This is true so long as there is no sudden large change of size or shape between the two contiguous sections. If such sudden change does occur, then for the passage from one to the other size or shape the whole ordinary theory of bending falls to the ground, and well-known dangers of cracks arise which are clearly indicated by the completed but much more difficult theory. In the absence of such sudden change, the two similarly curved neighbouring sections are inclined to each other partly on account of the curvature of the neutral axis and partly because of the change of shear strain which means slightly different deviations from perpendicularity to the neutral axis.

Strain Proportionate to Distance from Neutral Axis.

But whatever their inclination, because of their strict similarity, the normal distance between them varies linearly with the vertical height measured from upper or lower surface or from the neutral axis. At the neutral axis this normal distance is the same as in the unstrained condition, the definition of the neutral axis being that there is no horizontal normal stress at it. Thus the horizontal longitudinal strain, that is, the horizontal geometrical extension or compression, increases in direct proportion to the distance down or up from the neutral axis. This is true for all stiff beams to an extremely close degree of approximation where there is no sudden change of section, and is true however much the modulus of elasticity may vary over the section. For instance, it is true of beams of homogeneous material for bendings far past the limit of elasticity, when the variation of stress across the section is not at all in direct proportion to the variation of strain. It is equally true for sections compounded of different materials with different moduli of elasticity, so long as actual slipping fracture does not take place causing the different layers to part company by finite sliding. To further illustrate its degree of truth, suppose that one spot or fibre in the section, in consequence of special softness or special hardness or special quality of any kind, shows a dimple or hollow in the originally flat cross-section; if this speciality be continued through the next very close section, a similar dimple will be produced in this next section, and this dimpling will not interfere with the truth of this law of proportionality between strain and distance from neutral axis.

This proportionality of the longitudinal strain to distance from neutral axis is the real foundation of beam theory. Coupled with Hook's law of constant proportion between strain and stress, it leads to the ordinary beam theory for homogeneous material.

Slipping of Rods.

In rationally built reinforced concrete every endeavour is made to prevent the steel rods, bars or wires from actually slipping in the concrete so as to allow shear fracture of the adhesive contact between them. As this is of essential importance to the shear strength of the beam, a passing criticism may be allowed on the means adopted to effect this object. It is evident that it is waste of the steel to effect this purpose by varying the section of the steel rod. The utility of the rod is limited to the strength of its smallest section; all the extra section outside this at

he shouldered parts is pure waste. Twisted rods avoid this waste; but if the twist were perfectly uniform, there being nothing but adhesive and frictional resistance to turning, the resistance to pulling through by screw motion is only slightly greater than that of a plain rod—greater only in proportion to the greater length of the screw-line to the straight axial length. Any slight deviation from uniformity of twist will have only a feeble influence in increasing the resistance to pulling through. If, therefore, twisted rods be used it cannot be too strongly recommended that the twist should be largely varied within quite short lengths. Evidently the best form would be alternate short plain and twisted lengths. Some special rods used in America would seem to be an excellent design provided the flattenings of the round rod be made short and deep enough. The design leaves, or is intended to leave, the section undiminished at the flattened parts, and it has the great merit of avoiding any very sudden change of sectional shape either in the steel rod or in the embedding concrete, a feature even more necessary in the concrete than in the steel for the avoidance of severe shear stresses at the corners between the changed sections. Any sectional shape of rod with indentations at short intervals rolled into its top and bottom surfaces in such manner as to maintain nearly uniform

area of cross-section ought to accomplish the desired object efficiently.

Position of Neutral Axis.

Efficient connection of this sort between steel and concrete being effected, it is evident that the stretch (or contraction) in the direction of the rod of the concrete lying close to the steel must be the same as that of the steel. It follows that the longitudinal stress per sq. in. in the steel is greater than that in the concrete close to it in the ratio of its greater modulus of elasticity. This ratio is usually called e . Taking the rod or rods as lying normal to the bending-moment section, the forces contributed by the steel to the bending moment are therefore those that would be contributed by concrete stressed equally with that closely surrounding the steel of an area equal to e times the steel area. Using, therefore, the device of considering the steel area e times as large as it actually is, and still placed at the same level, that is, broadened horizontally e times, there is no difficulty in calculating in the ordinary manner the position of the neutral axis, and from this the geometrical moment of inertia of the equivalent section supposed filled with concrete alone. This calculation gives t_m at each section for any given loading, and gives also τ , or, what is the same thing, τ , for each part of any section supposed as above expanded at the steel

parts and filled with concrete only. These are ordinary calculations, and there is no space in this article to detail them. They should offer no difficulty to any engineer trained to make structural stress-estimates.

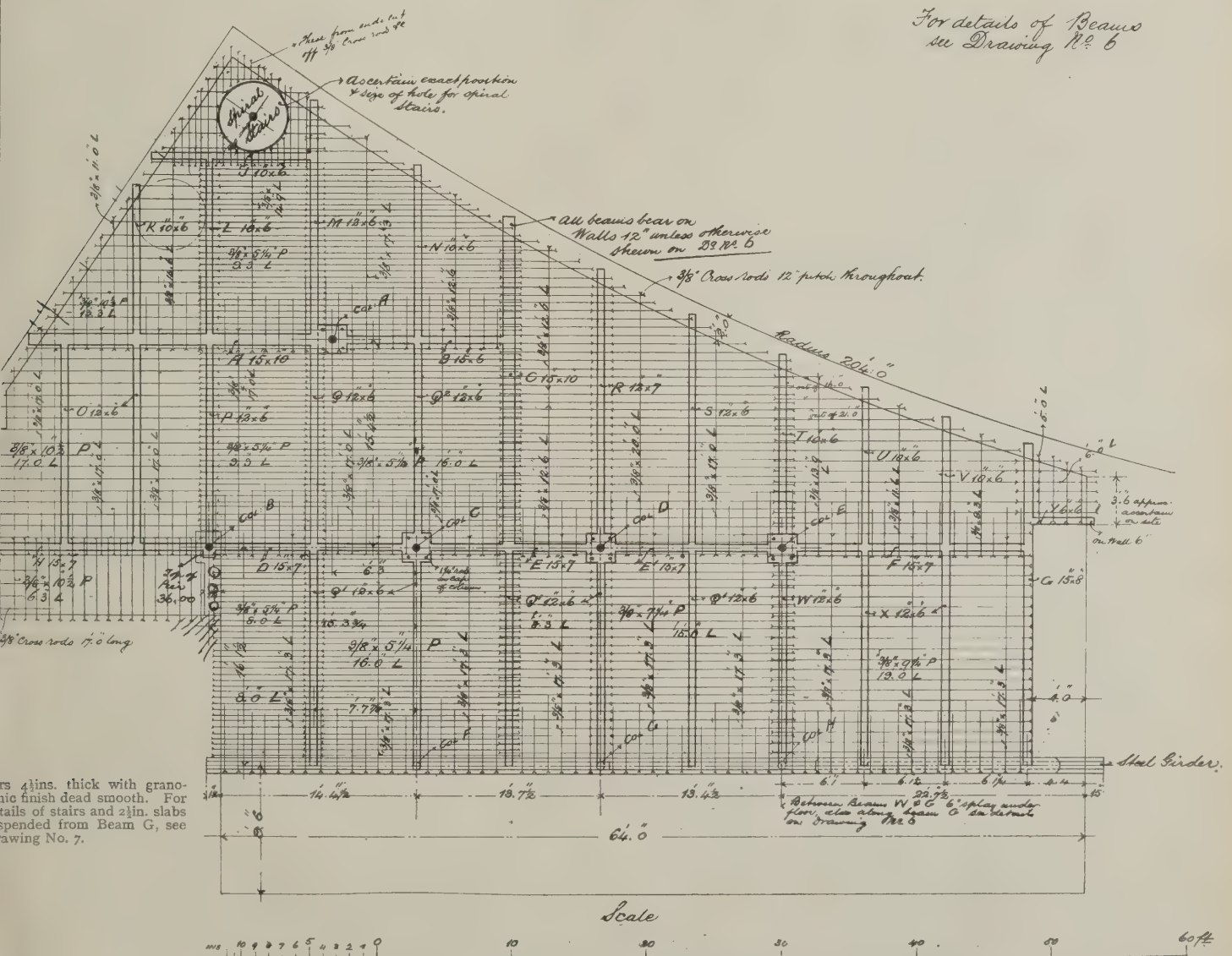
Supposing this done, the equation $S_v = \tau/h$ gives the means of finding the distribution of shear stress over this equivalent all-concrete section and the actual shear stress at each point of it. It now remains to interpret the results so obtained and convert them into measures of the actual stresses on the actual steel-concrete section.

As regards tensile stress over the vertical section, this interpretation is easy and simple. At every level in the concrete part of the actual section the tension is the same as in the equivalent section, and at every steel part of the actual section the tension is e times greater than in the concrete of the equivalent section at the same level.

It is not so simple, however, as regards the shear stresses. The completely accurate solution is beyond the limits of space remaining for this article, and the solution to be published must be looked upon only as a comparatively easy approximation.

[A correspondent has pointed out a slip made in the eighth line from foot of the last column in the first part of this article published on 23rd May, where the word "half" should be omitted. Also on the third line from foot of same column there is a misprint of 125 degs. for 135 degs.]

(To be continued.)



FRAMING PLAN FOR THE FIRST-FLOOR PLAN TO THE "DUNDEE COURIER," DUNDEE, CONSTRUCTED IN REINFORCED CONCRETE BY STUART'S GRANOLITHIC STONE CO., LTD.: WORKING DRAWING NO. 5, SHOWING BEAMS, &C. SCALE $\frac{1}{2}$ IN. = 1 FT. E. P. WELLS, ENGINEER. NIVEN & WIGGLESWORTH, ARCHITECTS.

NOTES AND NEWS.

The Charing Cross Disaster.—Major Pringle in his report to the Board of Trade on the fall of part of the roof of Charing Cross Station on December 5th last says the evidence is conclusive on the cause of the accident. The snapping of a particular tie-rod was the immediate cause of all that followed. It is, he says, the first known case of a tie-bar in a contained arch breaking under a reasonable stress. He rejects the suggestion that reduction of strength by rust or corrosion, fatigue of material, wind-pressure, disturbance of foundations and absence of buttressing to the west wall were responsible for the disaster. He says "the fracture occurred at a weld, by reason of a flaw in the welding. This flaw, commencing in the heart of the bar, had gradually extended outwards. The additional weight of the temporary staging was the immediate cause of failure, but as the total stress in tension at the time of failure on the whole sectional area of the bar did not exceed 5.13 tons per sq. in., I find that, for the necessary purposes of repair, such a stress was not in any way unreasonable, and could not be anticipated to cause danger of failure. Lastly, I do not consider that any reasonable precautions were neglected by the engineer or his staff in charge of the roof, or that it was possible by any practicable method to have discovered the flaw in the tie-bar. The particular lessons to be learnt from this sad accident are as follows:—(1) That in old iron roofs of similar design, more especially where welded bars of any size have been used, there is danger to be guarded against of concealed flaws, which may grow in size under continued tensional stress, although in itself that stress may not be exceptional; (2) that unless additional security be afforded by the duplication or strengthening of the main tensional members there is possible risk of failure; (3) that where such risk of failure exists, it is necessary to consider whether the walls supporting the roof are in themselves sufficiently strong to resist the thrust which such failure would bring on them, and if not, to strengthen them."

Cement.—Before the London Section of the Society of Chemical Industry on June 11th Mr. Bertram Blount F.I.C., F.C.S., read a paper on "Cement," dealing chiefly with the manufacture and testing of Portland cement and giving some of the recent theories as to the chemistry of cement action. After pointing out the great extension in this industry which has taken place in the past twenty years, and showing by reference to tables that the cement manufacture has made giant strides in America, which was formerly one of our best customers and has now almost ceased to import English cements, Mr. Blount explained the changes in the method of manufacture, due to the use of rotary kilns and tube and ball mills. He stated that just as manufacturers were face to face with an enormous falling-off in their export trade, they were called upon to remodel their factories and to make changes in their plant which amounted almost to pulling out all the existing kilns and machinery and sending them to the scrap-heap. On the subject of the testing of cement, attention was directed to the standard specification and to the fact that the committee were about to meet during the present week to consider any necessary alterations, as this specification has met with opposition in certain quarters. On the important subject of cement action Mr. Blount stated it was tolerably certain that three silicates of calcium existed and four aluminates, and recent research tended to prove that certain solid solutions of these compounds were rearranged during the act of setting.

STRESSES IN REINFORCED CONCRETE BEAMS.—II.

(Continued from p. 5, No. 589.)

Rectangular Beams with Top Reinforcement.

THE following symbols are used in this article, in addition to others given in the previous article of the series:—

c = greatest stress in concrete in compression.

s = greatest stress in steel in compression.

τ = greatest stress in steel in tension.

a = area of steel in tension.

k = area of steel in compression.

In order to calculate the stresses in a rectangular concrete beam which is reinforced both top and bottom, we proceed in much the same way as we do for beams with a single reinforcement at the bottom, such as were dealt with in the previous article of this series in our first "Concrete and Steel" Supplement.

Fig. 7 shows in elevation and Fig. 8 in perspective the wedges the volumes of which represent the compressive and tensile stresses in the concrete and in the steel of a doubly reinforced beam. We shall neglect, as before, the value of the concrete in tension.

As explained in the first article, the strain is proportional to the distance from the neutral axis, and stress = $E \cdot$ strain. Consequently $C : S : T :: E_c \cdot \text{strain} : E_s \cdot \text{strain} : E_t \cdot \text{strain} :: E_c \cdot y : E_s \cdot (y - h) : E_t \cdot (d - y)$.

As the modulus of elasticity of steel is practically the same in compression as in tension, we will call both E_s . Therefore

$$\frac{C}{E_c \cdot y} = \frac{S}{E_s(y - h)} = \frac{T}{E_s(d - y)}$$

and

$$T = C \cdot \frac{E_s}{E_c} \cdot \frac{d - y}{y} \quad (11)$$

$$S = T \cdot \frac{y - h}{d - y} \quad (12)$$

or, by substitution,

$$S = C \cdot \frac{E_s}{E_c} \cdot \frac{y - h}{y} \quad (13)$$

From Fig. 8 we see that the total stress on the concrete in compression is represented by the contents of the shaded portion multiplied by the highest stress = $c \cdot \frac{by}{2}$.

As stated in the first article, the resultant of this stress in the concrete passes through the centre of gravity of the triangle, which is situated $\frac{2}{3}y$ distant from the neutral axis.

The stress in the steel in tension is $\tau \cdot a$, and the distance of the resultant R_t from the neutral axis is $d - y$.

The stress in the steel in compression is $s \cdot k$, and the distance of the resultant from the neutral axis is $y - h$.

It was explained in the first article that the resultant of several parallel forces was the algebraic sum of the moments of the forces, or $R = \Sigma w$, and that the moment of the resultant was the algebraic sum of the moments of the forces, or $Rl_r = \Sigma wl$, where l_r = the lever arm of the resultant. We can therefore substitute for R in equation (5) the sum of the compressive forces. We then obtain

$$c \cdot \frac{by}{2} + s \cdot k = T \cdot a \quad (14)$$

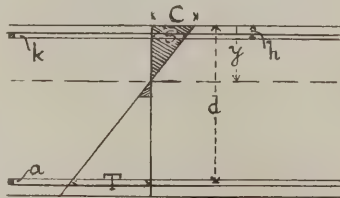


FIG. 7.

Also we can substitute the sum of the moments of the compressive forces for the moment of the resultant of the stress in the concrete in equations (6) and (7). We then obtain

$$M_r = c \cdot \frac{by}{2} \cdot \frac{2}{3}y + s \cdot k \cdot (y - h) + \tau \cdot a \cdot (d - y) \quad (15)$$

and by substituting (12)

$$M_r = c \cdot \frac{by}{2} \cdot \frac{2}{3}y + \tau \cdot k \cdot \frac{(y - h)^2}{d - y} + \tau \cdot a \cdot (d - y) \quad (16)$$

Substituting equations (11) and (13) in equation (14), we have—

$$c \cdot \frac{by}{2} + c \cdot \frac{E_s}{E_c} \cdot \frac{y - h}{y} \cdot k = c \cdot \frac{E_s}{E_c} \cdot \frac{d - y}{y} \cdot a$$

$$\therefore \frac{by^2}{2} + k \cdot \frac{E_s}{E_c} \cdot (y - h) = a \cdot \frac{E_s}{E_c} \cdot (d - y)$$

$$\therefore y^2 \frac{b}{2} + 2k \cdot \frac{E_s}{E_c} \cdot (y - h) = 2a \cdot \frac{E_s}{E_c} \cdot (d - y)$$

$$\therefore y^2 + 2y \cdot \frac{(k + a)}{b} \cdot \frac{E_s}{E_c} = 2 \cdot \frac{(kh + ad)}{b} \cdot \frac{E_s}{E_c}$$

The solution of this quadratic equation is

$$y = \frac{k + a}{b} \cdot \frac{E_s}{E_c} \cdot \left(\sqrt{\frac{2b(kh + ad)}{(k + a)^2} \cdot \frac{E_s}{E_c} + 1} - 1 \right) \quad (17)$$

It is obvious from equation (11) that if we fix the depth of the beam, give τ and c their full values, and know the value of $\frac{E_s}{E_c}$, then y

will be fixed without any regard to the ratio the areas of the two reinforcements may bear to each other.

Double reinforcements are not so economical of metal as a single reinforcement, and therefore we desire only to resort to them when the depth of the beam is fixed and the bending moment would cause the stress on the concrete to exceed its strength. To design a beam with double reinforcement we have the depth fixed therefore. Giving the full values to τ and c , we find y , i.e., the position of the neutral axis, by using equation (11). We now calculate the amount of tensile reinforcement that will develop the full strength of the concrete and see what is the moment of resistance by the methods given in our first article. We know the bending moment the load induces and the excess of this over the moment of resistance thus determined has to be resisted by adding metal in compression and more metal in tension. It has been previously explained that the moment of resistance is equal to the tensile force multiplied by the distance of its line of action from the line of action of the compressive force. We therefore make $\tau' \cdot a' \cdot (d - h) =$ the excess of bending moment, where τ' is the stress in the added amount of steel below (limited to 60,000 lbs. per sq. in.), and a' its area. The area k we then find from equation (16). There should be at least rin. of concrete covering the steel, so that we have h fixed.

(To be continued.)

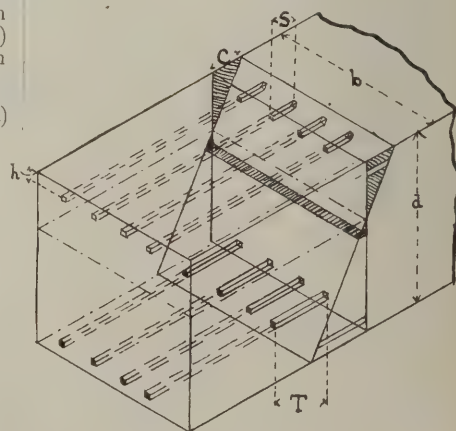


FIG. 8.

STEEL IN SPECIFICATIONS.

Some Avoidable "Extras."

By R. H. Jackson.

THE ubiquitous extra, like the poor, is always with us. It is not a thing of modern growth. Pericles suffered the severe censure of his fellow-citizens throughout the progress of his buildings by reason of an artistic disregard for the limits of the Athenian purse.

History has not recorded that it flourished in Egypt, but perhaps if the literature of one Rameses had been saved to us we might have traced its malevolent influence even in that happy land.

However, be it in Bubastes or in Battersea, it is a sordid and inevitable reality, and any items of information which tend to keep extras within reasonable bounds are well worth noting.

In the consistent advance in the use of steel in modern buildings a little lack of discrimination in the selection of steel shapes often entails an accumulation of extras which are quite unproductive of any enhanced value in the materials supplied.

Rolled steel is, without doubt, the most extensively used class of iron in architectural work to-day. By rolled steel we refer to all the shapes or "sections" which emanate

from the rolling mill. Before the use of steel had reached its present pitch, such sections as the joist or H-section were made by welding the flanges to the intermediate member, or "web." Even now specifications frequently make mention of the fact that the "welding must be thoroughly and securely carried out." If this stipulation were taken literally by the manufacturer the cost of producing such an article would be at least double that of the joist in everyday use.

Speaking broadly, the following are the sections which are *sine qua non* in the building of to-day:—Joists, channels, angles, tees. Plates should also be included in the list in view of their various uses in building work, chief amongst which is their presence in the compound girder.

The rolled steel joist takes perhaps the first place in point of demand, and without going into the technicalities of the processes of manufacture and rolling, or the peculiarities which rule in the control of prices, it would be well to point out one or two little things which appreciably affect the bill of costs.

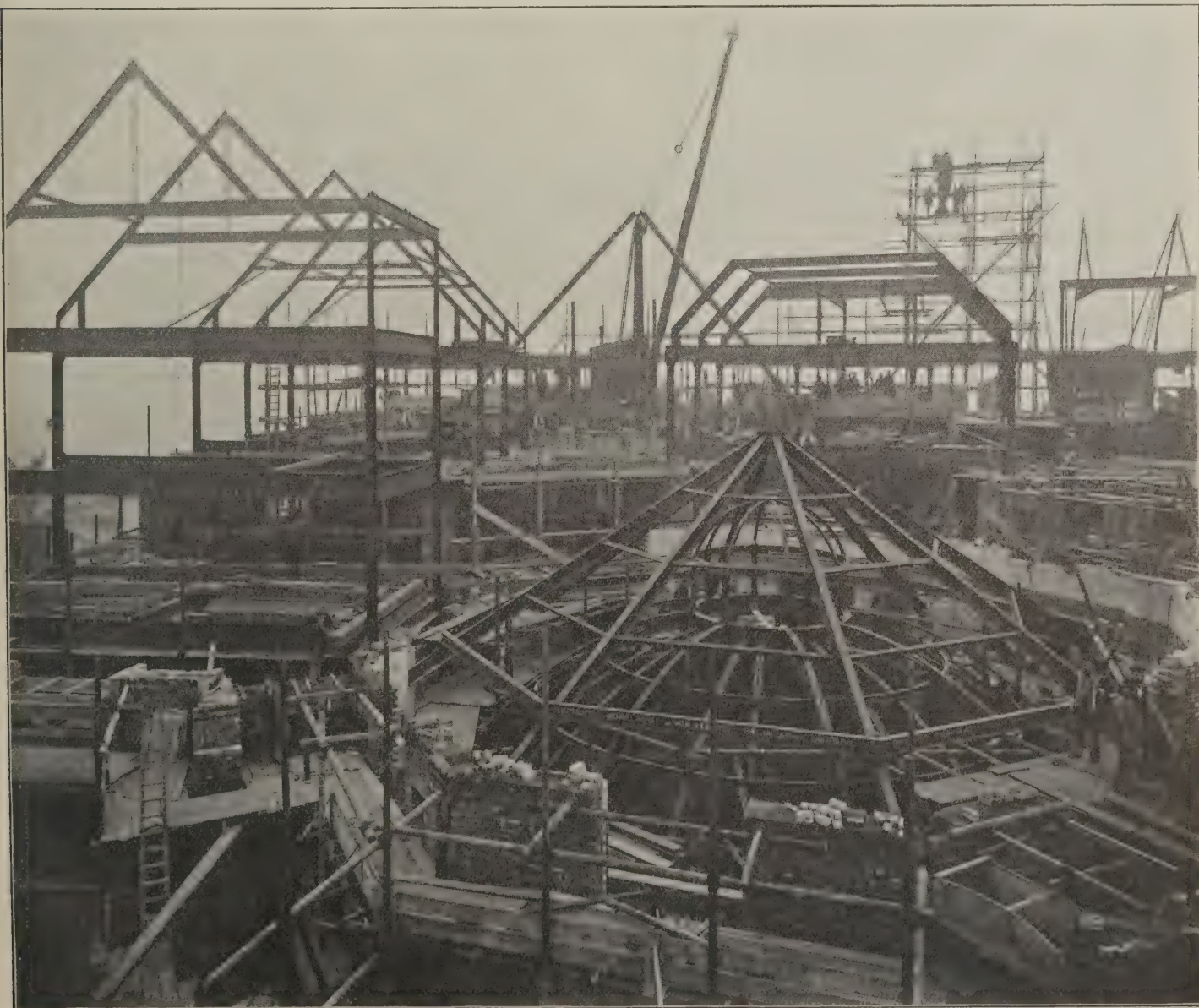
Frequently, in order that his mind may be at ease as regards the quality of steel which is going to be used, the architect refers to some old-established textbook, and culls therefrom an analysis of the chemical com-

position and other properties of an ideal metal. The specification is doubtless a very excellent one, and one which might leave the author easy in mind that he has covered his followers against every possible contingency which can arise.

This elaborate specification, however, may represent a class of product which can only be supplied at considerable increase of cost on the part of the manufacturers, besides incurring heavy delay in delivery. Needless to say, the manufacturers do not undertake an exceptional specification without making thoroughly well sure that they are not going to lose on the transaction. As a consequence, a high figure is often the result without any material advantage being gained on the part of the consumer.

Briefly, the ordinary steel of commerce is quite sufficient in quality for ordinary building purposes, and any stipulation as to tests, &c., is in the vast majority of cases superfluous.

A first-class merchant to-day (and there are a few) can frequently give a very valuable hint as to the best specification of steel for a particular purpose, keeping well in view both the question of economy and that of efficiency. He knows the capabilities of his works, and how they are situated as regards turning out any particular class of article promptly and successfully.



STEELWORK AT WARING AND GILLLOW'S NEW BUILDING, OXFORD STREET, LONDON. R. FRANK ATKINSON, F.R.I.B.A., ARCHITECT. RICHARD MORELAND AND SON, LTD., ENGINEERS.

The great feature in the steelwork at Messrs. Waring's new building in Oxford Street is that the steel frame is quite independent of the walls, stanchions having been carried up from the basement, and girders put across. All the galleries are free from obstruction by columns. Altogether 3,000 tons of steel were used. The above view (from a photograph by Messrs. Martin and Sander) shows the work in course of erection. In the foreground will be noticed the top of the rotunda, with its inner and outer shell.

The point the buyer should emphasize is the type of steel he is aiming at as regards tenacity, &c., and the particular purpose, if it be an exceptional purpose, for which the material is required. A merchant possessed of experience and technical knowledge will then see that the instructions are communicated to the works in such terms as to ensure the right thing being sent forward without prohibitive cost or delay.

Exceptional lengths should also be avoided, as they only incur extra risks in rolling, and consequently extra cost as well as in some cases an expenditure in freight which is quite out of proportion to the value of the bar. Quite frequently long girders are seen in specifications, which might have been specified in two pieces without detriment to the structure for which they were intended.

In all the sections which we have mentioned, joists, channels, angles, tees, or special sections such as broad flange beams, much extra cost, delay in delivery, and alteration to designs might be avoided by specifying only the listed sizes and standard weights.

The standardized dimensions of the British Engineering Standards Committee are a very safe guide as to what is readily and economically available.

Joists and channels, for instance, can of course be rolled with thicker webs (and consequently greater weight per foot) than those shown in the listed dimensions, but it should never be taken for granted that this can be done without extra cost or delay in delivery. It is only reasonable to expect that anything out of the ordinary run of a manufacturer's practice takes a second place to the article that is in regular demand.

We have seen text-books of very recent issue containing tables of rolled steel joists which include sections which have never been rolled for the last ten or fifteen years, and for which probably no rolls are at present in existence. These sections could, of course, be supplied, but at some slight inconvenience: something like six months would be required for their delivery, and for a small lot the extra would amount to a modest trifle of about £100 per ton!

Doubtless many of the points we have mentioned are within the cognizance of the majority of architects and draughtsmen, but they are all liable at times to be overlooked.

REINFORCED CONCRETE SYSTEMS.

II.—The Hennebique System.

THE Hennebique system of reinforced concrete construction was one of the earliest to be adopted in this country on a large scale, and we therefore devote the second article of this series to a description of it. The system was invented in 1892 by M. François Hennebique, a Belgian engineer, of Brussels, his patent dating from the same year. M. Hennebique is said, however, to have constructed floors of reinforced concrete in 1879. An important feature of the system introduced in 1892 was the adoption of the reinforced concrete beam.

The extensive adoption of reinforced concrete on the Continent and in this country is undoubtedly due in great part to the initiative of M. Hennebique. His system was from the first in a practical form, and he established by means of tests and theoretical investigation a basis of calculation for structural members which enabled structures of large size and suited to all sorts of engineering and architectural conditions to be economically and safely designed. The essentials of the system are to be found in the beam construction. Fig. 1 shows a longitudinal section of a Hennebique beam. It will be observed upon examination that the beams are continuous over supports, that some of the rods are inclined upwards towards the supports at the points of contraflexure, and that the beam is reinforced vertically by means of stirrups or hangers. Fig. 2 gives a detail of the inclined rods and stirrups at point of contraflexure, and also the connection between beam and pillar.

The Crux of the System.

The stirrups are the crux of the system. They reinforce the beam against shear and enable beams to be constructed of great span. The stirrups are placed closer together towards the supports where the shear is greatest. The shear of course is not so material a part of the problem in the design of a beam required to sustain a concentrated load only; it becomes, however, of vital importance when distributed loads are carried, as always occur in buildings.

The extension of the rods over the points of juncture of the supports and beams re-

inforces the concrete to take care of the reverse bending moment. The top rods over the beams serve another purpose also. The beams are calculated as T-shaped and not rectangular. This enables local loads to be transmitted directly to the beams and not through the floor slabs, so avoiding the compressive stress in the concrete being greatly increased due to its action at one end and the same time as a floor slab and as a flange to the beam.

Floor Slabs.

Fig. 3 shows a cross-section through the beams, and illustrates the form of reinforcement for the floor slabs. It will be seen that while some rods run straight across, others are cranked up until near the top of the beam and stirrups inserted near the junction of the floor slab with the beam. The stirrups in the small spans of the slabs do not need to be carried the whole way, as the shear is small and can be safely resisted by the concrete alone.

It may here be stated that in both beams and slabs only every other rod is inclined or cranked up. In the beams both straight and cranked bars come close together. In slabs they are separated some distance apart. The cranked rods also take part of the shear.

Double or hollow floors have been used in America with this system where it has been thought desirable to hide the beams.

It will be gathered from the foregoing that the system, so simple in its elements, effectually and economically takes care of all the stresses which are induced in a complicated structure. For very large spans it is obvious that the arch is more economical than the beam. We need not, however, detail the arch reinforcement, as it is very similar to plain beams.

In Fig. 4 we illustrate another part of the system, namely, the reinforcement of pillars or columns. This consist, as shown, of four vertical rods tied together at intervals by wire loops.

Foundations are also constructed in the Hennebique system of reinforced concrete, and Fig. 5 shows a typical foundation to a pillar.

Walls are constructed in the Hennebique system by placing rods vertically and horizontally. As regards the former, one series is on the outer face, and another is on the inner side, stirrups tying each set to the opposite face. The longitudinal rods are placed in the centre of the wall.

Roofs have also been constructed to a considerable extent in Hennebique ferro-concrete, both in this country and abroad. The usual form is a flat roof, but barrel roofs have also been built.

Staircases are another adaption, the reinforcement being similarly arranged to that in beams—that is to say, each flight is supported at head and foot by beams, and rods run between close to the underside of the stairs, whilst towards the point of support some of the rods are inclined upwards as in the beams. Stirrups are placed perpendicular to the soffit, extending to front edges of treads.

We publish views showing work in course of construction on this system. Fig. 5 shows a view of a cold storage warehouse at Southampton in this way. The pillars on the ground floor are clearly shown, and also the moulds or forms which were used for their erection. Long boards are placed on three sides, the concrete is then filled in layers, held in place on the fourth side by a short piece of board, and tamped down with iron rammers. Another piece of board is next placed in position, and the concrete raised to this further height. The work is continued in this manner until the pillar is completed. Centerings in the shape of long boxes are now placed between the pillars, the reinforcement for the beams laid therein, and the concrete rammed in as before. Fig. 6 shows the construction of a floor. The longitudinal

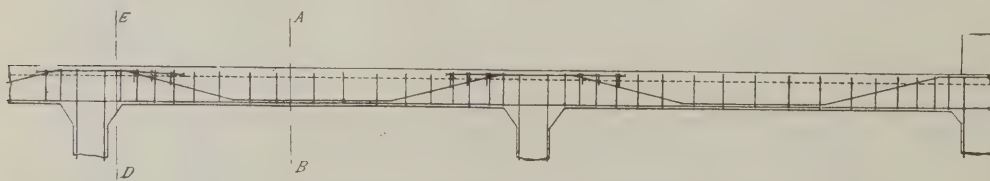


FIG. 1.—LONGITUDINAL SECTION OF HENNEBIQUE BEAM.

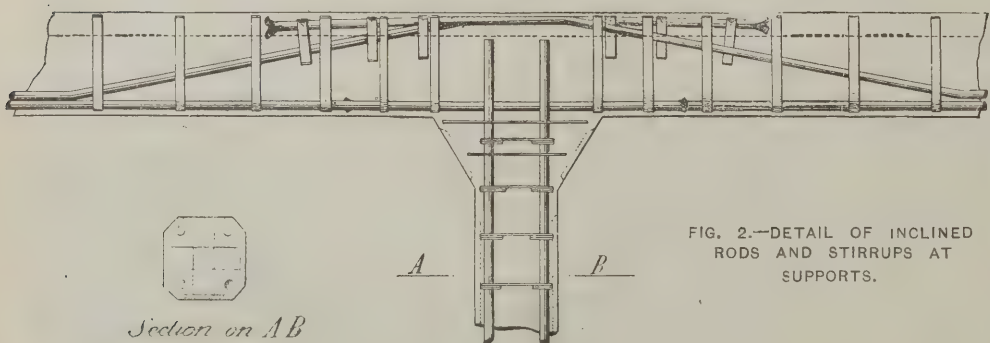


FIG. 2.—DETAIL OF INCLINED RODS AND STIRRUPS AT SUPPORTS.

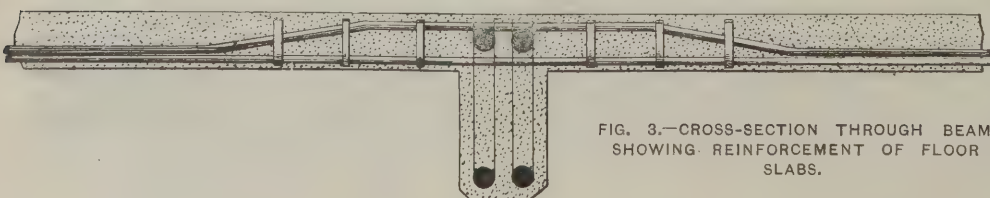


FIG. 3.—CROSS-SECTION THROUGH BEAM SHOWING REINFORCEMENT OF FLOOR SLABS.

rods and stirrups are clearly shown with the concrete partly filled in. This floor is, however, of the same depth throughout, and does not show the beams below the floor sustaining the floor slabs above. This particular view has an additional interest, because it illustrates the reconstruction of the floor over the Queen's bedroom at Sandringham after the fire which occurred in 1903 in connection with a fireplace of the sunken hearth type, which our readers will no doubt remember.

The Hennebique system has been used for many interesting buildings and engineering structures. We may particularly note cantilever work in which several floors have been supported over dock walls, railway sidings or sidewalks, and theatre galleries. Retaining walls, water towers, reservoirs, bridges, aqueducts, piles and pipes are now every-day adaptations of the system of M. Hennebique. In regard to bridges many tests have been carried out in France and in this country upon Hennebique constructions, and it has been shown that not only is there very great economy both in first cost and in upkeep, but that there is very little vibration, whereas with steel bridges it is considerable.

We illustrate in Fig. 7 the piles patented by Mr. L. G. Mouchel, the concessionaire of the Hennebique patents in this country, whose address is 38, Victoria Street, Westminster. The longitudinal rods are bound round with wire. It will be seen that the Hennebique pile is practically a pillar with a hollow centre. The hollow diaphragms are inserted for the purpose of saving weight, which in the case of a solid pile would be very considerable. The particular piles illustrated are 18ins. by 18ins. and 48ft. long.

Here may be mentioned an advantage which a reinforced concrete pile has that is sometimes not remembered, but which the Hennebique constructors have had to resort to, namely, that during the process of driving the pile may be easily lengthened if this should be desired. The piles are either driven by an ordinary pile driver, an iron cap being put on the head to prevent shattering under the blow, or sometimes a jet is passed down the centre of the pile through the point of the shoe, and water forced out so as to cause the pile to sink under its own weight or a light blow. A great deal of pile construction has been done on the Hennebique system in the foundations of buildings, piers and jetties in this country.

In view of the enormous number of buildings which have been constructed on the Hennebique system in France, Germany and America, it is obviously impossible for us to draw up an adequate list of even the most important buildings. We can only note that several structures built by M. Hennebique were prominent feature at the last international exhibition at Paris, since which date the system has made enormous strides in France and Germany.

We give a short list of some of the most important buildings which have been erected in this country on the Hennebique system under the general supervision of Mr. L. G. Mouchel. It may also be mentioned that there are a number of contractors who have secured licences for the system from Mr. Mouchel and practise in various parts of the country. Messrs. Holloway Brothers, Ltd., are one of the London contractors for the system.

List of some of the Buildings on the Hennebique System.

- G.W.R. warehouse at Nag's Head, Borough, London, S.E.
- Grain silos at Swansea, for Weaver & Co., Ltd.
- Co-operative Wholesale Society's warehouse, Newcastle-on-Tyne.
- Flour mill and grain silos, Victoria Dock, London, for W. Vernon & Sons.
- Cold stores at Southampton.
- G.W.R. goods station and warehouse, Canon's Marsh Bristol.
- G.W.R. grain warehouse, Plymouth Docks.
- Transit sheds, Manchester Ship Canal.
- N.E.R. goods station, Newcastle-on-Tyne.
- Electric car sheds, Bournemouth.
- Old Foundry, Hull.
- G.W.R. warehouse, Royal Albert Docks, London.
- Hudson & Kearn's printing works, London.
- Premises for C. C. Röder, Ltd., Acton.
- Whitbread & Co.'s beer stores, Willesden, and brewery, Chiswell Street, London, E.C.
- Hampton & Sons' repository, Battersea.
- Pogson's spinning mill, Slaithwaite.
- Drill Hall, Chatham.
- G.W.R. warehouse, Brentford.

As a natural consequence of the use of ferro-concrete for so many buildings where fire-resisting construction is desired in view of excessive risks, a number of fires have taken place which have proved the remarkable resistance which the construction has. In no instance has a failure been known. In many cases the Hennebique construction has prevented the fire spreading beyond the compartment in which it originated, while in buildings where only a part has been Hennebique construction, this part has, in many cases, saved a great portion of the building from total destruction, forming a fire stop more effectual than the work of any fire-brigade.



CO-OPERATIVE WHOLESALE SOCIETY'S FLOUR MILLS AND GRAIN SILOS AT DUNSTON-ON-TYNE. CONSTRUCTED ENTIRELY IN HENNEBIQUE FERRO-CONCRETE.

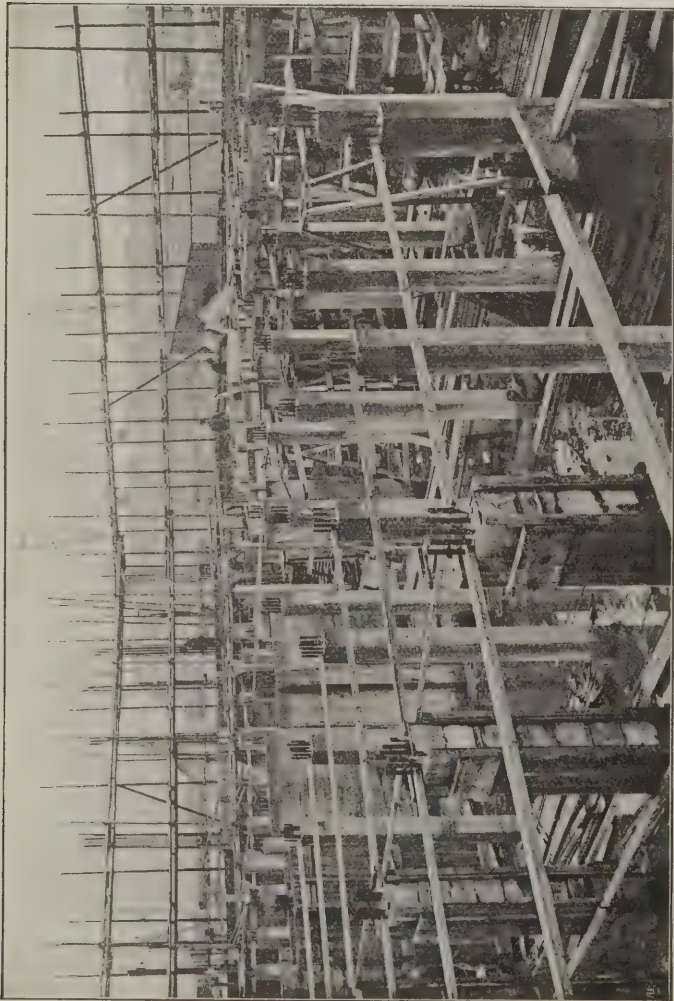


FIG. 5.—COLD STORAGE WAREHOUSE AT SOUTHAMPTON IN COURSE OF CONSTRUCTION.

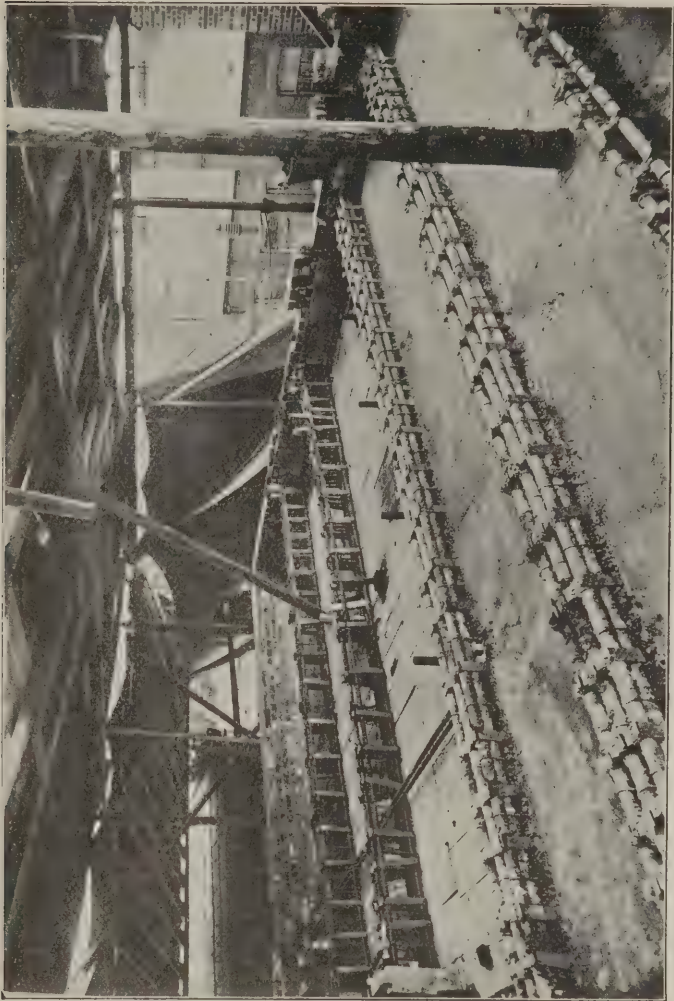


FIG. 6.—RECONSTRUCTION OF FLOOR OVER THE QUEEN'S BEDROOM AT SANDRINGHAM HOUSE AFTER THE FIRE OF 1903.

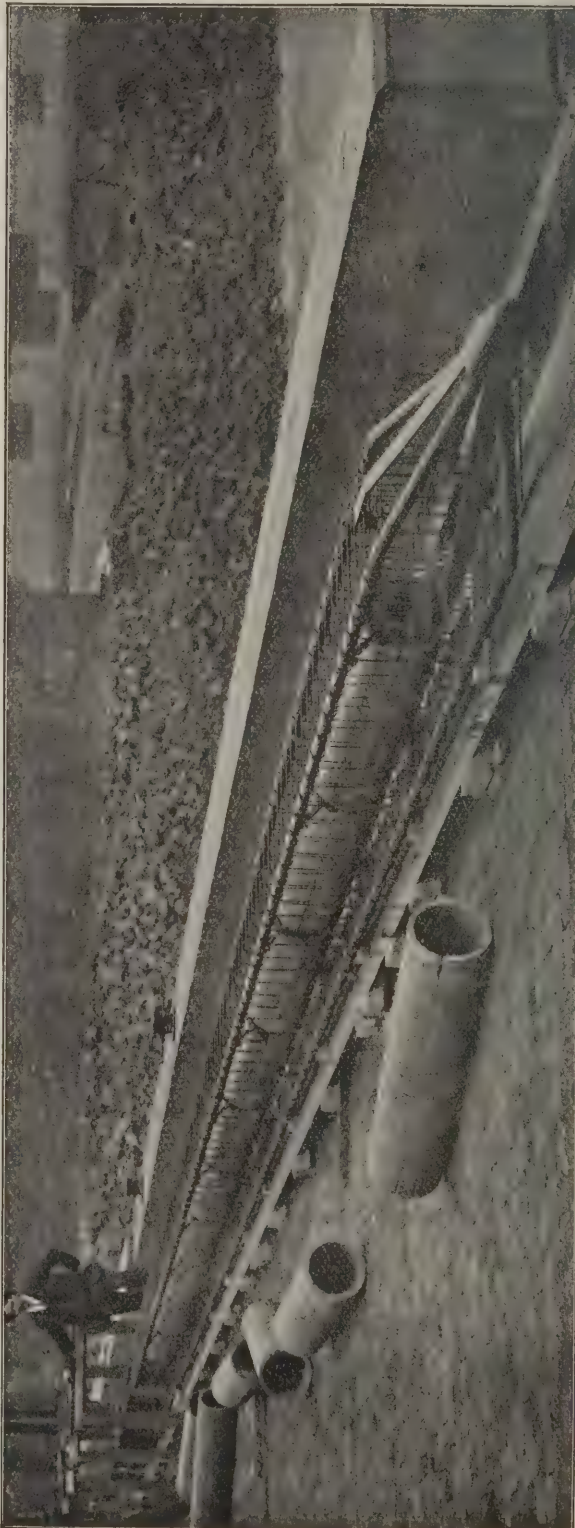


FIG. 7.—HOLLOW DIAPHRAGM PILES.

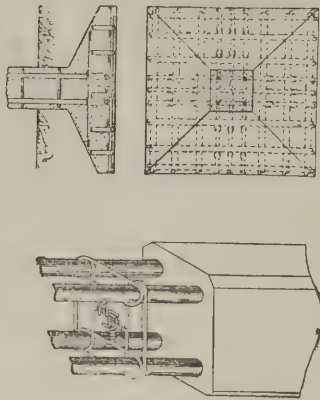


Fig. 4.
Reinforcement of
Pillars.

Fig. 5.
Foundations to a
Pillar.

SOME APPLICATIONS OF THE
HENNEBIQUE SYSTEM OF
REINFORCED CONCRETE
CONSTRUCTION.

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A National Collection. WE have heard it said, though we cannot vouch for the truth of it, that a more complete record of our old buildings is to be found with certain institutions in America and in Germany than in this country; but whether or no that is an actual fact, or one of those statements that pass current without anyone being able to check them, or having sufficient energy to do so, it certainly is true that we possess no proper collection of the multitudinous drawings that have been made of our old examples of architecture. For any individual in an unofficial way to attempt such a collection would seem from the start to be futile. The matter is a national one, and we are therefore glad to receive a communication from Mr. W. R. Lethaby and Mr. R. Weir Schultz, on behalf of a committee that has been formed, to

the effect that such a collection of drawings of architecture is at last proposed to be initiated. The committee point out that owing to the lack of any organized scheme, numerous sets of measured drawings of old buildings forming in themselves valuable historical records have been lost or destroyed, and many others are practically inaccessible to students. "Magnificent work has been done during the last fifty years by young architects and others, in making accurate drawings of old buildings both at home and abroad, and as many of these buildings have since been destroyed or materially altered, these drawings in some cases form the only record of their original design and arrangement. It has long been felt that drawings of this nature should be carefully collected and housed for future reference, and the committee charged with arranging a testimonial to Mr. Phené Spiers last year hoped to have been able to initiate such a scheme as part of the testimonial. This was found to be impracticable, but Mr. Spiers has since come forward, and of his own free will put aside the money balance of the testimonial as the nucleus of a fund for dealing with the matter, and he has invited a small committee to assist him in organizing and arranging a scheme." The authorities of the Victoria and Albert Museum were approached on the matter, and it is satisfactory to hear that arrangements have now been completed whereby the collection will be deposited in the Art Library at South Kensington, where the drawings will be accessible to students for purposes of study. The collection will not be confined to drawings of old work, but will include records of important public buildings and of works by eminent architects down to the end of the nineteenth century, photographs of buildings which no longer exist, or which have been materially altered, and sketch-books of deceased architects of repute. The need for such a collection has long been recognized, and it is satisfactory to know that a definite scheme has now been formulated. The committee are to be congratulated on their initiative. All they now need is the support of architects who can aid them by presenting drawings suitable to be included in this most important collection.

Congress Exhibitions. In connection with the International Congress of Architects which is to be held from July 16th to 21st several exhibitions will be held. Two of these are of considerable interest. The bare announcements that have previously appeared of these two exhibitions do not give any idea of their importance. Our remarks apply more particularly to the chronological exhibition of British architecture from the Norman Conquest, 1066, to the death of Sir Charles Barry in 1860. This exhibition has been placed in the hands of several of the foremost authorities on the

history of the various periods of architecture in this country, who are selecting the photographs by which the examples of architecture will be illustrated. The first section (Norman and Early English work) is in the hands of Mr. Francis Bond and Mr. W. J. N. Millard, who will collect together all the earliest examples of Norman, Romanesque and Gothic work. The second section on Gothic work (Domestic and Perpendicular) is in charge of Mr. C. Harrison Townsend and Mr. W. A. Forsyth, and these four gentlemen also have the benefit of Mr. E. S. Prior's assistance. The later periods, namely, the Early and Later Renaissance, will be supervised by Mr. J. A. Gotch and Mr. Mervyn Macartney respectively. Many of the photographs, we learn, have never before been exhibited, and some have been specially taken. Every building of note belonging to each particular style will not of course be illustrated by photographs, only the more important ones. In addition to the photographs there will also be shown models and drawings by deceased architects. For instance, the model of Wren's first design for St. Paul's Cathedral has been specially lent by the cathedral authorities. The Institute, too, possesses several interesting models and original drawings. It is obvious that such an exhibition will not only illustrate the course of this country's architectural history in a form superior to that to be found elsewhere, but it will be the first time that such an exhibition has been attempted. Moreover, it will trace our architectural history right up to the doors of the present. We are, of course, too close to give an adequate review of present-day work, but the Congress will not be debarred from some glimpse even of this, because the second exhibition, referred to above, is to be of photographs of buildings executed by living British architects. These are selected men, but the selection is a wide one; it goes beyond the bounds of the membership of the Institute, and includes all the best-known men both inside and outside the Institute. There is also to be a collection of oil paintings and water-colour drawings of English architecture. These will supplement the other exhibitions. The idea is a distinctly happy one, and we shall look forward to these exhibitions with the greatest interest. Whoever has been responsible for the idea is deserving of all praise. It is only to be regretted that the exhibition is not likely to form a permanent feature of an architectural museum. We should like to see this collection included with those of the plaster casts in the Royal Architectural Museum in Tufton Street, though this is impossible at present owing to want of room. Failing its inclusion among the exhibits of this museum we should like to see it housed in the Royal Victoria and Albert Museum at South Kensington.

S.K. EXAMINATIONS IN BUILDING CONSTRUCTION.—STAGE III.

[Not more than six questions to be answered, of which one only to be selected from each of the first two divisions: the tracing question 52 to be attempted by all candidates. The maximum number of marks attainable for each question is given in brackets. Time of examination, four hours.]

Division I.

41. Describe fully the tests which you would apply on the job to ascertain the quality of a sample of Portland cement submitted to you.

(50)

The usual and effective tests for Portland cement take time. They should be applied to quantities of cement delivered or to be delivered; tests on the job have more to do with the results of storage to discover whether the cement has been fairly treated in the store.

The workmen's test: Dip the bare arm into the opened bag; if the cement feels cold it should be rejected; such cement has been exposed to a damp atmosphere; the particles may in such circumstances have separately set and the cement has lost its active properties. If the cement feels warm it has not been sufficiently air-slaked; such cement will swell in the work.

Colour: An experienced workman accustomed to a particular make of cement will be able to judge it by its colour.

There should be no lumps of set cement in the mass. Sometimes lumps resulting from careless storage are bruised, and the cement refilled into the bags; a handful being taken, the grittiness of such cement is felt.

Many well-known makers have lead seals on the bags, which in some degree are a protection. A small glass phial may be filled with wetted cement: on setting, if the cement is "hot" it will burst the bottle; if underburnt or if dead it will shrink in the bottle, but this part of the test takes time. The cement may be tested on the job for quick or slow setting.

For fineness it may be tested on a standard sieve. If there is a reasonably accurate beam and scales on the job the weight of a measured quantity may be tried.

42. Compare the relative advantages of (a) marble, (b) concrete and iron, and (c) solid teak for a staircase from the point of view of resistance to fire. Give your reasons fully.

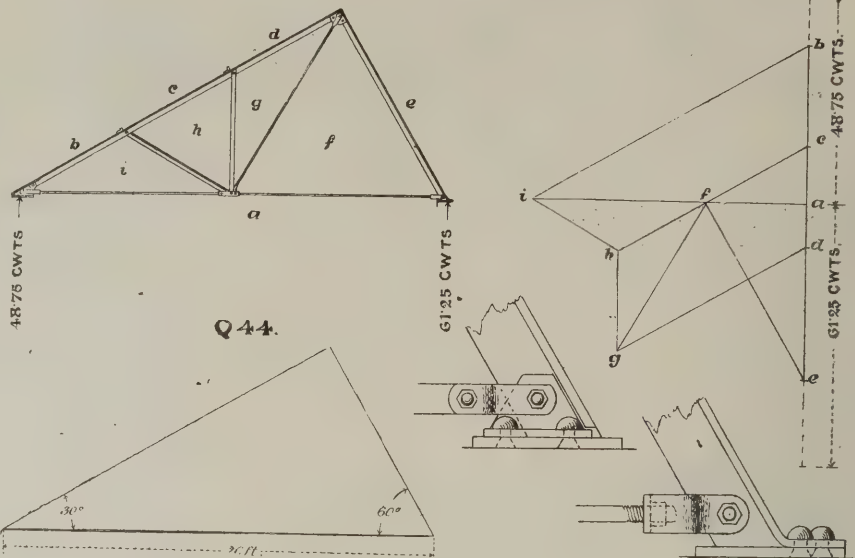
(50)

(a) Marble withstands fire badly, a hot fire burning it to lime. Any kind of stone when heated breaks up if water is thrown on to it, owing to irregular contraction.

(b) Concrete, when heated, will also break up if cold water is thrown upon it, but possibly it is safer than a very compact stone. Iron embedded in concrete is protected from the heat by the comparatively non-conducting concrete, and in many cases it will retain its strength and prevent the concrete falling to pieces.

(c) Teak, being a better non-conductor than stone or concrete, will not fail by breaking up when water is dashed upon it; it will fail by burning through, and as this takes time it may be safer when used solid in the steps of a staircase than stone or concrete and iron. The whole question is comparative.

All three substances will be destroyed in the ordinary circumstances of accidental fire. It is probable that where iron is depended upon for strength, and the iron is protected from heat by non-conducting cement-plaster on expanded metal or otherwise, there is found the best means of resisting complete destruction by fire. We believe the late Captain Shaw was in favour of wooden beams and pillars coated with common plaster. The obvious objection to wood is that it is a fuel, and when its protection is destroyed it adds its bulk to the general burning.



43. Describe the methods in practical use for preserving timber from the effects of moisture. Classify oak, elm and fir as to their suitability for use in (a) moist ground, (b) ground alternately moist and dry, and (c) dry soil.

(12)

Most timber bears moisture well if continuously immersed in water; it is the alternations of wetting and drying, or circumstances of position, which allow the action of animal or vegetable life (minute organisms) that require to be guarded against or provided for. Painting is the most obvious preservative. By this means the timber is shut off from contact with organic germs, and by preventing the penetration of wet is preserved from alternations. Timber is preserved by having its interstices filled with antiseptic substances, which may also be of an oily nature, repelling damp. Creosote is a usual substance employed. The timber is first subjected to a rarified atmosphere to draw out the moisture, and then the creosote is admitted and forced into the wood by pressure (pumped into the containing vessel).

(a) All three will keep well in continuously moist ground. The Irish bog oak and bog fir from prehistoric forests are at the present day put into work (the bog fir is particularly fresh and resembles pitch-pine in work). It was formerly supposed to be an advantage that coffins should not quickly decay, and elm was much employed for them.

(b) Our experience with oak is that when alternating from wet to dry it tends to foliate in the planes of medullary rays, thus admitting deleterious influences to its mass. It is usual to put oak sills to window frames. For this purpose straight-grained foreign oak is not the best; in any case care should be taken that the edges of medullary rays are not exposed to the weather. (The answer expected to this question is probably oak; but if wet and dry means unprotected by paint or otherwise, no timber can be recommended as suitable.)

(c) Oak and any timber is fairly suitable in very dry soil if it has been safely seasoned beforehand.

Division II.

44. The diagram represents, in outline only, a steel truss for a north light roof. Draw to a scale of $\frac{1}{8}$ (4 ft. to an inch) a suitable truss, and construct the stress diagram for a vertical load of $\frac{1}{2}$ cwt. per ft. super. to a scale of 20 cwt. to an inch. Draw one-quarter full size the detail of joint at foot of north side. The trusses are supposed to be 8 ft. apart.

(60)

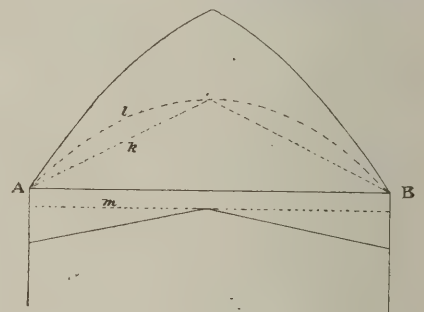
See drawings. Alternative details are shown of the joint at foot of north side. The stress diagram has been drawn on the assumption of a load of $\frac{1}{2}$ cwt. per ft. over the whole of the roof. This, while reasonable for the

purposes of the question, is much in excess of an actual load for the north side.

45. A beam 20 ft. clear span is subject to a distributed load of 10 tons combined with a central load of 5 tons: draw the bending moment diagram and the shear stress diagram: scales, 4 ft. to 1 in., 20 ton-feet to an inch, and 10 tons to an inch. What is the value of the bending moment in the centre and the reaction at each end?

(60)

See drawing. Bending moment diagram is shown by full line over A B, while dotted lines *l* and *k* indicate bending moments for distributed load and concentrated load respectively. Shear-stress diagram shown below



A B, *m* indicating shear diagram for concentrated load. Bending moment at centre = $\frac{WL}{8} + \frac{WL}{4} = 25 + 25 = 50$ ton-ft. Reaction at each end, 7.5 tons.

46. A compound girder, composed of two rolled steel joists placed side by side, with one 12 in. by $\frac{3}{4}$ in. top plate riveted on, carries in the centre of its span, which is 16 ft. clear, a steel stanchion, the weight of which, with its superincumbent load, is 35 tons. Calculate the scantling of the joists, and sketch the base of the stanchion and its connection with the girder.

(60)

Bending moment = moment of resistance = 1,680 ton-ins. Let *d* = depth of girder in inches. Assume thickness of joist flanges to be 1 in. and safe load 6 tons per sq. in. Then area of compound top flange = 18 sq. ins., area of bottom flanges = 12 sq. ins., and height of neutral axis from bottom flange = $\frac{1}{3}d$. $\therefore 1680 = 12 \times \frac{1}{3}d + 18 \times \frac{2}{3}d \times 6$

$= \frac{1680}{2} = 12 \times \frac{2}{3}d \times 6$

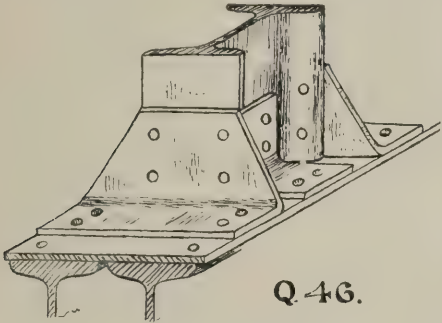
$\therefore d = \frac{1680 \times 5}{2 \times 216} = 19'4$ ins., say, *d* = 20 ins.

In this calculation we give no credit to the web for resisting bending moment, but we have also taken no account of the weight of the beam, nor of the distributing effect of the base of the stanchion, and we take a lower safe load per square inch than is some-

times taken. We should make the web 6 ins. thick.

We are here led to a size of joist which is different from any stock section we have seen; the nearest to it, of Dorman and Long's, is 18 ins. by 7 ins. by 75 lbs. per foot, but the 7 in. flange would be unsuitable to combine with the 12 in. wide plate proposed. The covering-plate should indeed be somewhat wider than the sum of the flanges.

Having arrived at the dimensions in the manner shown, and having obtained the weight of the girder itself, more careful calculations may be made by the exact



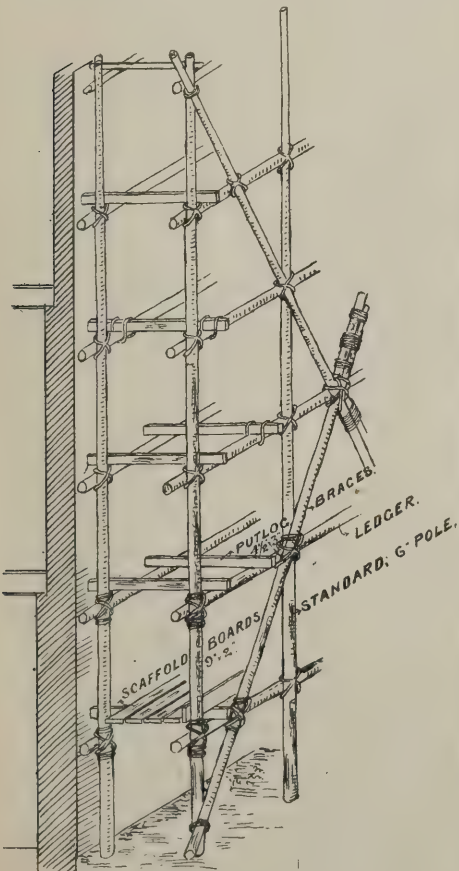
Q 46.

student, using the moment of inertia; but having regard to all the circumstances it is fair enough to act on the values here determined; they will be found to be full on the side of safety. For the attachment of the stanchion we should propose to rivet the brackets on to the joists together with the plate, and bolt the brackets to the stanchion. To bolt the brackets on to the joists would result in decrease of strength, as the bolts would not tightly fill the holes. See sketch.

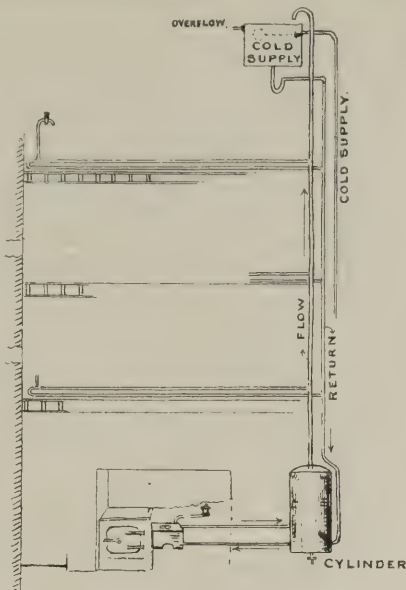
Division III.

47. How does a mason's scaffold differ from a bricklayer's scaffold? Sketch the end view of a mason's scaffold, about 30 ft. high, to a scale of $\frac{1}{4}$ in. to an inch; name the parts and mark the scantlings. What is the particular advantage of bracing in scaffolding?

(50)



Q 47.



A.

A mason's scaffold has an extra frame of standards and ledgers, placed as near to the face of the wall as practicable, to receive the inner ends of the putlogs, by which means holes in the wall are avoided. It is also made stronger than a bricklayer's scaffold; the standards are placed closer together and the whole more firmly braced. Bracing binds the scaffold together and secures it against rocking, and adds generally to its strength by stiffening the standards and ledgers. See sketch.

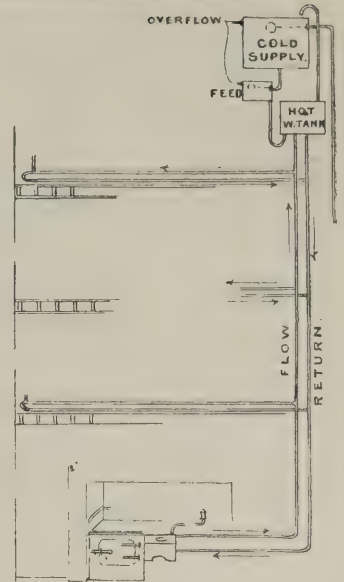
The above is a fair short book answer, and it is what is probably expected. We have seen, however, masons' scaffolds which might have been bricklayers' scaffolds. The answer only applies to coursed ashlar; in sneaked work holes may be left for putlogs. Book information on scaffolding should be modified by the increased use now being made of steam derricks with long jibs for setting stones, by which the weight of heavy stones never comes upon the scaffold. A single pole is shown for each standard, as they can be obtained long enough for the height of scaffold given; for any higher scaffold two poles would be required, lashed together. In some cases masons' scaffolds are made of squared scantlings fastened with bolts or coach screws. The above scaffolds are termed "independent," not being directly connected with the wall.

48. Describe clearly, illustrating your answers by sketches, the "cylinder" and "tank" systems of hot-water circulation, and state the relative advantages and drawbacks of each system.

(50)

The cylinder system is shown by sketch A, the tank system by sketch B. In the cylinder system the hot-water storage tank—the cylinder—is fixed at a comparatively low level and below the rising pipes. A flow-and-return are fixed between boiler and cylinder as shown. It is important to have no connections to these pipes by which the cylinder may be emptied. A rising flow pipe is connected to the top of the cylinder the upper end of which is turned over the cold-supply cistern or carried through the roof; this forms a steam exhaust as well as the "flow" from which hot-water supplies are taken. It is advisable to have a return to this and to all subsidiary flows as far as possible by which all "dead" water in pipes is avoided. It is an improvement to connect the cold water supply direct to the bottom of the boiler, instead of to the bottom of the cylinder as shown.

It is also useful to have an emptying cock to the cylinder, but it should have a loose



B.

spanner to prevent the cock being used except for cleaning and repairs. A safety valve is advisable in each system.

In the tank system the hot-water storage cistern is placed above the rising pipes, and all supplies are taken off the flow beneath the cistern, with or without returns connecting to the main return from cistern to boiler. The storage tank, being subjected to but little pressure, is usually rectangular, while the cylinder, being fixed at a lower level and subject to greater pressure, is made in that shape for the better resistance of the pressure.

Sometimes the small "feed" cistern is omitted. The principal advantages of the cylinder system are—(a) Circulation will continue if water-supply temporarily fails; (b) hot water can be obtained quicker and at a higher temperature; (c) the hottest water is drawn before the temperature is lowered; (d) the cylinder can often be utilized to air a linen closet.

The drawbacks are—(a) The supply cistern is more exposed to the action of frost, having no heat near it. (b) The cylinder, if too light, is liable to collapse by the generation of steam when hot-water is drawn and cold suddenly introduced. These drawbacks can easily be avoided or minimized.

The advantages of the tank system are few and unimportant.

The hot-water tank can be placed near to the cold-supply cistern to prevent frost, and a possible small advantage in some cases may be gained by placing the hot-water tank in the roof when no other convenient place is available.

Some of the drawback are—(a) The hot-water tank may be emptied by failure of the water-supply, involving risk of injury to boiler, if not a worse consequence. (b) When hot water is drawn off the cold water from "feed" mixes with the hot water in the tank and rapidly cools (this may to some extent be obviated by connecting cold supply to the return at some distance from the tank). (c) The tank, being usually placed at a considerable distance from the boiler, there is loss of heat by radiation from flow-and-return pipes, and there is often further loss from the tank itself.

49. An 18 in. brick wall, with the usual footings and concrete, is to be underpinned to a depth of 6 ft. Describe fully how this should be done, and draw an elevation and section of the first portion of the completed work to a scale of $\frac{1}{4}$ in. to an inch showing the old footings by dotted lines.

(50)

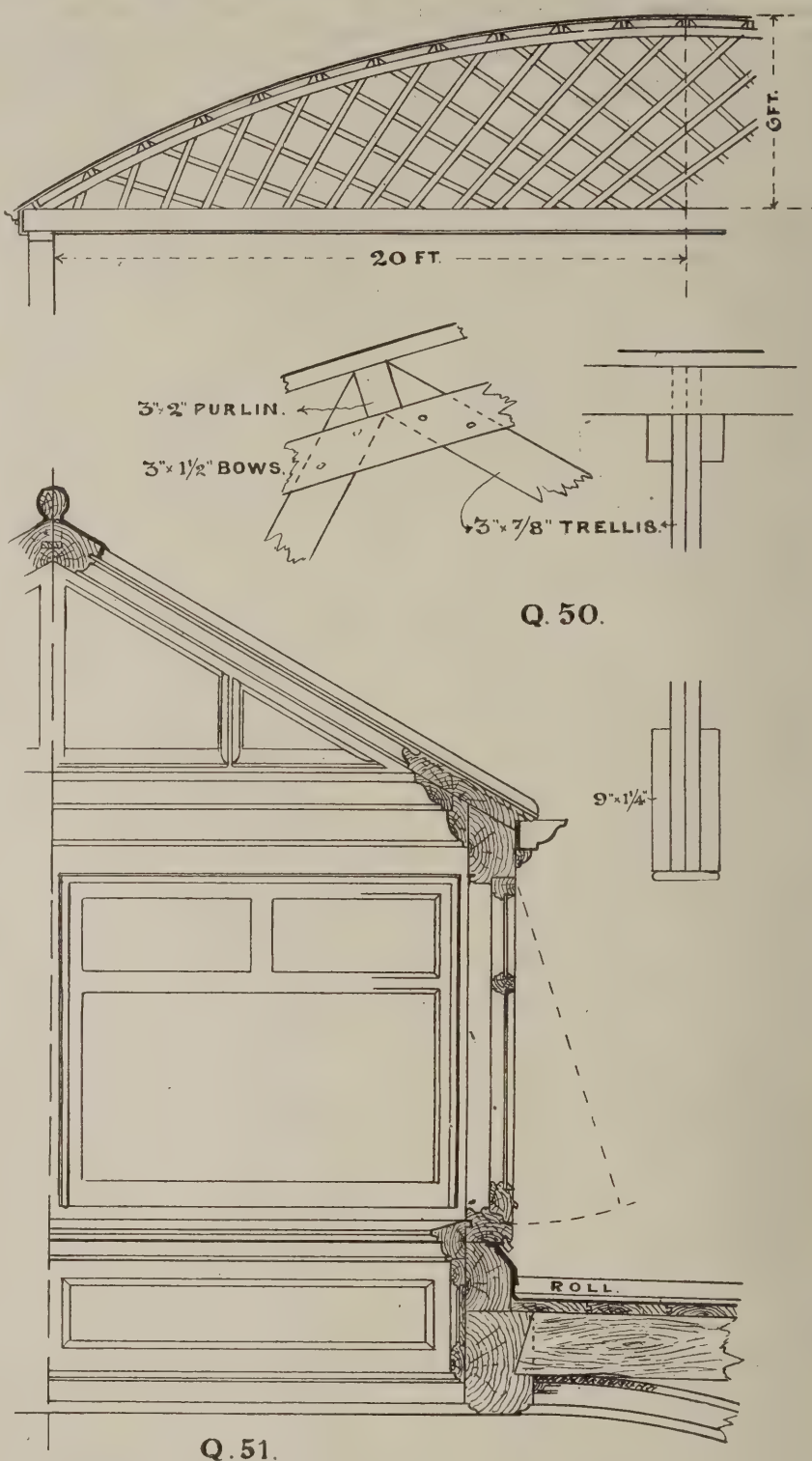
The method of dealing with this would

depend greatly upon the particular circumstances connected with the work; e.g., weight of and kind of loading on the wall, nature of soil, adjacent property, purpose for which the underpinning was done, &c. Underpinning work is done (usually) in short sections. One or more stout "needles" would be placed across under the wall, firmly packed and supported by a vertical or slightly raking "shore" at each end (holes large enough being excavated to allow of a good spreading base at a sufficiently low level), and the whole tightly wedged with hardwood wedges before any considerable amount of excavation was done. In some cases the upright shore can be dispensed with and a running baulk, placed on the ground parallel to wall, substituted to receive one end of the needle. When the shoring is tight and secure the excavation can be proceeded with, and the old footing and concrete removed for the section to be dealt with. (Shoring to the sides of excavation to be done as the nature of the soil requires.) Raking shores to the upper part of the wall may be required in certain cases. The new base should be put in of good concrete solidified by running (not too wet) and the brickwork brought up in cement-mortar and well wedged up to the old work. The ends of the completed section would be left for bonding with the following sections, and the kind of bond would depend upon whether the work was to be exposed, and the appearance desired. The shores should be left standing until the mortar is thoroughly set and hard. See drawing.

As a matter of fact, shoring for underpinning is often done in a much simpler manner than the above; sometimes considerable risk is run by contractors, partly to avoid expense, but sometimes for want of understanding, or neglecting to calculate the loading on the wall, or other circumstances connected with the work.

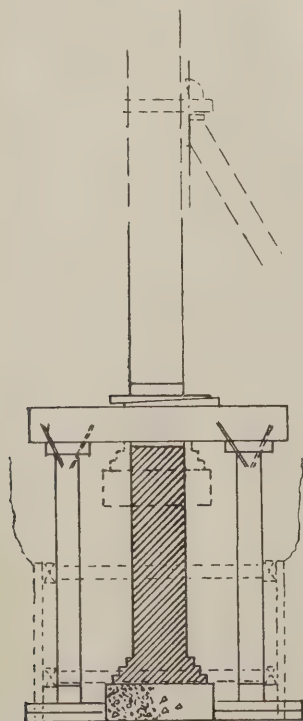
Q. 50. Draw to a scale of $\frac{1}{4}$ in. to an inch a "Belfast" roof truss for 40ft. span with a rise of 6ft., with detail of joints one-eighth full size = $1\frac{1}{8}$ ins. to a foot. (50)

See drawings. This question could only be answered by candidates who have heard the name "Belfast" applied to this class of

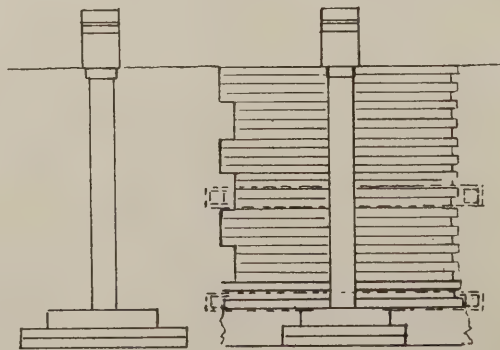


Q. 50.

Q. 51.



SECTION.



ELEVATION.

Q. 49.

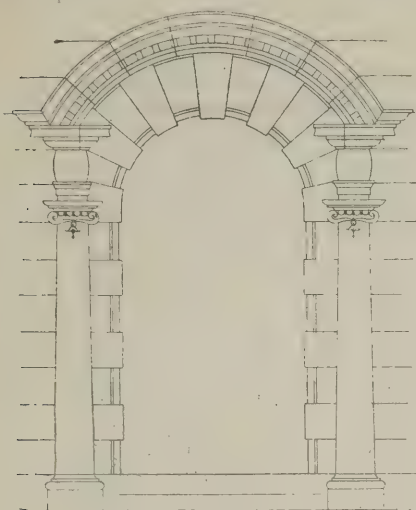
roof truss. This name is not general even in Ireland.

51. A billiard-room is to be covered with a lead flat having a lantern light 12ft. by 6ft. clear internal dimensions. Draw to a scale of $\frac{1}{2}$ in. to a foot a cross-section through the lantern showing 12ins. of lead flat on each side, with the trimmers and joists. Describe the precautions which you would take to prevent condensed water falling on the table. (50)

See drawing. This is only one of a number of possible designs, both as regards construction and appearance, no restrictions being imposed in reference to the lantern itself, apart from the dimensions; it might be constructed in a light manner of steel. We have given only a half cross-section instead of a full one, as evidently intended, seeing that 12ins. of the lead flat was to be

shown on each side. Surely there is work enough in a half-section.

52. Trace neatly in ink the drawing, Fig. 52. The lines should be firm and unbroken and should finish exactly at the proper points.



Q 52.

[This paper is not so open to criticism as the preceding papers; there is, however, not sufficient variety of subjects, and most of the questions require more time than is available at the examination to properly answer them. The last question, being a compulsory one, would be a serious matter for artizans, and even for most architectural students. Half of the doorway would be drawing enough, and would fully test the candidate's qualifications. As the tracing must (properly so) be in ink, time is required for the ink to dry, as well as to do the tracing.]

Answers to questions in Stage I. were given in our issue for May 23rd, and to Stage II. in the issue for June 6th.

NOTES ON COMPETITIONS.

Peace Palace Competition.

To those who did not take part in the Peace Palace competition, and who may not have an opportunity of seeing the report of the international jury which was appointed to consider the designs submitted, the following brief account of the doings of the jury may prove of interest:—The jury determined upon a method of procedure, and then separated in order that each member might study all of the 216 designs by himself. The designs were then re-examined by the jury in a body, and all those were rejected which failed to obtain a single favourable vote. Forty-four designs were thus retained for further consideration, and a vote by ballot was taken. Designs which failed to receive at least four favourable votes were set aside. The number of designs thus became reduced to sixteen. These sixteen designs were subjected to several renewed examinations, and the ultimate verdict was obtained by a vote of majority. The report would have been a much more interesting document had it contained a list of the forty-four designs which were first selected, classified under headings of nationality; and more interesting still had a full list of all designs submitted been included, similarly classified. From the list as it stands it is impossible to select the mottoes which accompanied British designs and those which did not, for they are, with one exception, either in Latin, French, German, Italian or symbols. The only English motto is "Triumphant Democracy," and this of course is no evidence that the design is of British origin. The word "Pax" abounds

in various forms and combinations, as was inevitable, and "Skibo" stands defiantly and leaves one speculating upon the land of its birth. Of the six premiated designs, four were by architects who had been specially invited by the committee to take part in the competition. The report concludes with a short description and criticism of the premiated designs. It is somewhat disconcerting to learn that the style of the design placed first, which we had all been informed by the newspapers was that of ancient French chateaux, is considered by the assessors as being in accordance with the local traditions of sixteenth-century architecture as obtaining at the Hague, and this is the chief reason why the design was selected. It is surprising that a reason of this sort should have prevailed with a majority of an international jury, beyond all other considerations, in this our year of grace 1906, and in connection with a monument the like of which history has not known. Let us with all haste state that this country's representative was numbered with the minority at that fateful issue. In view of the designs which have already been seen and published, the notes in the report are un-descriptive and unconvincing. The jury appear to have failed to approach the subject with the breadth of spirit which was expected of them, and the admission is reluctantly torn from one that the architectural aims and ideals of different nations, though each tending in varying degrees towards a common end, are not yet in a sufficient state of unity to render an international competition anything but a disappointment. It is stated that none of the designs sent in for this Palace of Peace are considered satisfactory by the promoters, and a new competition among forty competitors is suggested.

Convalescent and Nursing Home, Glossop.

This competition was referred to in our issue of May 30th as being particularly unsatisfactory. We were able to announce, a week later, that there was hope of an assessor being appointed and the conditions being revised. These hopes have now been confirmed by a communication from the town clerk to all applicants for conditions, which states that it has been decided to appoint an assessor and to supply additional information to architects desirous of competing. The committee intend to visit some institutions similar to the one they propose to have erected, in order to give them some idea of the accommodation it will be necessary to provide. The additional information, therefore, is not likely to be forthcoming for several weeks. It was the lack of information in the conditions, as well as the absence of an assessor, which was particularly complained of. The architect, in fact, was to have supplied the committee with all the information they ought to have acquired for themselves. It is a pleasure to be able to record that the committee now appear to be doing all in their power to make the competition a success.

Hospital at Stone.

Mr. W. A. Pite, F.R.I.B.A., of London, has been appointed assessor in the competition for the proposed new hospital to be built at Stone.

New Infirmary, Edmonton.

This competition is limited to five architects, the assessor being Mr. Rowland Plumbe, F.R.I.B.A. The total cost of the building is put at £250,000.

Dublin Technical Schools.

At last week's meeting of the council of the Royal Institute of the Architects of Ireland the question of the correspondence with the Corporation in connection with the promotion of a competition among Irish architects for the design of the proposed new technical schools in Dublin was considered.

Correspondence.

The A.A. Evening Studio.

To the Editor of THE BUILDERS' JOURNAL.

SIR,—May I call your attention to an incorrect statement made in your last issue? It is there stated that the evening studio of the Association is being closed. This is by no means the case. The council has for some time past had under consideration the advisability of amalgamating the evening studio (formerly conducted by Mr. W. G. B. Lewis) with the evening continuation school, as with the two schools under separate heads there was much overlapping, and from a financial as well as an educational point of view the new scheme will be advantageous to all students, as provision will be made not only for students who have passed through the day school but for students who are engaged in offices during the daytime, as well as those wishing to prepare for the R.I.B.A. examinations or desirous of taking up special subjects in design or construction. The new arrangement will provide evening instruction which will supply the wants of all grades of students without disturbing the smooth working of the scheme of continuous study, and it was evident to the council that the time had arrived when the studio system should be codified into one scheme.—Yours truly,

H. TANNER, junr.,

Hon. Secretary,

WESTMINSTER. Architectural Association.

[As the statement made in our columns was furnished by the late instructor of the school, Mr. Lewis, we assumed it was correct.—ED. B. J.]

R.I.B.A.

Presentation of the Royal Gold Medal.

THE last meeting of the session of the Royal Institute of British Architects was held on Monday evening at 9, Conduit Street, W., the occasion being the presentation of the Royal Gold Medal to Sir Laurence Alma-Tadema, R.A.

In presenting the medal Mr. John Belcher, A.R.A., president, referred to the good service Sir Alma-Tadema had rendered to architecture—indirectly for the most part, yet not the less substantially and really—and though he was known to the world chiefly as a great painter, the Institute felt no hesitation whatever in presenting his name to the King for the Royal Gold Medal.

After referring to Sir Alma-Tadema's "style," the president mentioned two well-known pictures of his—"Architecture in Ancient Rome," in which he depicts the architect engaged on his work, and the other in which the sculptor Phidias is represented putting the finishing touches to the Parthenon frieze and explaining it (apparently) to his friends and patrons.

As a wonderful illustration of Sir Laurence Alma-Tadema's architectural knowledge, and the clearest proof of the practical value of his archæological researches, he called attention to the series of designs which he made for Sir Henry Irving for the scenery to illustrate Shakespeare's play of "Coriolanus."

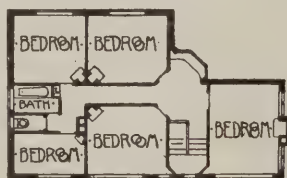
Sir Alma-Tadema, in replying, said the sister arts had always appeared to him indivisible—different parts of a single whole; and he realized that from this point of view he might be regarded as a link of some interest. In some of his works he had tried to reconstruct antique buildings; in others he had been concerned with the proportions of figures to architecture.

Mr. Andrew Moseley, F.R.I.B.A., of Fulham, S.W., died recently, aged 94.

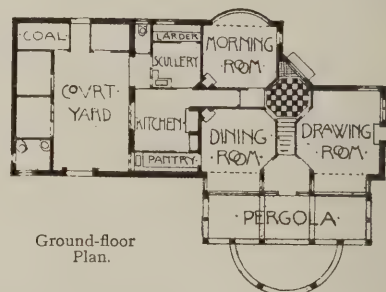
Mr. Philip Wilkinson, F.R.I.B.A., of London, died on June 13th.



This house has been built at a cost of about £1,000, Mr. Harold Falkner being responsible for it. The interior is very interesting. The dining-room is panelled throughout with Jacobean oak with exposed ceiling joists, and in the drawing-room is a frieze modelled by artists of the Bromsgrove Guild of Craftsmen. Some of the fireplaces have tiles from a local pottery. On the other side of the house to that shown above is a pergola, leading out to the garden.



First-floor Plan.



Ground-floor Plan.

OUR PLATES.

New Central Library, Bristol.

THE new central library in Deanery Road, Bristol, was formally opened by Lord Winterstoke last Wednesday. To the left of the main front on the ground floor is the entrance, leading into a spacious hall. This is lined with veined green marble, with blue mosaic on the vaults: the floor being of Piastraccia marble, the wall skirting and bases to piers in Grande Antique, the dado of Cipollino, and the capping of Irish green marble. Leading out of this hall is the lobby to the newsroom on the front and the lending library at the back, and, at the opposite end, the magazine-room, this last leading out from the newsroom. The lending department provides accommodation for 25,000 volumes. At the end of the entrance hall is the staircase to the upper floors. This is very cleverly contrived on a semi-circle. The chief room on the first floor is the reference library, which fronts Deanery Road and has large bay windows at either end and three small bays in between, groups of statuary being placed in recesses under the arches over the small bays. The reference library is 150ft. long and 40ft. high and holds about 100,000 volumes. It is a very

fine room, in stonework, with handsome electroliers depending from the arched ceiling. Leading out of this room is what is called "the Bristol room," containing the Bristol collection of books. This room has a richly carved chimneypiece (by Grinling Gibbons) and bookcases brought from the old library in King Street. The rest of the first floor is taken up with the chief librarian's rooms, at the back of the building, while book stores and the upper part of the reference library occupy the top floor. The architect of the building is Mr. H. Percy Adams, F.R.I.B.A., of London, whose design was selected in competition, for which sixty-one designs were submitted, Mr. E. W. Mountford being the assessor. The builders were Messrs. Willcock, of Wolverhampton. Adjoining the library is the Norman Abbey gateway to Bristol Cathedral. This had to be taken in account in the design of the new building.

Peterborough Cathedral Restoration.—The Peterborough Cathedral Restoration Committee are about to undertake the repair of the north transept on the advice of their architect, Mr. G. F. Bodley, R.A. The north wall leans a good deal, but Mr. Bodley thinks the settlement took place a considerable

time ago and that the masonry has now got its bearing. The cracks and displacements require to be carefully treated. Mr. Bodley says: "The building must obviously be accepted as an ancient one, and all the old work that it is possible to retain should be retained. But all that adds to the durability of the fabric and to its greater preservation should be certainly carried out as soon as is possible, and any glaring deficiency should be made good."

Tests with Firegrates.—In the article in our issue for June 6th dealing with the tests with domestic firegrates carried out at the new Government Offices in Whitehall by the Smoke Abatement Society, in conjunction with Sir Henry Tanner, we illustrated the grate of Messrs. Hendry & Pattison, Ltd., which was bracketed with those of Messrs. J. & R. Corker, Ltd., and Messrs. Candy & Co., as giving the best results. The grate illustrated was the firm's "warm-air" grate, and though actually tested in the tests, it was not the one tested in the final test. This latter was a "non-warm air" grate, exactly similar in construction to the other, except that there is no air chamber at the back. We are asked to point this out in order to remove any misunderstanding.

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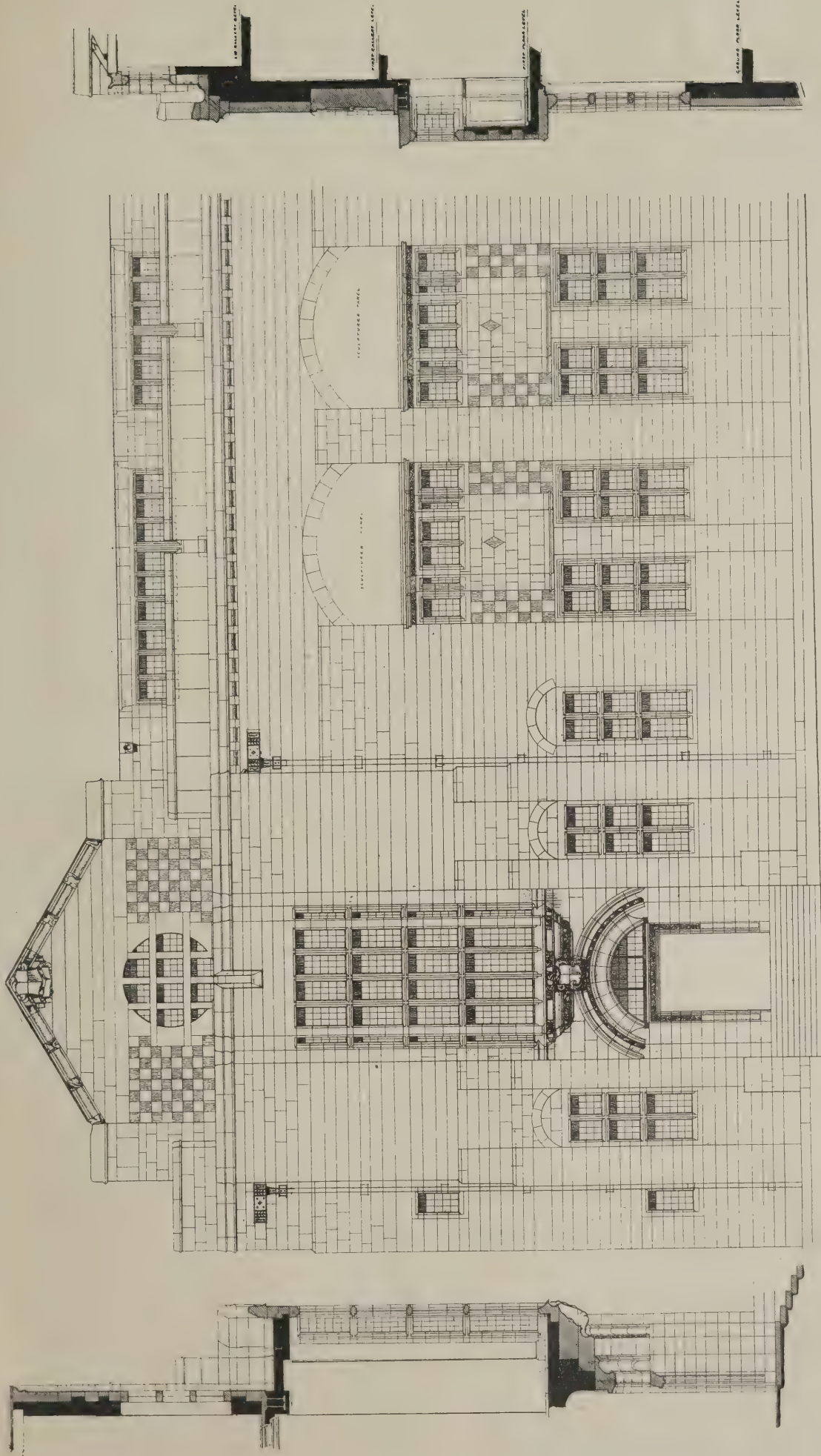
Main Front, to Deanery Road.



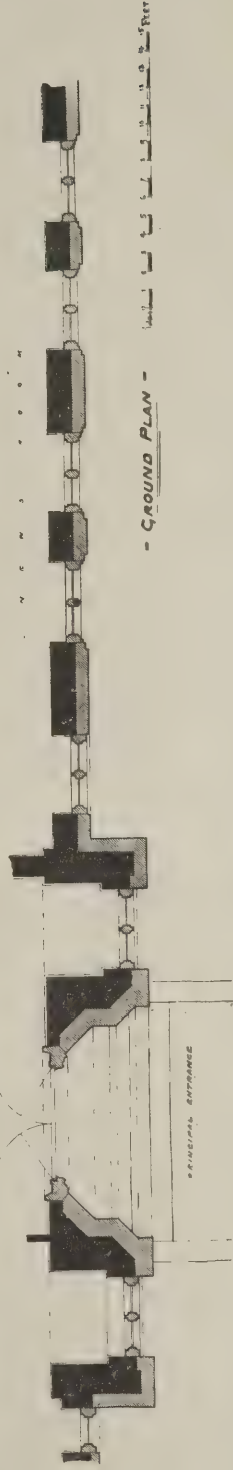
The Reference Library.

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Photos: Smith.



- SECTION THRO' ENTRANCE -



- GROUND PLAN -

- SECTION -

UPPER PART OF WALL
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Enquiries Answered.

Questions should in all cases be addressed to the Editor and be written on one side of the paper only.

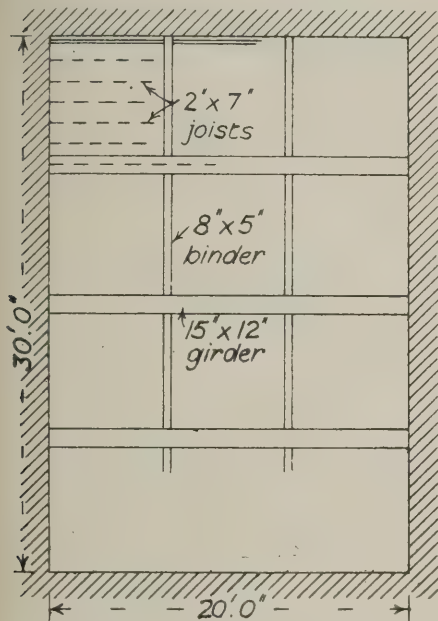
The services of a large staff of experts are at the disposal of readers who require information on architectural, constructional or legal matters.

Correspondents are particularly requested to be as brief as possible.

The querist's name and address must always be given, not necessarily for publication.

Scantlings for Framed Floor.

MARCH.—PROBATIONER writes: "Please advise me as to the scantlings of a framed floor, room 20ft. by 30ft., for the testimony of study required for the Intermediate R.I.B.A. examination. I send small sketch



plan showing sizes as I have worked them out."

It is not stated whether the floor is for a public building, warehouse or private dwelling; the purpose would make a difference in the load to be allowed for. Taking the load, including weight of floor itself, to be $1\frac{1}{2}$ cwt. per ft. super., the wood girders would have to carry $\frac{30}{4} \times 20 \times 1.5 = 225$ cwt. Then

by formula $w = \frac{bd^2}{L}$, $225 = \frac{bd^2}{20}$, or $bd^2 = 4500$. Assuming b to be $\frac{4}{5}d$, then $\frac{4}{5}d^3 = 4500$, or $d^3 = 4500 \times \frac{5}{4}$, or $d = \sqrt[3]{5625} = 17\frac{3}{4}$ ins., and $b = \frac{4}{5}d = 17.75 \times \frac{4}{5} = 14\frac{1}{4}$ ins.

This formula without a constant allows a factor of safety of 7, which is not too much for permanent work. The binders would have to carry $\frac{20}{3} \times \frac{30}{4} \times 1.5 = 75$ cwt.

Then $w = \frac{bd^2}{L}$, $75 = \frac{bd^2}{7.5}$, or $bd^2 = 75 \times 7.5 = 562.5$. Assuming b to be $\frac{5}{8}d$, then $\frac{5}{8}d^3 = 562.5$, or $d^3 = 562.5 \times \frac{8}{5}$, or $d = \sqrt[3]{900} = 9\frac{3}{4}$ ins.; and $b = \frac{5}{8}d = 9.75 \times \frac{5}{8} = 6$ ins. The common joists would have to carry $\frac{7.5}{6} \times \frac{20}{3} \times 1.5 = 12\frac{1}{2}$ cwt. Then $w = \frac{bd^2}{L}$, $12.5 = \frac{bd^2}{6.6}$, or $bd^2 = 12.5 \times 6.6 = 83.3$. Assuming b to be $\frac{2}{3}d$, then $\frac{2}{3}d^3 = 83.3$, or $d^3 = 83.3 \times \frac{3}{2}$, or $d = \sqrt[3]{125} = 5$ ins.; and $b = \frac{2}{3}d = 3\frac{1}{3}$ ins.

$\sqrt[3]{292} = 6\frac{5}{8}$ ins.; and $b = \frac{2}{3}d = 6.625 \times \frac{2}{3} = 4\frac{1}{2}$ ins.

say, 2 ins. With the exception of the common joists; the scantlings proposed are insufficient, moreover, the method of framing the floor is out of date; rolled steel joists should be substituted for the wood girders.

HENRY ADAMS.

Concrete and Iron Floors.

GLASGOW.—J. G. F. writes: "I purpose making the upper floors in a villa of breeze-concrete, supported by I-beams at 4ft. centres. The spans are 12ft. and 15ft. in the clear. What sizes and weights of beams should I employ; also thickness of concrete. Is there any objection to finishing the floors with granite, i.e., dispensing with floorboards entirely? Where hollow spaces are employed is it necessary to brander and lath the outside walls?"

We really cannot continue to answer such simple questions as this. We have dealt with such subjects over and over again in our columns. Our correspondent ought to be able to determine such elementary questions himself; if he cannot his education has been sadly neglected. We are always ready to advise readers upon any points of real difficulty or out-of-the-way problems, and we are continually publishing theoretical and practical articles on the principles of construction, which our correspondents must apply for themselves in their everyday practice.

Book on Operating Theatres.

W. writes: "Which is the best publication on the modern operating theatre for a county hospital? Please name any theatres recently erected that would repay a visit of inspection."

There are no recent books upon the particular branch of hospital design you name. Almost any recently-erected hospital will serve for study. We would suggest the General Hospital, Tunbridge Wells (H. Percy Adams, architect) or Camberwell Infirmary (Edwin T. Hall, architect). Plans and elevations of the operating-theatre at the latter are published in "Specification No. 9" (3s. 3d. post free from our offices).

Hospital Construction.

BATLEY.—X. Y. Z. writes: "(1) Which is the most recent plan or arrangement of conveniences and bathrooms (cross-ventilated) to a hospital ward? (2) What is the least size of such a bathroom to accommodate slipper bath and lavatory basins (two),

and also the usual size of the w.c. rooms? (3) What is the most suitable width for hospital-ward windows, and the usual height up to sill from floor-level? (4) Do you consider it any advantage to have hot-water piping to the wards, in addition to Shorland's patent stoves?"

(1) See recent plans published in our columns, in "Specification" Nos. 7 and 9, and in the "Hospital." (2) Bathroom about 10ft. by 7ft., but the shape can be modified; w.c.'s are usually about 3ft. by 5ft. (3) 3ft. to 3ft. 6ins. wide, about 3ft. above the floor. (4) We do not think hot-water piping advisable. It collects dirt, and is troublesome to keep clean. The heating and ventilation can also be combined on the "plenum" system.

Exemption from Examination.

TONBRIDGE.—LEGAL writes: "Does the R.I.B.A. preliminary examination exempt one from the preliminary examination of the Incorporated Law Society?"

We should not think so, but you might write to the secretary of the Incorporated Law Society, Chancery Lane, London, W.C.

Floor for Bath.

WOLVERHAMPTON.—G. P. writes: "It is proposed to use for public meetings, concerts, &c., a swimming bath with a pond roof, by 40ft., and it is desired to provide a temporary floor level with the promenade round the pond. Kindly explain a simple method of constructing this floor."

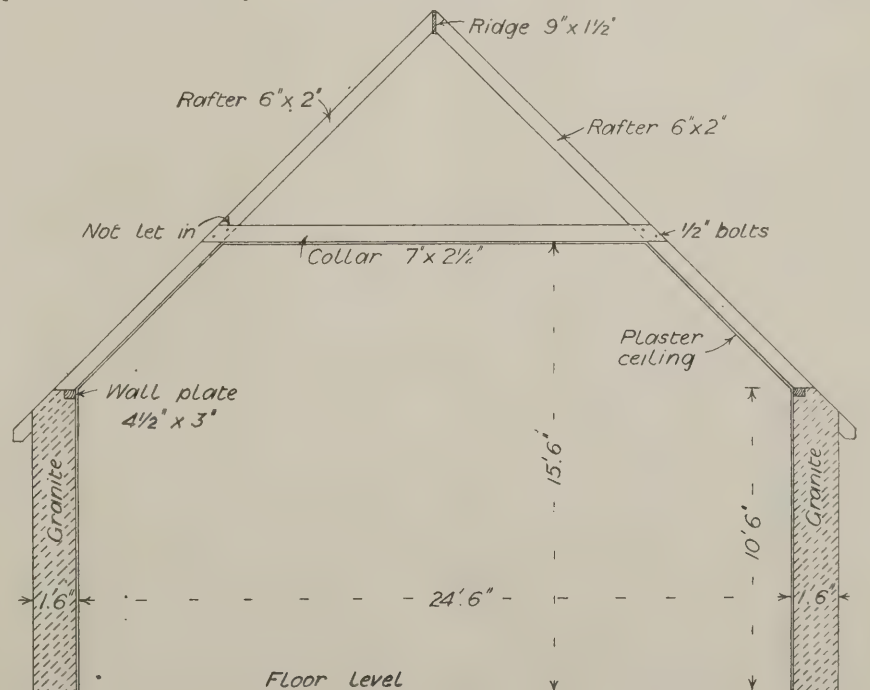
See an article in our issue for April 3rd, 1901.

Roof for Hall.

DUMFRIES.—ROOF writes: "I send rough cross-section of a small hall 24ft. 6ins. wide, height to underside of tie 15ft. 6ins., wall head 10ft. 6ins., slope of roof 45 degs., thickness of wall 1ft. 6ins. What kind of roof should be used over this span, and what sizes of timber would be required? The ceiling of the hall is to be plastered."

A collar-beam roof should not be used over a span exceeding 18ft., but if care be taken and the timbers be made sufficiently large, there is probably no very great risk in increasing the maximum span to 25ft. in places that are not exposed to the wind. In the present case the roof might be as shown by the accompanying drawing, but it will be rather a light one. The collar is on every pair of rafters.

HENRY ADAMS.



ROOF FOR SMALL HALL.

Complete List of Contracts Open.

With a few exceptions, news of Contracts Open are not repeated after they have been published once in these columns, so that readers will find particulars in our previous issues of other contracts that still remain open.

Unless expressly stated to the contrary all deposits required for bills of quantities, &c., are returned on receipt of bona-fide tenders.

The words "Fair Wages Clause" inserted in certain paragraphs signify that persons tendering must conform to a fair-wages clause in the contract, which requires them to pay the rates of wages current in the district.

BUILDING.

June 28. Seaford.—*Stabling, riding-school and house*, for the Seaford West Co., Ltd., at Seaford. Names to be sent in at once to W. Lambe, Estate Office, Claremont Road, Seaford, Sussex, from whom quantities and other particulars can be obtained in due course on deposit of £3 ss., which will be returned on receipt of a bona-fide tender. All tenders to be sent sealed to the Estate Office by noon on June 28.

June 30. Kilkeel.—*Construction of a concrete wall* at Kilkeel Harbour. Drawing and specification may be seen at the office of the County Surveyor, Courthouse, Downpatrick, and at the office of the R.D.C., Union Workhouse, Kilkeel. Tenders, endorsed "Kilkeel Harbour Wall," to be lodged in the office of James Heron, county surveyor, before noon on June 30.

June 30. Leeds.—*Erection of house and shop and two back to back houses*, in Harehills Lane, Leeds, for T. H. Aze. Contractors desirous of tendering for the whole trades must forward their names to Thomas Winn and Sons, architects and surveyors, 84, Albion Street, Leeds, on or before June 30.

June 30. New Elgin.—*Mason, carpenter, plumber, slater, plasterer, painter and glazier works* of a cottage to be erected in Rothes Road, New Elgin. Plans and specifications to be seen with James Jameson, architect, 77, High Street, Elgin, and tenders must be lodged with him by June 30.

June 29. South Molton.—*Erection of a new farmhouse* on the Whitechapel Estate, near South Molton, Devon. Plans and specifications may be seen and bills of quantities obtained on payment of £3 from E. H. Harbottle & Son, architects, County Chambers, Exeter, to whom sealed and endorsed tenders must be sent on or before June 29.

June 30. Haywards Heath.—*New public elementary Council school*. Persons desirous of tendering are requested to send their names and addresses to the county surveyor of East Sussex (F. J. Wood), County Hall, Lewes, on or before June 30, from whom full particulars can be obtained.

June 30. Belfast.—*Erection of the Jaffe Memorial Schools* at Cliftonville, Belfast. Plans and specification may be seen at the offices of Young & Mackenzie, architects, Scottish Provident Buildings, Belfast, and schedule of quantities obtained from A. Ferguson, building surveyor. Sealed tenders, addressed to Sir Otto Jaffe, J.P., to be lodged with the Architects on or before June 30.

June 30. Halifax.—*Alterations and extensions* to shop in Broad Street, Halifax. Plans may be seen and bills of quantities obtained at the offices of Jackson & Fox, architects, 7, Rawson Street, Halifax, to whom tenders must be sent by noon on June 30.

June 30. Ashburton.—*Erection and completion of two villa residences* in the Higher Western Field, on the Druid Estate, for the Ashburton Building Co., Ltd. Drawings, conditions and specification may be seen, and forms of tender, together with bills of quantities, obtained on application at the offices of R. Montague Luke, civil engineer, 15, Princess Square, Plymouth, and upon payment of a deposit £2 ss. Copies of drawings and specifications may also be seen on application to W. H. Langier, secretary of the Company, Maythorne, Ashburton. Sealed tenders, endorsed "Tender for Villas," must be delivered to the Secretary not later than June 30.

July 2. Eccles.—*Rebuilding the "Blue Bell" Hotel*, Monton Green, Eccles. Copies of quantities may be obtained from the architect, N. Hartley Hacking, 50, Blackfriars, Manchester, on payment of £2 ss. Plans may be seen at the Architect's office from 10 a.m. to 4 p.m. Sealed tenders to be delivered to the Architect not later than July 2.

July 2. Lochgelly.—*Brick and digger, joiner, plumber, slater, plaster, glazier, iron, grates and painter works* of 100 houses, also for nine cottages to be erected in Lochgelly, for the Lochgelly, Iron and Coal Co., Ltd. Schedules of quantities may be had and plans can be seen at the office of W. Birrell, architect and surveyor, 200, High Street, Kirkcaldy, on deposit of £1 rs. Offers to be lodged with the Secretary of the Company, 40, St. Vincent Place, Glasgow, on or before July 2, sealed and endorsed "Tender &c., Houses, Lochgelly."

July 2. Aylesbury.—*Erection of a new infants' school*, for about 100 children, at Wraysbury, and minor alterations to existing school, under the superintendence of the Works Department, Education Office, Aylesbury. Applications are to be accompanied by particulars of any responsible work previously carried out by the Contractors, together with names and addresses, for reference, of at least three architects who have superintended such work. Subject to the approval of the Education Committee, the competition will be limited, and contractors selected for tendering will be required to deposit £1 rs. for the bills of quantities supplied. Plans, specifications and conditions can be seen at the Works Department, Education Office, Aylesbury. Applications to be sent to the undersigned on or before July 2.

July 2. Elgin.—*Mason, carpenter, plumber, and painter, works of improvements* at Duffus School. The plans and specifications may be seen with John Wittet, architect, Elgin, and at the School, and estimates must be lodged with the architect, on or before July 2.

July 2. Bingley.—*For the bricklayer's and mason's (including ironfounder's work), carpenter's and joiner's, slater's, plumber's, plasterer's, and painter's work*, required in the erection of dressing, twisting, and store rooms, at the Albert Mills, Bingley, for A. R. Wright. Plans may be seen and quantities obtained at the office of W. Rhodes Nunns, M.S.A., architect and surveyor, 13, Market Street, Bingley, up to July 2.

July 3. Stockport.—*Manual and team labour and materials* required in the erection of car shed extension and river retaining wall at Mersey Square, Stockport. Plans, sections, specifications and conditions may be seen and forms of tender obtained on application to the Borough Surveyor, St. Petersburg, Stockport, on payment of £1 rs. Tenders, addressed "The Town Clerk, Stockport," sealed and endorsed "Tender for Car Shed Extension," to be left at his office at or before noon on July 3.

July 3. Utrecht (Holland).—*Construction of station buildings* at Boarle-Nassau. For particulars apply to Director of Dutch State Railways, Utrecht. Tenders to be in by July 3.

July 3. London, N.E.—*Work required to be done in forming area and steps to boiler-house, and in the alteration of the drains to "C" Block of the Vallance Road Infirmary, N.E., for the Whitechapel Guardians*. A copy of the specification, &c., may be obtained at the Guardians' Offices, 74, Vallance Road, Whitechapel, on payment of £1 rs. Sealed tenders, upon a form which will be issued with the specification, must be delivered at the Guardians' Offices before noon on July 3.

July 3. Aberavon.—*Erection of a residence* at Pentyla, Aberavon. Plans and specifications may be seen at the office of J. A. James, architect, Port Talbot, to whom tenders are to be delivered not later than July 3.

July 4. Cork.—*Erection of morgue* for the Por-Sanitary Authority, in accordance with plan and specification, which may be inspected at the office of John Ahern, town surveyor, Queenstown. Tenders will be received by M. O'Keefe, clerk, Municipal Buildings, Cork, up to 5 p.m. on July 4.

July 4. Cork.—*Repairs to the Intercepting Hospital*, Queenstown, for the Port Sanitary Authority. Copy of specification may be obtained on application to the Clerk, by whom tenders will be received up to 5 p.m. on July 4.

July 4. Neath.—*Erection of business premises* in Windsor Road, Neath. Plans, &c., can be seen on application to Andrew Bracey, house furnisher, 137, Windsor Road, Neath. Quantities can be obtained on deposit of £2 ss. Tenders to be sent in under seal to above address, endorsed "Tenders for Business Premises, Windsor Road, Neath," on or before July 4.

July 4. Monmouth.—*Erection of new buildings* for the Baptist Church. The drawings and specification can be inspected on application to W. Sambrook, or at the offices of B. Lawrence, architect, Newport, from whom bills of quantities can be obtained on the deposit of £1 rs. The tenders are to be sent under cover to W. Sambrook, Wyesham, near Monmouth, by July 4.

July 4. New Sarum.—*Erection of a cabmen's shelter and convenience* in Fisherton Street, and a public latrine in Castle Street. The plan and specification of the proposed buildings may be seen, and bill of quantities, together with form of tender, can be obtained at the office of the City Surveyor, Endless Street, Salisbury, on payment of £1 rs. Sealed tenders, endorsed "Latrines," must be sent to Francis Hoddling, Town Clerk, Municipal Offices, Salisbury, on or before July 4.

July 5. Devonport.—*Erection of a new administrative building* at the Infectious Diseases Hospital, near North Prospect. Plans, specifications, and conditions may be seen and forms of tender and quantities obtained on application to the Borough Surveyor, 29, Ker Street, Devonport, to whom tenders must be delivered, properly endorsed, on or before 10 a.m. on July 5. The sum of £1 rs. will be required as a deposit. Fair wages clause.

July 5. Bingley.—*Erection of a washhouse* at Bingley. Plans can be seen and quantities obtained at the offices of Samuel Jackson & Son, Tanfield Chambers, Bradford, from June 30 to July 5.

July 5. Dewsbury.—*Erecting about 217 yds. of brick walling* at the washhouse at Staincliffe. Specification and particulars to be obtained from the master of the Workhouse. Tenders to be delivered to Joseph Peace, clerk to the Guardians, Union Offices, Wellington Street, Dewsbury, not later than July 5.

July 5. Belfast.—*Erection of workmen's cottages* on the Mill Town Road, Purdysburn. Plans and specifications can be seen at the offices of Young & Mackenzie, architects, Scottish Provident Buildings. Sealed tenders, endorsed "Tender for Cottages," to be lodged in the Town Clerk's Office, before 11 a.m. on July 5.

July 5. Cardiff.—*Erection of shops and premises* according to the plans of E. H. Bruton, F.R.I.B.A., Cardiff, for G. A. Spencer, The Square, Senghenydd, where plans and specification may be seen on June 27, and to whom tenders are to be sent not later than July 5.

July 5. London.—*Erection of seven coal offices* at Finchley Road, London, for the Midland Railway Co. Plans and specifications may be seen, quantities and

particulars obtained on application at the Engineer's Office, Derby Station. Sealed tenders to be forwarded by post to the Secretary of the Way and Works Committee, Midland Railway, Derby, not later than 9 a.m. on July 5.

July 6. Dublin.—*Erection of vestry and heating arrangements* to mortuary chapel in Deans Grange Cemetery. Plans and specifications can be seen at the Cemetery (Registrar's Office) during office hours, 8.30 till 4 o'clock. Tenders to be delivered at Deans Grange Cemetery on or before July 6.

July 6. Newton Abbot.—*Erection of a six-stall stable* at Newton Abbot, for the Great Western Railway Co. Plans and specification may be seen and forms of tender and bills of quantities obtained at the office of the Engineer at Plymouth Station, between 10 and 4. Tenders, addressed to G. K. Mills, secty., Paddington Station, London, and marked outside, "Tender for Stable, Newton Abbot," will be received on or before July 3.

July 7. Stafford.—*Alterations and improvements to Stretton Council School*, near Burton. Builders desiring to tender for the work should apply to Graham Balfour, Director of Education. Quantities will be supplied, for which a deposit of £1 rs. will be charged. The drawings and specification can be seen at the offices of the Education Committee at Stafford.

July 7. Eccles.—*Erection of the Carnegie Public Library* in Church Street. A copy of the bill of quantities, general conditions and form of tender may be obtained at the Town Clerk's Offices on depositing the sum of £2 ss. The plans may be inspected and further particulars obtained at the office of the architects, Potts, Son & Hennings, 34, Victoria Buildings, Victoria Street, Manchester. Tenders, endorsed "Tender for Carnegie Library," to be delivered to Edwin Parkes, town clerk, Town Hall, Eccles, not later than noon on July 7.

July 7. Truro.—*Alterations and additions* to the Bella Vista College, Truro, according to plans and specifications which may be seen at the County Education Office, Truro, or by appointment at the office of Sampson Hill, architect to the Committee, Green Lane, Redruth, from whom all particulars relating to the work may be obtained. Sealed endorsed tenders, on official forms which may be had from the Secretary or the Architect, are to be sent to F. R. Pascoe, secty., Education Office, Truro, on or before July 7. The alterations to the building are to be completed before September 29 next.

July 9. Birmingham.—*Reconstruction of a portion of the tramway depot* in Kyott's Lake Road. Applications for forms of tender and bills of quantities may be made on or before June 28, at the office of the quantity surveyor, Anthony Rowse, King's Court, Colmore Row, Birmingham. Before obtaining the bills of quantities, it will be necessary to deposit a sum of £3 ss. for which a receipt will be given. The drawings may be seen on and after the same date at the office of the architect, Frank Barlow Osborn, F.R.I.B.A., 13, Bennett's Hill, Birmingham. Fair wages clause. Tenders must be delivered not later than noon on July 9 in sealed envelopes, addressed to the Chairman of the Tramways Committee, Council House, Birmingham, endorsed "Tender for Tramway Depot."

July 9. Limerick.—*Erection of twelve farmhouses* at Mount Shannon, near Limerick for the Irish Estate Commissioners. Plans and specifications can be obtained from the secty., Estates Commissioners, on receipt of £1 rs. Tenders should be enclosed in a sealed envelope, marked "Tender" in left hand corner, and addressed to The Secty., Estates Commissioners, 26, Upper Merion Street, Dublin. The latest date for the receipt of tenders will be noon on July 9.

July 9. Hastings.—*Alterations and additions to the existing grammar school buildings* and for the erection of a workshop. Plans and specification may be seen and quantities obtained at the offices of the architects, A. W. Jeffery & Son, 5, Havelock Road, Hastings, on payment of a fee of £1 rs. Sealed tenders, endorsed "Grammar School Tender," to be addressed to "The Clerk, Education Committee," 18, Wellington Square, Hastings, not later than noon on July 9.

July 9. Southampton.—*Works of external and internal repairs, gravelling, lavatory accommodation, rebuilding, lighting, ventilation, and new offices* to Grately School. Tenderers may see plans and conditions of contract, and obtain specification at the office of W. J. Taylor, county surveyor, The Castle, Winchester. Plans and conditions of contract may also be seen at the school. A deposit of £1 rs. will be required for a copy of the specification. Deposits must be made by cheque payable to Hants County Council, and crossed Bank of England, or particulars will not be sent. Tenders, endorsed "Proposed work, Grately Council Schools," are to be delivered to H. Barber, clerk to the County Council, The Castle, Winchester, on or before July 9.

July 10. Isle of Wight.—*Repairs to the Havenstreet School*. Plans and specifications may be seen at the County Education Offices, Newport, I.W., or at the offices of the County Surveyor, St. Thomas's Street, Ryde, I.W. Sealed tenders, endorsed "Havenstreet School," should reach F. G. Flux, secty., County Educational Offices, Newport, I.W., not later than July 10.

July 10. Croydon.—*Erection of a school* for 1,200 children, proposed to be built in Davison Road, Croydon, in accordance with the drawings prepared by H. Carter, Pegg, F.R.I.B.A., of Thornton Heath. Bills of quantities

and forms of tender can be obtained at the Committee's Office, upon payment of £1 rs. Applications should reach James Smyth, clerk to the Committee, Education Office, Katharine Street, Croydon, not later than June 20, and tenders must be delivered not later than noon on July 10. Tenders will only be received subject to the plans, specification and the terms of the draft contract, which will be deposited at the Committee's office and may be inspected during office hours.

July 10. London, S.W.—Erection of two public elementary schools, one to accommodate 836 children on the Lawn Lane site, South Lambeth Road, S.W., and the other to accommodate 804 children on the Franciscan Road site, Tooting Craveney, S.W., for the L.C.C. Persons desiring to submit tenders may inspect the drawings and specification and obtain the bills of quantities, forms of tender, and other particulars, at the Education Offices (Architect's Department), Victoria Embankment, W.C., upon payment to the Cashier of the sum of £5 in each case. Fair wages clause. Each tender must be enclosed in the envelope provided and delivered at the Education Offices, Victoria Embankment, W.C. (Room No. 119), not later than 11 a.m. on July 10, after which hour no tender will be received. Any tender which does not comply with the printed instructions for tender may be rejected.

July 11. Newcastle-on-Tyne.—Remodelling and extending the Mason Dinnington (Mixed) Council School, situate near Newcastle-on-Tyne, also for the erection of a new infant Council school to accommodate 150 scholars, to be erected immediately adjoining the existing mixed school buildings, for the County Council Education Committee. Contractors will be required to tender for both works, and those desirous of tendering should forward their name and address to the undersigned not later than June 28, together with a deposit of £2 2s. Plans of both works may be inspected at the Committee's offices, and sealed tenders, endorsed "Tenders for Dinnington New School and Improvements," must be forwarded to C. Williams, secretary to the Education Committee, Pearl Buildings, Newcastle-on-Tyne, not later than 10 a.m. on July 11.

July 12. Llanerchymedd.—Additions and alterations to the Council school, together with new infants' school, out-offices, boundary walls, &c. Plans and specifications may be inspected at the Llanerchymedd Council School, and at the office of J. Owen, F.R.I.B.A., county architect, Menai Bridge. Tenders, endorsed "Llanerchymedd School," (on forms which will be supplied by the Architect), to be delivered to R. H. Williams, secretary of education, Education Offices, Llangefni, not later than 10 a.m. on July 12.

July 12. Dewsbury.—Erection of a new head post-office at Dewsbury. Drawings, specification and a copy of the conditions and form of contract may be seen on application to the Postmaster between 10 a.m. and 5 p.m. Bills of quantities and forms of tender may be obtained at the Office of Works on payment of £1 rs. Tenders must be delivered before noon on July 12, addressed to the Secretary, H.M. Office of Works, &c., Storey's Gate, London, S.W., and endorsed "Tender for Dewsbury Post-office."

July 17. Edmonton.—Alterations and additions to the Brettenham Road School, together with the annual cleansing and repairs at their Brettenham Road and Croyland Road Schools. Persons desirous of tendering should send their names to the architect, Henry W. Dobb, Town Hall, Lower Edmonton, on or before Monday, July 2, when specifications, plans and form of tender will be forwarded. Fair wages clause. Tenders must be delivered to John Moule, secy., Education Offices, Brettenham Road, Upper Edmonton, on or before noon on July 17.

July 25. Birmingham.—Erection of six homes for epileptics and other works on the Monyhull Hall Estate, near King's Heath, Birmingham, according to plans and specifications prepared by C. Whitwell and Son, architects to the Joint Committee. Builders desirous of tendering must apply to R. J. Curtis, clerk to the Joint Committee, Guildhall Buildings, Birmingham, in writing, and deposit the sum of £25 on or before June 30. Bills of quantities will then be forwarded, together with instructions as to the inspection of plans and drawings. The amount of the deposit will be returned by the Joint Committee's cheque to those who deliver a bona fide tender to me on or before July 25. No tender will be definitely accepted until the Local Government Board has finally approved the plans and estimates.

August 16. Antwerp.—Reconstruction of the Government Bonded Warehouses, known as the "Nord-Ancien and Nord-Nouveau." The specification ("Cahier des charges," No. 1,144) relating to the contract may be obtained from the Hôtel de Ville, Antwerp, at a cost of 2 francs. All tenders should be sent in sealed registered envelopes, addressed "A Monsieur le Bourgmestre en l'Hôtel-de-ville d'Anvers," and should reach the Hôtel de Ville not later than August 16. A deposit of £1,000 is required to qualify any tender. A copy of the specification may be seen at the offices of the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall Street, London, E.C.

No date. Meltham.—Mason's work required in the erection of sprinkler tower on the top of the present staircase of the cotton mill at Meltham. For particulars apply to W. Carter, Station Street, Meltham.

ENGINEERING.

June 28. Birmingham.—Works in connection with the reconstruction and widening of Fazeley Street canal bridge. The drawings and specifications may be inspected and quantities and forms of tender obtained on deposit of £1, at the City Surveyor's Office. Tenders, endorsed "Fazeley Street Bridge," to be sent in to T. Arnall, A.M.I.C.E., acting city surveyor, Council House, Birmingham, by June 28. Fair wages clause.

July 2. London, E.—Supply and fixing of iron roof trusses and an overhead traveller at the pumping station, Vicarage Lane, East Ham. Full particulars may be obtained from the borough engineers. Tenders to be delivered addressed to the "Chairman, Public Health

Committee, Town Hall, East Ham," not later than July 2. Fair wages clause.

July 2. Selly Oak.—Supply and fixing of the laundry and general machinery at Selly Oak Baths, in accordance with the drawings and specifications prepared by the consulting engineer, W. M. Binney, A.M.I.C.E. Drawings, specifications and other particulars may be seen on application at the Surveyor's Office, 23, Valentine Road, King's Heath, and forms of tender obtained on deposit of £1 rs. Tenders, endorsed "Machinery for Selly Oak Baths," are to be delivered at the office of Edwin Docker, clerk to the Council, 10, Newhall Street, Birmingham, by July 2.

July 2. London, E.C.—Supply and delivery of 100 feet girder bridges for the Bengal and North-Western Railway Co., as per specification to be seen at the Company's offices. Tenders, addressed to Alexander Izat, managing director, 237, Gresham House, Old Broad Street, E.C., are to be lodged not later than noon on July 2. For each specification a fee of 10s. will be charged, which cannot under any circumstances be returned.

July 6. Warwick.—Construction of covered service reservoir (capacity about 500,000 gallons), and the provision, laying and jointing of about 500 yds. of 12in. and 8in. cast-iron pipes, together with all special castings and valves required; also for the erection of engine-house and gas-producer house, and other works in connection therewith, in accordance with the plans, sections, detail drawings and specification prepared by the Engineers. Plans and specification may be seen and form of tender and bills of quantities obtained at the offices of the engineers, Wilcox & Raikes, 63, Temple Row, Birmingham, on payment of a deposit of £3 3s. The tenders must be sent in under seal in envelopes supplied, endorsed "Warwick Water Supply, Contract No. 4," to Brabazon Campbell, town clerk, Warwick, not later than noon on July 6.

July 11. London, S.W.—Work and materials required in the construction of the permanent way (for electric traction), bridge work, road widenings, &c., for Contract No. 17, for the Middlesex County Council, Railway No. 1 (Order 1903). A line of double track (with crossovers, contingent works, &c.) to be laid along Green Lanes, in the districts of Wood Green and Southgate, in the county of Middlesex, to a length of 3 miles or furlongs, 4 chains, or thereabouts. The plans, conditions of contract, specification of works, &c., for this contract may be seen and schedule of quantities obtained by intending contractors, on payment of £10, on application to H. T. Wakelam, M.I.C.E., county engineer, Middlesex Guildhall, Westminster, S.W. Tenders, properly sealed and endorsed "Tender for Light Railway No. 1," to be delivered to Sir Richard Nicholson, clerk of the County Council, Middlesex Guildhall, Westminster, S.W., not later than noon on July 11.

July 12. Ciney (Belgium).—Installation of new pumping apparatus for the water-supply works. Particulars may be obtained from the Secretariat Communal, Ciney Namu. Tenders to be sent in by July 12.

July 20. Birmingham.—Construction of a covered filtered water reservoir and connections at the Frankley Waterworks, Northfield, near Birmingham. The drawings may be seen and specifications and bills of quantities obtained at the offices, 44, Broad Street, Birmingham, on and after July 2, on the deposit of the sum of £5. The site at Frankley may be inspected by appointment from July 2 to July 6 inclusive. Early application for particulars is necessary, as only a limited number will be given out, and none after July 6. Fair wages clause. Sealed tenders, endorsed "Tender for Works at Frankley," are to be delivered to E. Antony Lees, secy., 44, Broad Street, Birmingham, at or before noon on July 20.

July 24. Thornaby.—Renewal of the superstructure of the bridge carrying the passenger lines over the River Tees near Thornaby, Stockton, and the construction and erection of new steel bridge of five spans, of a total length of about 340 feet, including about 360 tons of steel-work for the North-Eastern Railway. The contract will also include the removal and rebuilding of part of the piers in masonry. Plans may be seen, and specification, detailed quantities, and form of tender obtained on personal application at the office of W. J. Cudworth, the company's engineer, at York. Sealed tenders marked "Tenders for the renewal of Tees bridge, Thornaby" must be sent to the secy. at York, before noon on July 24.

IRON AND STEEL.

July 12. Aldershot.—Manufacture and erection of a steel water tank and substructure, with appurtenances, at the Water Company's Reservoir Grounds, Cargate Hill, Aldershot. Copies of tender, general conditions, and specification may be had on application to the Secretary and General Manager, accompanied by a deposit of £2 2s., and drawings may be inspected at the office of the consulting water engineers, John Taylor, Sons & Santo Crimp, Caxton House, Westminster, S.W. Tenders should be delivered in sealed package, addressed to R. W. Edwards, secretary and general manager, Chief Offices, Victoria Road, Aldershot, on or before July 12, endorsed "Tender for Water Tank."

July 24. Johannesburg.—Supply and delivery of 235 colonial tons of barbed wire, 500 tons of galvanized drawn steel fencing wire, and 62,500 eyebolts. Forms may be obtained from Chief Railway Storekeepers, Germiston, and the Railway Storekeepers, Pretoria and Bloemfontein. Tenders to be sent in by July 24.

PAINTING AND PLUMBING.

June 28. Greenwich.—Painting works to be carried out at the Children's Homes, Sidcup, for the Guardians. Specification and form of tender can be obtained at the Clerk's Office, Union Workhouse, East Greenwich, and must be returned before June 28, on which day the same will be opened at a meeting of the Guardians.

June 28. Salford.—Decorating the whole of the inside of the 38 cottages on the east and west side of the Salford Town Hall. The specification and form of tender can be obtained from the Borough Engineer, Town Hall, Salford. Tenders, endorsed "Tender for Decorating

Cottages," addressed to the Chairman of the Town Halls Committee, to be delivered to L. C. Evans, town clerk, Town Hall, Salford, not later than 10 a.m. on June 28.

June 29. Dewsbury.—Painting of two steel bridges over the River Calder and the Calder Canal, for the Waterworks Board. Specification and form of tender may be obtained and the general conditions seen on application at the Engineer's Office, Town Hall, Dewsbury. Tenders to be sent to H. Ellis, clerk to the Board, Town Hall, Dewsbury, on or before June 29.

June 30. Liverpool.—Painting, colouring, lime-whiting, &c., and works in connection therewith, at the Military Barracks at Manchester, Seaford and Preston, in the Liverpool S.B. District (separate tenders). Persons desiring to tender for the execution of these works must leave their names at the Royal Engineer Office, 14, Elliot Street, Liverpool, on or before June 30, and pay the sum of 10s. for either of the bills of quantities, which, with form of tender, will be issued to each candidate, the amounts not being returned unless the work is abandoned. Any contractor not on the approved list of War Department contractors must furnish with their application satisfactory references from two architects or engineers of their ability to carry out such works.

July 2. Manchester.—Painting the roof of the Smithfield Market. Specification may be obtained at the office of the City Architect, Town Hall, upon payment of £1 rs. Sealed tenders, enclosed in the official envelope, to be delivered at the above office not later than 9 a.m. on July 2.

July 2. Carlisle.—Painting works required to be executed at the Town Clerk's Office, Fisher Street (work to be commenced at the beginning of August). Specifications and full particulars may be obtained from Henry C. Marks, M.I.C.E., city engineer and surveyor, 36, Fisher Street, Carlisle, on payment of 10s. 6d. Sealed tenders, endorsed "Tender for Painting Town Clerk's Office," to be delivered at the Surveyor's Office not later than 10 a.m. on July 2.

July 2. Cardiff.—Painting certain wards, &c., and for the external painting of a portion of the Cardiff Infirmary. Specifications may be obtained at the Secretary's Office at the infirmary. Sealed and endorsed tenders to be delivered to Leonard D. Rea secretary and general superintendent, not later than noon on July 2.

July 3. London, S.E.—Cleaning, decoration and repair of old receiving ward, Elder Road, West Norwood, for the Lambeth Guardians. Tenders, which will be received only on printed forms, sealed and endorsed "Tender for Repairs, Norwood Receiving Ward," must be sent by post to W. Thurnall, clerk, Guardians' Board Room and Offices, Brook Street, Kennington Road, S.E., not later than July 3, and will be opened at the Boardroom at noon on the following day, when all persons tendering, or their authorised agents, must be in attendance. Draft of contract may be inspected at the offices on any day between 10 and 5. Specification and form of tender will be supplied on personal application and on payment of £2 in respect thereof.

July 3. Penrith.—Painting, &c., of the retort house roof. Particulars on application to the Manager at the Gas Works. Sealed tenders, endorsed "Gas Works Painting," must be delivered to George Wainwright, clerk, Town Hall, not later than July 3.

July 6. Warrington.—Painting and cleaning of certain schools. Specifications, forms of tender, and all further information may be obtained at the office of the Borough Surveyor, Town Hall, at which place tenders must be delivered before noon on July 6.

July 7. Hove.—Distemping walls, ceilings, &c., at the Hove Sanatorium, Portslade. Further particulars may be obtained at the office of the borough surveyor, H. H. Scott, Town Hall, Hove. Tenders, on forms supplied, addressed to H. Endacott, town clerk, Hove, endorsed "Tender for Distemping, &c., Sanatorium," will be received up to 2 p.m. on July 7.

July 7. Mistley.—Painting and other work at the Police Station, Mistley, Essex. Specification can be seen at the Police Station upon application to the Inspector. Sealed tenders, endorsed "Tender for Painting, &c., Mistley Police Station," must reach F. Whitmore, county architect, 73, Duke Street, Chelmsford, not later than July 7.

July 7. Southminster.—Painting and other work at the Police Station, Southminster, Essex. Specification can be seen at the Police Station upon application to the Superintendent. Sealed tenders, endorsed "Tender for Painting, &c., Southminster Police Station," must reach Frank Whitmore, county architect, 73, Duke Street, Chelmsford, not later than July 7.

July 11. London, S.W.—Painting, distemping, general repairs, &c., at the Infirmary in the Fulham Road, S.W., and at the Children's Home in Millman's Street, Chelsea, S.W., for the Guardians of St. George's Union. Specifications and all particulars may be obtained from W. Ernest Hazell, A.R.I.B.A., No. 5, Tavistock Square, W.C., between 10 a.m. and 5 p.m. Tenders must be signed, sealed and endorsed "Tenders for Painting, &c., at St. George's Infirmary and Children's Home," and forwarded to Thomas Warlock, clerk to the Guardians, Saint George's (Hanover Square) Hall, Mount Street, W., not later than 11 a.m. on July 11.

July 13. Preston.—Painting, &c., public conveniences in various parts of the borough. Specification, form of tender and all other information may be obtained at the office of the Borough Surveyor, Town Hall, Preston, to whom sealed tenders, endorsed "Tender for Painting, &c., Conveniences," must be delivered not later than noon on July 13. Fair wages clause.

July 13. Preston.—Painting, &c., required throughout the Cattle Market, Brook Street. Specification, form of tender, and all other information may be obtained at the office of the Borough Surveyor, Town Hall, Preston, to whom sealed tenders, endorsed "Tender for Painting, &c., Cattle Market," must be delivered not later than noon on July 13. Fair wages clause.

(Continued on p. 348.)

ARCHITECTS IN NATAL.

Some Interesting Colonial Views.

A SOUTH AFRICAN correspondent sends us a report of the annual meeting of the Natal Institute of Architects held on May 18th at Pietermaritzburg, on which occasion the president, Mr. W. Lucas, F.R.V.I.A., F.R.G.S., delivered his inaugural address. In the history of their institute the past year would, he said, be specially marked for the achievement—in conjunction with the Master-Builders' Association—of a set of conditions of contract which it was hoped would soon prove acceptable to all involved in building operations, and set at rest a number of contentious points that had hitherto prevailed through the use of diverse conditions; it seemed highly probable now that a uniform set throughout South Africa would be secured.

Architects' Registration.

Speaking on architects' registration, in respect of which a pamphlet had been circulated among members of the Natal Government and Legislature, Mr. Lucas said that several leading members of the House had expressed themselves as favourably disposed to such a step, and it behoved them not to slacken efforts towards obtaining such registration, their hopes being that at no distant date the Natal Legislature would have no hesitation in placing the profession on the same footing as law and medicine.

Dealing with the matter of

Competitions.

he said that one of their ideas was the general adoption of a model set of conditions, prepared conjointly by the several South African Institutes, on the lines of those of the Royal Institute of British Architects. The outstanding competition of the year, that for the new Law Courts at Capetown, was, on the whole, eminently satisfactory, though the premier result again emphasized the futility of competing for an important complex city building without an intimate personal knowledge of local conditions dominating the site.

During the present year it was hoped that further steps would be taken towards bringing about closer alliance and ultimate federation of the kindred institutes of South Africa.

South African Architecture.

At the congress of the British Association held at Johannesburg last year papers on "The Training of Architects" and "The Architectural Problem in South Africa" had been read. A plea was put in for a fuller revival of early Cape design, and it was urged that "in all South African practice the main ideas of Classicism and Mediævalism were necessary, whilst a combination of the concentrated insularity of the Anglo-Saxon with the far-seeing daring life of the Dutch, especially in ecclesiastical work, would be of great service to architecture."

It had been rightly said that if only a few leaders of trade in every South African centre were to co-operate with the profession in so far as to be content with plainer buildings in substantial stone or brick—truly architectural works—in preference to tawdry surface displays of cement stucco, overwrought terra-cotta, glass and cast-iron work so prevalent, the tone of architecture would not only be appreciably raised, but with it the tone and true prosperity of commerce.

The Undeveloped Resources of Natal.

A Government report that furnished considerable food for reflection was that of the industries commission. It was a most regrettable fact that many industries which had failed, and others which were now languishing, would, with the aid of technical knowledge, ere this have become established and profitable undertakings. The natural conditions of Natal colony were so favour-

able to the cheap, rapid and effective growth of certain trees supplying marketable woods that a profitable investment stood inviting enterprise in this direction. In close proximity to the railways were deposits of clay suitable not only for the excellent bricks that were produced, but for most if not all descriptions of ornamental bricks, terra-cotta and tiles; while evidence showed that all the cement required for the colony could be manufactured from local deposits. Valuable limes, being worked to a limited extent, only existed in several centres. The plant now in contractors' workshops in the colony was sufficient for the production of joinery, including doors and windows, at such reasonable prices that there was practically no longer any necessity to specify imported goods in this particular. Recent developments in the manufacture of structural metalwork also promised well for architecture, and to learn that the steelwork for the roof of the new town hall at Durban was being prepared in the colony was most gratifying.

So far there had been practically

No Encouragement

in South Africa (compared with that given by other colonies) to establish industries allied with the building trades. In fact, it appeared that industries as a whole owed little to former Governments. Mr. Lucas thought, however, it was clear that as the result of this commission's arduous labour, linked with the influence of the Master-Builders' Federation, some of the anomalies of the past as to the relative duties on imported rough and manufactured timber, to the great gain of the latter, would be removed at an early date, and that conditions would prevail to enable local productions to compete favourably with imported articles.

Conciliation Boards.

The inauguration of conciliation boards in preference to the promotion of Compulsory Arbitration Bills was to be commended. Already boards were in working order at Capetown and Durban. Another movement that particularly commended itself was the recent formation of an assurance company to primarily safeguard builders' risks. This was having the support of the trade at the Cape, and was under consideration by Natal. A further excellent idea was the forwarding of official monthly trade reports to colonies outside South Africa.

Quantities.

Owing to the unsettled state of the law in reference to quantities, Mr. Lucas said he was not prepared to advocate architects taking out their own, nor was he keen on their supply by quantity surveyors, unless fully guaranteed by the latter, the ideal of course being quantities forming the basis of the contract. A growing custom which as architects they ought to combat was for proprietors to supply material—either direct or through the architect—aiming at everything relating to the contract passing through the contractors' hands, with the exception of peculiarly specialist work. Many architects did not realize the legal risks to which they exposed themselves by indenting, or in anywise ordering, any materials on behalf of a client under a building contract, whether specified as prime cost or as conditional to a contract.

Tenders.

On the question of tenders received, he believed that any advantage in the publication of other than the accepted tender was far outweighed by the disadvantages. For some years the Master-Builders' Association of Melbourne—representing one of the most powerful and extensive of building interests—had upon this point held the reverse view to that of the Federated Builders of South Africa, with the result that last year, owing to the request of that Association that the Royal Victorian Institute of Architects should more fully give

their wishes favourable consideration, that Institute as a body did not divulge any but the accepted tender.

The Architect in Being.

As an architect was not called upon to be a walking encyclopædia, the sooner the teaching of those who claimed that to be efficient to practise one should reach an obviously unattainable standard—the sooner this was ignored the better for the profession. We needed less of the academic of the schools and more concentration on the germ idea of the building in hand; less of detail and fuller touch—at the expense of detail—with the primary *motif* of classification; less time in making the mind a storehouse of historical facts and more passionate readiness for emergencies; less pencilling at the drawing board, and more brooding with closed eyes over the bases of expression; less striving after mechanical perfection, and more encouraging of initiative in office and workshop: always remembering, as "Punch" had said, that an architect's best friend was his india-rubber.

Mr. Lucas said he was old enough to know that the virility of the work of Belcher and of Hare, the dash of that of Lanchester and Rickards, the formal stateliness of Webb and Bell, the vim of Norman Shaw, and the charm of Gilbert Scott the youngest—all found source and inspiration to a large degree in the work of pioneers who, beyond supplying the professional press with an occasional illustration and the erection of a modest structure, left practically no outstanding examples of their genius.

PROJECTING SHOPS.

Protest against the Building Act Clauses.

A PUBLIC meeting was held recently at St. Pancras Town Hall to protest against clauses 10 and 12 of the London Building Acts Amendment Act, 1905, relating to projecting shops.

Mr. H. D. Widdicombe said their objection was to the application of the obnoxious clauses to existing premises, because they as owners or occupiers had no part or lot in determining the material of which such premises were constructed. They either found them as they were, or built them to the requirements of the then existing public authority. In either case they did so in the belief that after a bargain had been entered upon, that bargain, so long as it was not unconscionable or contrary to public policy, should stand. In St. Pancras there were 700 projecting shops affected by the Act.

Under Section 10

any building with an extension of more than 7ft. was required to have a roof of fire-resisting material; not only that, but the fire-resisting material must be jins. thick: and any lantern light or ventilating cowl was to be removed to not less than 6ft. from the main front of the building, and carried up on its three inner sides in fire-resisting material. The cost of this work in each case would amount to an average of about £60. In addition there was the serious inconvenience caused while the work was being carried out—quite three weeks. Again, the removal of lantern lights to a distance of 6ft. from the main front of the building meant that the shop parlour or room in the main building on a level with the shop would be in a state of perpetual gloom, in the Cimmerian darkness of which the shop-keeper or his assistant would have to enter up on the wrong side of the ledger the cost of extra illumination—another item which made the payment for this protection much too heavy to be borne.

Some Facts and Figures.

Sir William Collins, M.P., L.C.C., said that at the time the Bill was before Parliament it was pointed out that in London,

between 1895 and 1905, there were thirty-three lives endangered and twenty-four lives lost by the want of such a provision in shops as was now required. These cases had arisen in Ben Jonson Street, Stepney, and in the Hackney Road, and it was deplorable instances of that sort that had suggested to the Building Acts Committee of the County Council to go to Parliament for legislation. So far as he could remember, the draft Bill dealt with new shops, and it was not until the retrospective element was introduced that hostility was aroused in regard to what the owners of existing projecting premises thought was a grievance, so far as they were concerned. There was power given under clause 10 to appeal to the Tribunal of Appeal, and while that was something within the means of large owners, the provision did not seem equally useful with regard to the interests of the small shopkeepers. He had enquired about clause 10 at the Council, and was informed that, up to May 28th, 6,234 notifications had been received, 4,094 of which related to shop fronts. The Building Acts Committee in the notices they had sent out called special attention to the London County Council's

Powers of Exemption

under the Act. Under these powers the Council was empowered in reasonable cases to exempt; and further, the Council was desirous that the Act should be worked with as little inconvenience as possible. Words to that effect were contained in the notices sent out. He was informed that 366 applications for exemptions had been already received. Where no case had been made out for total exemption, partial exemption had been allowed, provided certain alterations were carried out rendering a portion of the roof fire-resisting, and providing means of escape on to adjoining premises or access to the roof itself. No doubt alterations of that kind, or some of them, might be less costly than the original requirements. In 154 of the applications for total exemption, sixty-one had so far been partially exempted, fifty-eight refused and thirty-five exempted. His own idea was to endeavour to get the County Council to take a large view of their exemption powers rather than to go for an amendment of the law which was in the dim and distant future.

A resolution was carried protesting against the sections, and appealing to the London County Council for the amendment or abolition of them.

Notes and News.

Mr. David W. B. Haining, architect, Falkirk, has been appointed assistant borough surveyor of that town.

The Programme of the 7th International Congress of Architects, to be held in London next month, has been issued. H.R.H. Princess Louise will attend, and the Duke of Argyll will take the chair at the inaugural meeting at the Guildhall on July 16th. There will be about 500 foreign delegates.

A large new Drapery Store in Princes Street, Edinburgh, is to be built from designs by Messrs. John Burnet & Son, architects, of Glasgow. Skeleton steel construction will be adopted. A corner tower rising to a height of 127ft. 6ins. will be a feature of the building, which will comprise seven floors. White freestone is the building material.

The Royal Prince's Parade at Bridlington has been extended northwards, and on the extension a pavilion capable of seating 1,600 persons has been erected. The sea wall has been continued further north, and the old wooden terraces replaced in stone. These works have cost £40,000. They are to be officially opened by the Lord Mayor of London on July 6th.



"CARSTONE", HUNSTANTON.
FOR MISS LUCAS.
H.C. IBBERTSON ARCHT. 28 MARTINS LANE EC
The walls of this house are of a local stone known as Car, rich brown in colour, left rough and with large stones at the angles. Rough-cast is used on the bay and chimneys. The roof is of red tiles, and the woodwork painted green. The work was carried out by Messrs. George Chambers & Son, of Snettisham, Norfolk, at a cost of £762 10s. The decorative leadwork was designed and worked by the architect.

At the "Country in Town" Exhibition, to be opened by H.R.H. Princess Christian in the Whitechapel Art Gallery on July 5th, there will be exhibited plans for beautifying crowded areas in London. The exhibition will be open until July 19th. Admission will be free.

New Council Schools at Wisbey have been erected at a cost of £20,546, accommodation being provided for 360 boys, 306 girls and 206 infants—total 926. The architect was the late Mr. William Vaughan, and the clerk of works Mr. James Drake, M.I.C.W.A. The heating and ventilation has been carried out by Messrs. Ashwell & Nesbit, of Leicester.

Mr. R. S. Lorimer, A.R.S.A., of Edinburgh, who has charge of the restoration of the late Sir Charles Tennant's mansion "The Glen," in Peeblesshire, hopes to have it ready in the autumn. Internally, the arrangements have been largely modernized, and the hall and staircase have been thrown into one by a handsome stone arcade.

A Big Stained-glass Window.—From the designs of Mr. J. Eadie Reid, the Gateshead Stained-Glass Co., Ltd., have just completed what is considered to be one of the largest one-light windows ever made in the North. It measures 14ft. by 6ft. and weighs about three-quarters of a ton, 100 sq. ft. of glass being used in its manufacture. The subject is the Ascension.

The Anglo-Saxon Church of Corhampton, situated on the picturesque banks of the River Meon, has just been repaired and restored, at a cost of £800, under the superintendence of Mr. T. G. Jackson, R.A. The Saxon chancel arch has been strengthened; the bell-cote, dating from 1600, reconstructed; the bells, dated 1619 and 1829, rehung; and the Saxon west window opened.

Messrs. Sheen & Wells, heating engineers, of Sheffield, have received instructions to fix their improved small-pipe hot-water heating apparatus in Long Clawson Parish Church, near Melton Mowbray.

Additional Poor-Law Buildings.—Despite protests from several quarters, the St. George's (Hanover Square) Board of Guardians are proceeding with their scheme for the erection of a new board-room, offices and extensions of the workhouse in Wallis's Yard, Buckingham Palace Road. Mr. Francis G. Smith, F.R.I.B.A., is architect for the buildings, tenders for which are now being invited. It is estimated the preliminary outlay will be about £25,000.

Bitumastic Enamel.—Nearly the whole of the interior surfaces of the double bottom fore and aft of the new Cunarder "Lusitania" has been coated with Messrs. Wailes, Dove & Co.'s patent bitumastic enamel, also the bilges and interior surfaces of bunkers. The tank tops in turbine, boiler and machinery spaces have been coated with patent "bitumastic" covering. The total area of surfaces coated by Messrs. Wailes, Dove & Co. is about 620,000 sq. ft.

A Model Colliery Village is to be erected at Bentley, near Doncaster, for Messrs. Barber, Walker & Co., of Eastwood, Notts., under the direction of Mr. E. Hall-Ballan, M.S.A., of Doncaster, architect to the company. The familiar "pit rows" and unsightly conveniences are to be dispensed with. The cottages will be built in separate blocks of not more than four, and each cottage will have its own private conveniences and garden at front and rear. It is intended that the overcrowding, so common in mining centres, is to be in this case entirely avoided.

CONTRACT LIST (continued from p. 345).

July 16. Ipswich.—*Painting and decorating work* to be done at all or any of the following Council schools during the August holidays:—Outside painting: London Road Girls' and Infants', St. Mary Elms Boys', Cavendish Street Boys', Nacton Road Mixed. Inside cleaning, colouring and whitewashing: Westerfield (including teachers' house), Whitton (including teachers' house), Trinity Street Girls' and Infants', Springfield Boys', Girls', and Infants' (excluding new classrooms). A copy of the specification and any further particulars may be obtained on application to E. T. Johns, Tower Chambers, Tower Street, Ipswich. The price for each school must be stated separately. Fair wages clause. Tenders, plainly endorsed "Tender for August Work," must be delivered to J. Hepburn Hume, secy., Education Committee's Offices, Tower House, Tower Street, Ipswich, between 10 and 12 noon on July 16.

ROADS AND CARTAGE.

June 28. Ashford.—*Road metal*, for the U.D.C. Supply of 2,060 cub. yds. (more or less) of zin. gauge broken granite, &c., as per form of tender, to be obtained from W. Terrell, surveyor, North Street, Ashford, Kent, to whom sealed tenders, with samples, are to be sent not later than 5 p.m. on June 28, endorsed "Tender for Granite."

June 30. Northwood.—*Laying of new kerb* in Church Road, Northwood, for the U.D.C. Forms of tenders and full particulars may be obtained from W. Louis Carr, surveyor, Council Offices, R.S.O., Northwood, Middlesex. Tenders, properly endorsed, are to be delivered to Edmund R. Abbott, clerk, Northwood, R.S.O., Middlesex, not later than June 30.

June 30. Truro.—*Steam rolling*, for the R.D.C. The district is divided into two divisions, and there are about 225 days' rolling required in one division and about 144 in the other. Two rollers (10 or 12 tons) must be kept constantly at work in each division from Nov. 1, 1906, until the work is completed. Tenders are required for the rolling in both or either of the divisions, and they should state price per working day of eight hours for each roller, including driver, flagman and everything necessary (except only horses and drivers for water-carts). For further information apply as to the North Division to John Retallack, surveyor, Ventongimps, Callestick, S.O., and as to the South Division to James P. Carbis, surveyor, Ruan High Lane, Grampond Road. Tenders are to be sent to G. C. Hancock, clerk, St. Agnes, Cornwall, on or before June 30.

July 2. Wisbech.—*Supply of highway materials*, including granite, granite chips, granite dust, double-sifted gravel, footpath gravel, coarse sand, zin. broken stone, clunch and Portland cement. For particulars and forms of tender apply to the Borough Surveyor, Exchange Square, Wisbech, to whom samples should be sent. Sealed tenders to be delivered to C. E. F. Copeman, town clerk, Wisbech, not later than 10 a.m. on July 2.

July 2. London, N.—*Making-up* of Station Avenue, Winchmore Hill, and Broomfield Avenue and part of Osborne Road, Palmers Green, within the Council's district. Plans may be seen on application to the Council's surveyor, Charles G. Lawson, from whom copies of the specification and forms of tender may be obtained on depositing £2 in cash. Tenders, endorsed "Private Streets," must reach W. M. Ellenor, clerk of the Council, Council Offices, Palmers Green, N., not later than July 2.

July 2. Bollington.—*Supply of about 300 tons of zin. Welsh granite macadam*, and for a quantity of zin. Welsh granite macadam and chippings, to be delivered at the Bollington railway station for the U.D.C. Tenders, endorsed "Macadam," to be sent in so as to reach Samuel Knight, clerk, Council Offices, Bollington, near Macclesfield, not later than 5 p.m. on July 2.

July 2. Urmston.—*Flagging and kerbing* of the footways of Station Bridge, Urmston, and its approaches for the U.D.C. Plans, specifications, and forms of tender may be obtained from James Heath, surveyor to the Council. Sealed tenders must be delivered to T. J. Rowland, clerk to the Council, Council Offices, Urmston, not later than 4 p.m. on July 2.

July 2. Wakefield.—*Supply and delivery of granite or Whinstone setts and macadam*. Forms of tender and any other information may be obtained from the City Surveyor, Wakefield. Tenders, sealed and properly endorsed, must be sent to W. Greenhalgh, town clerk, Town Hall, Wakefield, not later than 9 a.m. on July 2.

July 3. London, S.E.—*Supply of 200 tons of waste and broken pieces of Jersey or Guernsey granite*, for breaking, to be delivered at the stoneyard in Wincott Street, Kennington Road, S.E., for the Lambeth Guardians, having first been weighed by the contractor at the weigh-bridge of the workhouse in Renfrew Road. Tenders, with full specification, including name of quarry, must be sent to W. Thurnall, clerk, Guardians' board room and offices, Brook Street, Kennington, S.E., sealed and superscribed "Tender for Granite," on or before July 3, and will be opened at the Board Room on July 4. A small sample of the stone to be supplied should be sent.

July 3. Edinburgh.—*Work on the carriageways of:* (1) Esslemont Road, (2) Granby Road, (3) Abercorn Road, (4) Willowbrae Avenue, (5) Westfield Avenue, (6) Plewlands Terrace, (7) Craiglockhart Terrace, (8) Shandon Terrace, (9) Shandon Crescent, (10) Shandon Road—macadamising; (11) West Park Place, (12) West Newington Place, (13) lane at Ethel Terrace—concrete; and for granolithic work on the footways of (1) Esslemont Road, (2) Granby Road, (3) Abercorn Road, (4) Willowbrae Avenue, (5) Westfield Avenue, (6) Plewlands Terrace, (7) Craiglockhart Terrace, (8) Shandon Road; also for widening at Western Terrace. Schedules of quantities and specifications may be obtained on application to the City Road Surveyor, City Chambers. Tenders, sealed within the official envelopes supplied, must be lodged with Thomas Hunter, W.S., town clerk, City Chambers, Edinburgh, by 5 p.m. on July 3.

July 4. Tadcaster.—*Macadamising, kerbing, channelling* (and asphalt footpaths on front streets), for the under-mentioned private streets, situate at Crossgate, in

the Parish of Barwick-in-Elmet, Marshall Terrace, Back Marshall Terrace, Marshall Street, Back Marshall Street, Back Austhorpe Lane, and a portion of Back Austhorpe Road, between Back Marshall Place and Austhorpe Road; together having a length of about 1,200 lin. yds. Plans, sections, and specification may be inspected at the office of Spinks & Pilling, engineers and surveyors, 28, Park Row, Leeds, from whom bills of quantities and form of tender may be obtained on payment of £2 2s. Sealed tenders, endorsed "Private Street Works Tender," to be sent to Geo. A. Bromet, clerk, Council Offices, Tadcaster, not later than July 4.

July 4. Middleton.—*Private street improvements*, in Egerton Street, Wilton Street, Walker Street, and Church Street (Rhodes). Specification, quantities and form of tender (which contains a fair-wages clause) may be obtained and plans may be seen on application to the Borough Surveyor, between 9.30 and 10.30 a.m., and on payment of a deposit of 10s. 6d. Tenders, addressed to the chairman of the surveyor's committee, endorsed "Tender for Street Works," are to be delivered at the Town Hall on or before July 4.

July 4. London, N.—*Paving with compressed asphalt* part of Stroud Green Road, Hornsea. Forms of tender, &c., and particulars can be obtained from E. J. Lovegrove, borough engineer and surveyor, Municipal Offices, No. 99, Southwood Lane, Highgate, on any morning between 10 and 12. Tenders must be on the prescribed form and be delivered or sent by post (sealed and endorsed) so as to be received in the Town Clerk's Office by 4 p.m. on July 4. Schedules, duly completed, must accompany the tenders.

July 4. Hove.—*Executing paving and other works* in Wilbury Villas (between north end of Railway Bridge and Old Shoreham Road). Further particulars may be obtained, and plans and specifications seen, at the office of the borough surveyor, H. H. Scott. Tenders, on forms supplied, addressed to H. Endacott, town clerk, Town Hall, Hove, and endorsed "Tender for Wilbury Villas," will be received up to 6 p.m. on July 4.

July 4. Chester-le-Street.—*Making-up* the following private streets:—Prospect Street (back), Prospect Street (front), Prospect Terrace (back), west ends of Prospect Street and Prospect Terrace, Villiers Place, Lucy Street (front), West View (front), Morningside Terrace (back), Ashley Terrace (front), Lambton Terrace (back), North Burns, Nicholson's Buildings Road, concrete retaining wall and fencing for ditto. Plans, sections and specification may be seen and schedule of quantities, together with form of tender, obtained at the Highway Surveyor's Office any day between 9 a.m. and 5 p.m. The surveyor will go over the streets any time by arrangement with persons wishing to tender. Sealed tenders, endorsed "Tender for Private Street Works," to be delivered to G. W. Ayton, highway surveyor, Chester-le-Street, not later than July 4.

July 9. Beckenham.—*Widening of Bromley Road* (The Knoll) for a length of 300 ft. The works consist of about 1,500 cub. yds. excavation, 70 cub. yds. concrete, 5 rods gault brickwork, 300 lin. ft. channelling, 500 sq. yds. red-brick paving, together with the remodelling and flinting of 100 lin. yds. of roadway. Plans and sections may be seen and bills of quantities, specifications and forms of tender obtained on application to John A. Angell, surveyor, on the production of a receipt from the Collector (who attends his office daily from 9 to 10 a.m. only, except on Tuesdays, when his hours are from 9 a.m. to 1 p.m.) for a deposit of £1. A clause will be inserted in the contract providing that the contractor shall (1) pay to the workmen employed in the execution of the work the wages generally accepted as current for workmen engaged in similar work in the district; and (2) to the extent of 75 per cent. at least of the staff required in the execution of such works, give preference to, and engage such competent workmen of the class required as may be bona-fide residents in the parish of Beckenham and may offer themselves for employment. Tenders, duly sealed and endorsed "Tenders for Bromley Road Widening," to reach undersigned not later than 4 p.m. on July 9. The Council do not bind themselves to accept the lowest or any tender.

July 10. Mountain Ash.—*Execution of public street improvements* in Bush Road, Mislain, for the U.D.C. Specification and plans and sections may be seen and forms of tender and bills of quantities may be obtained on application to W. C. Thomas, surveyor to the Council, Town Hall, Mountain Ash. Sealed tenders, prepaid, and endorsed "Bush Road," to be sent to H. P. Linton, clerk to the Council, Town Hall, Mountain Ash, by 9 a.m. on July 10.

July 10. Ottery St. Mary.—*Construction of a new footpath over St. Saviour's bridge*, Ottery St. Mary, to the railway station, being a continuation of the present footpath, and about 498 feet in length. The plans, specification, and form of contract can be seen at the office of the County Council, at the Castle of Exeter, where tenders are to be sent on or before July 10.

July 13. Preston.—*Levelling, paving, flagging, channelling, &c.*, Elijah Street, Tweed Street, Mona Street and Shelley Road. Plans, section and specifications may be seen and schedule of quantities and form of tender obtained at the offices of the Borough Surveyor, Town Hall, Preston, to whom sealed tenders, endorsed "Tender for Paving, &c.," must be delivered not later than noon on July 13.

July 14. Hastings.—*Cartage* of 300 yds. of unbroken stone from their quarry at Gatehurst Farm, Pett, to various places in the district, for the R.D.C. Forms of tender, which only can be received, may be obtained from the district surveyor, D. Paine, Stonelynk Farm, Fairlight, Hastings. Tenders to be forwarded to Arthur R. Inskip, clerk, 11, Wellington Square, Hastings, not later than July 14.

July 14. Stretford.—*Paving*, with granited rock, asphalt, &c., the following streets for the U.D.C.:—Wesley Street, Burleigh Street, North Lonsdale Street, Powell Street, Alphonus Street. The drawings and specification may be seen and forms of tender, with schedule of quantities and other particulars, obtained on application to Ernest Worrall, surveyor, any day during office hours on payment of a deposit by cheque of £2 2s. Sealed tenders,

endorsed "Private Streets Works," addressed to the Chairman of Highways, are due at the Council Offices, Old Trafford, by July 14.

SANITARY.

June 28. Thrapston.—*Construction of three small septic tanks, and laying about 280 yds. of 4 in. outfall pipes* to Irrigation Land. The drawings and specifications may be seen at the Office of the Clerk to the Rural District Council at Thrapston, where copies of the quantities may be obtained on payment of 5s. Sealed tenders, endorsed "Denford Sewage Disposal," must be delivered to Gerald Hunnybun, clerk to the Council, Rural District Council Office, Thrapston, on or before June 28.

June 28. Penycroft.—*Providing and laying* about 210 lin. yds. of 6 ins. diameter stoneware and cast-iron pipe sewers, about 1,130 lin. yds. of 6 ins. diameter stoneware pipe sewers and effluent carriers, the erection of a bacterial filter, sewage distributing outlets, manholes, lampholes, flushing tanks, ventilating columns and other appurtenant works, for the Llantrisant and Llantwit Fardre R.D.C., in connection with the sewerage of Penycroft. Drawings and specification may be seen on application to Gomer S. Morgan, surveyor, School Street, Pontyclun, from whom bill of quantities and form of tender may be obtained, on or before June 22 upon payment of £1. The Surveyor will meet the contractors on the ground at 1 p.m. on June 22. Tenders must be delivered to W. Spickett, clerk to the Council, before 10 a.m. on June 28.

June 29. Walthamstow.—*Erection of an underground convenience* adjoining the Public Baths, High Street, in accordance with plans and specifications which may be inspected at the office of G. W. Holmes, A.M.I.C.E., engineer to the Council, on and after June 19. Forms of tender may be obtained by previously depositing in cash the sum of £3 3s. Sealed tenders, upon the forms supplied, addressed to C. Sydney Watson, clerk to the Council, Town Hall, Walthamstow, and endorsed "Tender for Underground Convenience," must be delivered not later than 5 p.m. on June 29.

June 29. Matlock.—*Supply of the following pipes* during July, August and September, for the North Darley U.D.C., 50 yds. of 6 in. best glazed pipes; 1,300 yds. of 9 in. best glazed pipes; 300 yds. of 12 in. best glazed pipes. Also various bends and junctions. Forms of tender may be obtained from the Surveyor. Tenders, endorsed "Tender for Pipes," are to reach the office of F. C. Lynn, solicitor, Matlock, Bath, by June 29.

July 1. Hexham.—*Taking up certain old sewers and drains and laying about 1,300 yds. of 6 in., 9 in. and 12 in. pipe sewers with manholes, lamp-holes, flushing chambers and house connections complete* at Prudhoe, for the R.D.C., in accordance with plans, specifications and particulars prepared by J. E. Parker, A.M.I.C.E., Post-office Chambers, Newcastle-on-Tyne, from whom quantities can be obtained on depositing £1 1s. Sealed tenders, marked "Prudhoe Sewerage," to be sent to J. H. Nicholson, clerk, Hexham, not later than July 1.

July 2. Settle.—*Construction of about 585 lineal yds. of 9 in. internal diameter earthenware and cast-iron pipe sewers*, together with necessary manholes, inspecting shafts, ventilators, &c., for the R.D.C. The drawings, specifications and conditions may be seen and bills of quantities obtained at the offices of the engineers, Barber, Hopkinson & Co., Craven Bank Chambers, Keighley, on payment of £1 1s. Sealed tender, endorsed "Giggleswick Outfall Sewer," and on the form provided, to be delivered to T. E. Pearson, clerk to the Council, Town Hall, Settle, not later than noon on July 2.

July 2. Birmingham.—*Provision and construction of the following foul water sewers and drains* for the Yardley R.D.C.:—1,803 yds. of .8 in. sewer, including 489 yds. in tunnel; 64 yds. of 12 in. sewer; 1,112 yds. of 9 in. sewer; and 59 yds. of 6 in. sewer. Also the relaying and reconnection of house drains, together with manholes, flushing chambers, and other works appertaining thereto, in accordance with plans, drawings, specification, and conditions of contract, which may be seen on application to the engineer and surveyor, Arthur W. Smith, Council House, Sparkhill, near Birmingham, between 10 and 1 and 3 and 5 (Saturdays, 10 and 1). Specification, bill of quantities, and form of tender can be obtained on payment of £3 3s. Fair wages clause. Tenders, endorsed "Tusley Sewerage," to be addressed and delivered to Francis Ladbury Thompson, clerk of the Council, The Council House, Sparkhill, near Birmingham, not later than noon on July 2.

July 3. Salford.—*Sewering, paving and completing* of certain streets in the borough. The plans and specifications may be seen and forms of tender, with quantities, obtained at the Borough Engineer's Office. Tenders, endorsed "Paving Streets," addressed to the Chairman of the Highway Committee, must be delivered to L. C. Evans, town clerk, Town Hall, Salford, not later than 10 a.m. on July 3.

July 3. Hipperholme.—*Construction of main pipe sewers*, 2,674 yds. in length, for the drainage of the Syke Lane Valley, Hipperholme, together with the necessary manholes, stormwater overflow chambers, and other appurtenant work. Plans and specifications may be seen and forms of tender obtained at the office of Frank Massie, M.I.C.E., Teley House, Kirkgate, Wakefield, on and after June 22, on payment of £2 2s. Tenders, fully priced out, endorsed "Tender for Syke Lane Drainage," to be delivered to E. H. Hill, clerk to the said Council, Council Offices, Hipperholme, not later than noon on July 3.

July 3. Bedford.—*For the following works*:—(1) The construction of an underground sewage pumping station, including storage tank, engine-room, &c., complete at the Bedford Park; (2) the laying and completing of cast-iron and glazed pipe surface-water sewers in the Amphill Road district, including the construction of manholes, lampholes, &c.; (3) the construction and completing of a brick outfall sewer, together with all manholes, lampholes, and necessary alterations to existing pumping station. Full particulars may be obtained upon application to N. Greenshields, A.M.I.C.E., borough engineer, Town Hall, Bedford. Sealed tenders, endorsed (1) "Sewage Pumping Station," (2) "Surface-Water Sewers," or (3)

"Outfall Sewer" respectively, and addressed to the Chairman of the Streets and Buildings Committee, Town Hall, Bedford, to be delivered by 9 a.m. on July 3.

July 3. Loughton.—Laying 500ft. run of 3in. and 337ft. run of 12in. storm-water drain, including necessary gulleys, &c. The District Surveyor to the Council will supply all information. Tenders, marked on the outside "Tenders," are to be delivered to J. H. Hayward, clerk to the Council, Council Offices, Loughton, Essex, on or before 4 p.m. on June 2.

July 4. London, W.—Construction of underground convenience adjoining Uxbridge Road and within Kensington Gardens. Conditions, specification, bills of quantities, and form of tender will be furnished when ready upon application to E. B. B. Newton, A.M.I.C.E., F.S.I., borough surveyor, Town Hall, Paddington, and payment of £1 for a set of documents. Any further information may be obtained, and drawings seen, at the Borough Surveyor's Office, Town Hall, between 10 to 4 (Saturdays, 10 a.m. and 1 p.m.). Tenders must be sent in sealed and endorsed "Convenience," directed to A. W. J. Russell, town clerk, Town Hall, Paddington, W., and delivered not later than Saturday, July 14 after which no tender will be received. The Council do not pledge themselves to accept the lowest or any tender.

July 7. Glasgow.—Construction of sewer No. 1 (Contract No. 2), extending from a point in Paisley Road, south of Ibrox Station, to a point in Saint Andrew's Drive, west of Shields Road. Plans, specifications and working drawings may be seen and specifications and schedules of quantities and forms obtained on application to the City Engineer, at his office, City Chambers, 64, Cochrane Street, Glasgow, on payment of a fee of £5 5s. Sealed offers, marked outside "Tender for Sewer No. 1 (Contract No. 2)," must be lodged with A. W. Myles, town clerk, City Chambers, Glasgow, not later than July 7.

July 7. Horwich.—Drain tiles required for No. 11 bacteria beds, 60ft. in diameter, for the U.D.C. Plans may be seen and the necessary information obtained from the engineer, Mr. H. L. Hinnell, M.I.C.E., of 41, Corporation Street, Manchester. Sealed tenders, endorsed "Drain Tiles," together with samples of the tiles, to be delivered to Peter Taberner, clerk to the Council, Council Offices, Horwich, not later than July 7.

July 7. Horwich.—No. 11 sprinklers, fittings, &c., for bacteria beds, 60ft. in diameter, required at their sewage-disposal works, for the U.D.C. Plans may be seen and full particulars and specification obtained at the office of the engineer, H. H. Hinnell, M.I.C.E., of 41, Corporation Street, Manchester, upon a deposit of £1. Sealed tenders, endorsed "Sprinklers," must be delivered to Peter Taberner, clerk to the Council, Council Offices, Horwich.

July 9. Tavistock.—Works of sewerage and sewage-disposal, including the providing and laying of stoneware and cast-iron sewers and the construction of sedimentation tanks, manholes, &c., Tavistock. Drawings may be seen and copies of the specification, bill of quantities, and form of tender obtained at the office of the engineer, John Chadwick, F.G.S., Bletchley, Bucks, upon payment of a deposit of £3 3s. A duplicate set of drawings may also be seen at the Surveyor's Offices, Tavistock. Sealed tenders, on the prescribed forms, endorsed "Tender for Sewage Works," must be received at the office of W. W. Mathews, clerk to the Council, Council Offices, Tavistock, not later than noon on July 9.

July 9. Runcorn.—Construction of new sewerage works in the parish of Walton Inferior. The works will comprise stoneware pipe sewers, together with all manholes, lampholes and other appurtenances. Drawings and specifications may be seen and quantities, form of tender and all other particulars obtained on application at the offices of James Diggle & Son, civil engineers, Hind Hill Street, Heywood, and 14, Victoria Street, Westminster, S.W., on and after June 23, on payment of a sum of £2. The plans may also be seen at the office of G. F. Ashton, clerk, 71, High Street, Runcorn, to whom sealed tenders, endorsed "Tender for Walton Inferior Sewerage Works," are to be sent not later than July 9.

July 10. Clacton-on-Sea.—Construction of 842 yds of 30in. diameter circular brick storm relief sewer from Clacton-on-Sea, with 24in. iron pipe sea outfall 70 yds. long, and 1,184 yds. of 15in. stoneware pipe stormwater relief sewer from Great Clacton, with all appurtenant works, for the U.D.C. The plans may be seen and quantities and form of tender obtained at the office of the engineer, W. H. Radford, C.E., Albion Chambers, King Street, Nottingham, on deposit of £3 3s. A copy of the plans may also be seen at the Surveyor's Office, Town

Hall, Clacton-on-Sea. Sealed and endorsed tenders must be sent in to G. T. Lewis, clerk to the Council, Town Hall Buildings, Clacton-on-Sea, on or before July 10.

MISCELLANEOUS.

June 28. London, E.C.—Supply of the following stores for the Great Indian Peninsula Railway Co.:—Lifting jacks, &c.; brass and iron screws and split pins; signal wire strand; galvanized W.I. water tubes; galvanized buckets, pans, &c.; turpentine; white lead. Specifications and forms of tender may be obtained at the office on payment of the fee for the specification, which payment will not be returned. Tenders must be delivered in sealed envelopes addressed to J. I. Berry, secy., Company's offices, 48, Cophall Avenue, E.C., marked "Tender for Lifting Jacks, &c." or as the case may be, not later than 11 a.m. on June 28.

June 30. Felling.—For the following works at Wardley School:—Forming of heating chamber and hot water apparatus; repair of playground, and walls, &c., and drainage of west playground. Plans and specification may be seen any morning between 9.30 and 10.30 at the office of H. Miller, architect, Council Buildings, Felling. Sealed tenders, endorsed "Tender for Heating" or "Tender for Repairs," much reach G. Bolam, clerk to the Education Committee, Council Buildings, Felling, R.S.O., co. Durham, not later than June 30.

June 30. Rotherham.—Supply of the following stores and materials required by the Tramways Department during the twelve months ending August 31, 1907:—Oils and grease; tools, hardwood, brake blocks; cast-iron brake blocks; paints and varnishes; brass castings; nuts, bolts and screws; river sand, &c. Forms of tenders, specification and further particulars can be obtained upon application to the Tramways Manager, Tram Depot, Rotherham. Fair wages clause. Tenders, endorsed "Tramways Stores," to be sent to W. J. Board, town clerk, Town Hall, Rotherham, not later than June 30.

July 2. Atherstone.—Draining, fencing, and laying-out of cemetery, for the Parish Council as follows:—(1) for draining; (2) for the supply of unlimbable iron fencing and gate; (3) for laying-out the land and fixing fencing. Plan and specification may be seen on application to J. J. Ryan, engineer and surveyor, North Street, Atherstone, and tenders endorsed "Tender for Cemetery Extension," must be received by W. A. Hatton, clerk, Atherstone, not later than 6 p.m. on July 2.

July 4. Colchester.—Supply of cleaning, &c., materials, to all the Public Elementary Schools in the borough for the period ending 31st August 1907. Schedules of the materials may be obtained and samples of some of the articles required may be seen at the office of the Education Committee. Tenders, under seal, and endorsed "Tender for Cleaning, &c., Materials," must be delivered to Ernest H. Bultitude, clerk, Education Offices, 8, East Stockwell Street, Colchester, not later than July 4.

Partnerships.

Dissolutions of Partnerships.

[The date when the partnership was dissolved is given in parenthesis where known.]

A. & G. BROWN, builders and contractors, Derby. (June 1.) Debts by A. Brown.

G. H. SHARPE & H. F. CLARKE, brick and tile manufacturers, Ryton-on-Dunsmore. (June 1.)

R. H. TRIBE & W. ROBINSON, builders and contractors, Guildford. (June 2.) Debts by R. H. Tribe.

R. & S. WILLIAMS, architects, Cardiff. (June 8.) Debts by S. Williams, who continues.

D. I. & C. H. OLDHAM, builders and contractors, Pen-leton. (May 25.) Debts by C. H. Oldham.

D. CORBETT, D. S. CORBETT & T. E. FLOWS, plasterers and contractors, West Hartlepool. (June 8.) Debts by D. & D. S. Corbett, who continue as D. Corbett & Sons.

J. ROBBINS, J. JOHNSON & T. S. T. TREGELLAS, builders, contractors, &c., London. (Feb. 14.) J. Robbins and J. Johnson continue.

L. NICHOLLS & G. P. TELFORD, masonry contractors and builders' merchants, Newcastle-upon-Tyne. (May 21.) Debts by L. Nicholls, who continues.

Trade and Craft.

New Asbestos-Cement Slates and Slabs.

We are now all familiar with the various products of asbestos and Portland cement made in the form of slabs for wall and ceiling covering. These products have also been used and suggested for roofing purposes. To make a good slate, however, the slabs need be of great tenacity and hardness. The insurance companies admit their fire-resistance, and in this respect they are superior to ordinary slates. Their lightness is of course another factor in their favour. Such roofs, too, conduct much less heat from the sun than slates or corrugated iron, while their faces are smooth, and consequently lay flatter on the roof. Economy is also effected in several ways, namely, freight, labour in laying, roof timbers and speed of erection. We have recently received samples of an asbestos-cement slate recently put on the market, which seems to possess many good qualities, and yet to avoid the dangers of shortness, porosity and liability to deteriorate. The tensile strength of "Eternit" slates, as they are called, is 5,781 lbs. to the sq. in.; their resistance to crushing is 8,281 lbs. per sq. in. It is claimed, therefore, that they have 30 per cent. greater strength than Bangor slates. They are also 65 to 70 per cent. lighter, because "Eternit" roofs average 21 lbs. per sq. yd., with 2 $\frac{3}{4}$ in. lap, whilst Welsh slates average 67 lbs. and red tiles 80 lbs. One thousand "Eternit" diagonal slates (style C), 15 $\frac{1}{2}$ ins. by 15 $\frac{1}{4}$ ins., with a 2 $\frac{3}{4}$ in. lap, cover a roof area of 132 sq. yds., or about 12 squares. The slates are made in three colours—grey, blue and terra-cotta—all of which are warranted unfading. "Eternit" sheets are also made for walls and ceilings. Their size is 99ins. by 47 $\frac{1}{2}$ ins. by $\frac{1}{8}$ in. thick and upwards. "Eternit" slates are manufactured under Ludwig Hatschek's patents of 1900—basic patents for the manufacture of such slabs. Mr. Hatschek was an Austrian paper and cardboard maker, and his patent has reference to the manufacture of sheets from asbestos and Portland cement in machines similar to those used for making cardboard, to which their great strength is attributable. It may be mentioned that "Eternit" is on the Admiralty and War Office lists, and large roof areas have been executed with the material in both foreign and home stations, including those at Kingston (Jamaica), Gibraltar, as well as at Sheerness, Chatham, Devonport, Portsmouth, &c. "Eternit" is supplied by Messrs. G. R. Speaker & Co., of London.

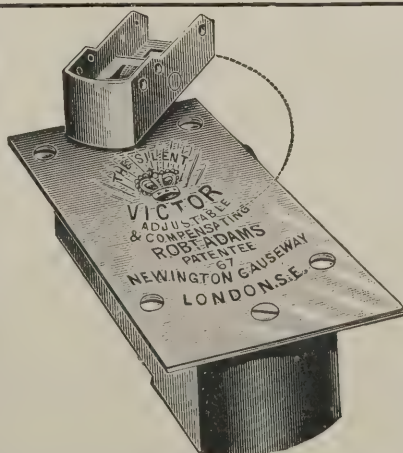
Coming Events.

Saturday, June 30.
ARCHITECTURAL ASSOCIATION.—Fifth Summer Visit to Ipswich.

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MR. THOMAS HARDY ON CHURCH RESTORATION.

AT last Wednesday's annual meeting of the Society for the Protection of Ancient Buildings, held at Burlington House, Mr. Thomas Hardy, the novelist, read a paper on "Memories of Church Restoration." He said it might be true that our more intelligent architects now knew the better way, and that damage was largely limited to minor buildings and to obscure places. But continue it did, despite the efforts of that Society, nor did it seem ever likely to stop till all tampering with chronicles in stone were forbidden by law and all operations bearing on their repair permitted only under the eyes of properly qualified inspectors. The difficulty they encountered over the threshold in respect of church conservation was the fact that the building was held in two contradictory lights and was required for two incompatible purposes. To the incumbent the church was a workshop or laboratory, to the antiquary it was a relic. To the parish it was a utility, to the outsider it was a luxury. How could they unite these incompatibles? Continuing, Mr. Hardy, after dwelling upon the mistakes of builders and the abuses in the rehanging of bells, asked why the old sets of chimes had been removed from nearly all the country churches. Another abuse of ecclesiastical

fabrics was that arising from the fixing of Christmas decorations. The battalion of young ladies to whom the decking with holly and ivy was usually entrusted seemed to be possessed with the fixed idea that nails might be driven not only into old oak and into the joints of the masonry but into the freestone itself, if you only hit hard enough. The bulk of preservation lay in organizing resistance to the enthusiasm for newness in those parishes where priests and churchwardens regarded a church as a sort of villa to be made convenient and fashionable for the occupiers of the moment.

A Reservoir is proposed to be constructed by the Birkenhead Town Council, as first part of a new water scheme, at an outlay, including the cost of pipes, of about three-quarters of a million of money.

A new Book on Haddon Hall, by Mr. G. Le Blanc Smith, is announced to be published by Mr. Elliot Stock immediately. It will deal with the great families who have owned Haddon since the Conquest, and will furnish much new and hitherto unpublished information concerning the estate and its owners. A full description of the ancient fabric, its store of tapestry, old glass, carvings and metal-work will be included, and the whole work will be fully illustrated by photographs and facsimiles.

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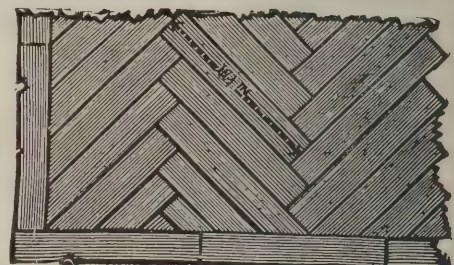
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17½ x 3 x 1½	6 9	6 3	



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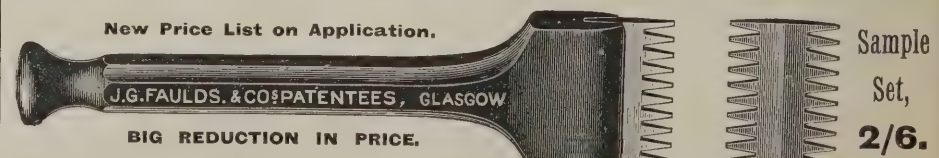
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THE BUILDERS' JOURNAL

AND ARCHITECTURAL ENGINEER.

June 27th, 1906.

CONTRACTORS' SUPPLEMENT (MONTHLY).

THE QUANTITY SURVEYOR

In his relation to
The Builder and the Estimating Clerk.

By W. E. Davis.

IN the consideration of the relationship of the three individuals above mentioned we can reduce the parties to two—the quantity surveyor representing one and the estimating clerk the other. The builder for the present purpose can be left out of the reckoning, as in this relationship he is fully represented by his estimating clerk. "Estimator" would, we think, be a better title and a more just one to the individual, the term "clerk" suggesting a somewhat subordinate position rather than the very important one which the estimating clerk holds in a large contracting firm, or indeed in a business of any size where the estimating is not done by the principal.

The Importance of the Position

is hardly sufficiently appreciated until one considers that practically the fortunes of the business are in his hands. In the first place he has at the outset to steer carefully between two positions. He must be (except under those special conditions which may be left out of consideration here) at the bottom of the list of tenders in order to secure the work, at the same time not "too much so," as his employer, with that want of consideration that employers are sometimes guilty of, would not fail to remind him and call attention in very forcible terms if he found that he could still have been at the bottom of the list and yet have had anything from 5 to 15 per cent. more on his price; on the other hand to be very close and yet not quite at the bottom, that is, to lose the work by 1 per cent. or under is very little if any more appreciated. It is therefore obvious that the estimating clerk's responsibility in these days of keen competition is a very serious one, and that practically the fortunes of his employer are largely in his hands from the time of pricing the estimate until the settlement of the final accounts.

Record of Variations.

It is becoming a very usual and at the same time a desirable practice with large firms for the "estimator" (to use the more dignified title) to have the control during the progress of the various works for which he has estimated, so far as the ordering of the various materials is concerned and the keeping of a record of the variations from the contract. This can only be done by systematic visiting, when in consultation with the foreman in charge he arranges to have the materials on the works in something like the order in which they will be used, in order to avoid delay and the expense of storage and shifting. In town work in a confined situation these are somewhat important matters. By keeping in touch with the work he is enabled to keep a close record of variations and gives notice to the quantity

surveyor when work is about to be covered up, such as underpinning, extra work to foundations and those many things the measurement of which at the time of execution saves so much discussion and dissatisfaction at the end of the work when the time comes for the final settling of accounts. Finally comes the meeting with quantity surveyor, when he practically has to act in the capacity of a quantity surveyor in watching his employer's interests, by bringing forward his claims and seeing that they are properly measured—at least so many of them as are allowed. This last is important, as it is in this connection that the estimator has to be

Something of a Diplomat.

for while he should be careful of his employer's interest he should avoid bringing up vexatious claims, to find, as is sometimes the case, that he irritates the quantity surveyor and in addition to that not only discovers a mare's nest, but also that the surveyor has "something up his sleeve," so that the claim finally results in an omission rather than the expected addition.

The Place of the Clerk of Works.

Where a competent and conscientious clerk of works is employed the settlement of variations is considerably simplified, as it is possible for a record to be kept of these during the progress of the works, and the exchange of signed copies of these notes leaves the surveyor to deal only with the measuring. Where no clerk of works is engaged and the work is to be covered up and there is no drawing showing the variation, the careful estimator will give notice to the surveyor, so that he can at any rate take a note of the work so covered up, even if he does not take the full measurements.

Although most contracts provide that

Day-sheets

shall be sent in weekly where daywork is to be performed, this stipulation is too often ignored, with the result that endless discussions take place as to their correctness, whereas if this were enforced such discussion could take place while the work was in the minds of those concerned, when errors would be easily discoverable and as easily rectified. This question again is simplified by the presence of the clerk of works. A clerk of works' signature on the day-sheets should not necessarily cover more than the fact that the time and materials therein given are correct, leaving the question as to whether the work should be measured to the discretion of the surveyor, with a due regard to fairness. Contractors may sometimes complain that a surveyor is somewhat "close," but generally there are few complaints of unfairness.

A point not to be lost sight of in dealing with the delay in the delivery of day-sheets is

The Temptation to "Load"

them when it is known that their consideration is likely to be postponed till a date when it will be impossible to recall every-

thing connected with them. Artemus Ward was of opinion that there was "a lot of human nature in man." A foreman, after all, is a very human man (we will leave out of consideration his employer and the estimator) with a natural desire to bring his work out well for his employer, even if he has not, owing to the price the work has been taken at, a difficulty of "getting home" with it. He is greatly tempted to "help the job" by getting "something in" on the day-sheets, and being greatly tempted, has been known to fall. By strictly enforcing the weekly delivery of day-sheets, much trouble and a good deal of suspicion will be saved and the satisfaction will be felt that by so doing the foreman will be spared the pain of wounding his conscience, thus conducing to his peace of mind when he reflects upon his days' works. There may possibly be exceptions to the last sentence, but we are dealing here with things as they ought to be, and we hope in the majority of cases do exist.

No surveyor will complain if the estimator brings forward a long list of

Variations.

provided they are clearly defined and he (the estimator) is prepared to deal with them in a reasonable manner. This is, of course, always supposing that the quantities have been properly taken out, and that this long list is not due to vague descriptions and errors of omission. One estimator the writer has met on various occasions (and who will be again mentioned later in dealing with pricing) brings forward such a list and against each item he has a note referring to the quantities and also a note in a note-book he keeps for the purpose. As an example, he makes an abstract of the ironmongery (with the positions according to the specification) and similar fittings, also of the "prime cost" amounts included in the quantities, and against these a note of those executed and the prices against the "prime costs," while the receipted invoices showing the proper discounts are also forthcoming at the settlement as a matter of course, and not, as in too many instances, as the result of one or more applications. Consequently the disputed or debatable items are surprisingly few, even in the most complicated works. This doubtless entails a good deal of work upon the estimator, but the result is eminently satisfactory to the surveyor, as saving him a great deal of the worrying investigation that these items generally entail (as the writer is writing as a quantity surveyor the reader will pardon this note of appreciation), and, as far as the writer can ascertain, is satisfactory also from the point of view of the contractor. The continuance of the system is some guarantee as to this last, and, as it is methodically carried through the extra work at the earlier stage, is probably a good investment of time. This system consistently carried out certainly tends to the expeditious settlement of the work upon the job as well as helping to a thorough investigation of

any claims put forth. The estimator, too, feels that he is getting all that he is justly entitled to, and at the same time has a fair idea as to how the account will work out as compared with the cost.

Then comes the all-important point of

Pricing.

For, however voluminous may be the bills of quantities, there are always a number of items to which these do not apply. Here again is an opportunity for the exercise of that valuable commodity, tact, for while the estimator should get all to which he is legitimately entitled, greed sometimes produces disastrous results. In the writer's professional experience, he has had dealings with estimators of almost every character, *i.e.*, business character. And one of the most satisfactory to deal with is the one before mentioned. He adopts a practice which at first sight appears pedantic.

Marginal Analysis of Prices.

In pricing all-important items he analyses his prices on the margin of the bill, this analysis being the result of close observation and long experience on various works. The effect being, that in many cases the contract prices can be made to apply in part to the items in the variations. Moreover, the prices throughout this estimator's bills are consistent from beginning to end. As mentioned above, this system appears at first sight pedantic, but in practice it is not so, while the settlement of accounts has been simplified, and although the work has been obtained in keen competition, the result has been satisfactory to all concerned. This no doubt has also—from the builder's point of view—been to a great extent due to the fact that this estimator keeps his work closely in touch all through, the consequence being that the waste in ordinary materials is infinitesimal.

The Quantity Surveyor's Part.

We have dealt somewhat fully with the position and duties of the estimator, by which it is clear that his work demands great experience and that he has to exercise the greatest discretion. In writing the foregoing we have premised that the quantity surveyor has performed his part of the work properly, *i.e.*, his bill of quantities has been free from those vague "sporting" items in which the differences in reading may make hundreds per cent. difference in the prices. In his relation to the estimator he has to remember that the items in the bill are all the information that the estimator has before him, and that "thought reading" is not part of his qualifications. It is a very usual complaint on the part of architects that too much detail is given, and that this

Detail increases the Cost

of the work. Now the writer, with every wish to avoid quarrelling with his friends for obvious reasons, maintains that this is not the case, and that the proficient estimator with the full details before him prices every item on its merits, whereas without this detail a "covering" price is put down which in 90 per cent. of the cases works out to considerably more than the sum total of the detailed items. The contrary may have been the case years ago, but estimators of the modern school approach their work in a more methodical manner than did their predecessors.

Prices are more closely cut

than ever they were before; therefore with the fuller information and the absence of speculation the estimator is enabled to leave a smaller margin.

Apropos of this a large provincial contractor told the writer that he generally priced the average London quantities 10 per cent. less than those sent locally because he knew exactly where he stood; whereas in those items that left so much to the imagination he never knew what allowance

to make for the "extra labours," and so had to keep well on the right side to cover all contingencies.

A system that it is well for the surveyor to bear in mind is the

Greater Subdivision

of the various bills than is usually the case. In theory this lengthens the bills unduly, but in practice it is found not to be the case. It enables everyone concerned to trace the various items more easily, and thus gives the contractor a better opportunity of judging of the correctness of the bills of quantities. This possibly may not appeal to all surveyors, but no practitioner worthy of the name would raise any objection to such a check, while it would certainly have a tendency to separate the sheep from the goats in the surveying profession.

It is somewhat satirically said that speech is

Intended to Conceal Thoughts,

and some bills of quantities give one the impression that they were intended to conceal the thoughts of the architect; they remind one somewhat of those "jobbing builders'" accounts which are evidently prepared with the idea of rendering checking impossible. While leaving the exact method of subdivision open, it is sufficient to say that any system which tends to give the contractor greater confidence, will have a beneficial effect in tendering, by enabling him to price each item more closely, as the element of speculation will be reduced to a minimum.

While dealing with the bills of quantities attention may be called to the question of

Marginal Sketches.

As is well known, in other subjects, a sketch will very often save pages of writing, and at the same time more clearly explain the point under consideration. So it is with a bill of quantities, a good marginal sketch will make an item clearer than a column of description. Good is emphasized, as it is too frequently the case that the term "sketch" is taken much too literally. A puzzle diagram is sometimes given absolutely with no character and entirely out of proportion. Possibly the surveyor "taking-off" may not be a very excellent draughtsman, and the "workers-up" no better and possibly worse. So that in the various stages of transition, the final sketch bears little resemblance to the architect's drawing.

One surveyor the writer is acquainted with follows a very good system, *i.e.*, by not putting the sketches in the dimensions at all, but by indicating them with a letter in pencil on the drawing and referring in his dimensions to that letter and giving the number of the drawing. These are then traced from the drawing for insertion in the bills. Of course by this system it is essential that the "taker off" should be referred to to point out how much he wishes included; he also has to use care in reading over the bill to see that they comply with his intentions, but the result is certainly satisfactory. In any case they should be drawn to scale and well dimensioned.

The Conclusion

may be arrived at that the relation between the quantity surveyor, the builder and the estimating clerk is one of mutual dependence, and while the interests are not identical a much more satisfactory result for both client and builder is obtained by each one acting to the best of his ability in his department. Antagonism is disastrous to all concerned, and certainly in very few cases has either party suffered by a friendly business association. But "friendly business association" must not be read as looseness on either side. Neither party must forget the interests he has to serve, but there is absolutely no reason why—with each doing his work in a conscientious manner—"friendly business" should not be synonymous with "strict business."

Builders' Notes.

Another Master-Builders' Association—Blackburn has about 120 master-builders within itself and within the local area which is properly regarded as belonging to the town. It has therefore been decided to form a master-builders' exchange as a common centre for members of the craft.

Master Builders to Visit Dublin.—The National Federation of Building Trade Employers of Great Britain and Ireland will hold their annual conference in Dublin, commencing on Tuesday, July 31st, with a council meeting in the Mansion House, where the general meeting will open the following day at 10 a.m. Entertainments and excursions will take place subsequently. Mr. John Good, hon. secretary of Dublin Master-Builders' Association, is sparing no efforts to make the proceedings a success.

Prosperous Builders.—The depression in the building trade does not appear to have affected the earnings of Spencer, Santo & Co., Ltd., as the directors are able to pay 10 per cent. for last year, the same rate as in the two previous years. The nett available balance on December 31st last, including the amount brought forward from the previous year, was £24,156, out of which it is proposed to pay 6 per cent. on the ordinary shares, making with the interim dividend paid 10 per cent., and leaving a balance of £4,396 to carry forward.

A Lathe Works.—Messrs. John Lang & Sons, lathe manufacturers, Johnstone, have concluded contracts for the erection of additional works which will more than double their present extensive buildings. The firm lately added thirteen acres of land to their grounds, and important extensions were made, including a new iron foundry, pattern shop, pattern stores and suite of offices. The contracts have been secured by Messrs. George Robertson & Co., Paisley, for brickwork, and Messrs. Robert Simpson & Co., Ltd., Johnstone, for carpenter, joiner and glazier work, and also for the erection of all steelwork in connection with the new buildings. When finished the works will be the largest in Britain devoted to lathe manufacture. The department alone devoted to the manufacture of lathes measures over 700ft. in length by upwards of 500ft. in width.

Carpenters and Joiners.—The reports of the branches of the Amalgamated Society of Carpenters and Joiners for the quarter ending March show the expenditure of the society to have exceeded receipts by £9,236, thus reducing the cash balance to £85,042, this being £3,479 less than in the corresponding period of 1905 and £38,944 short of the stipulated amount required by rule. The members of the ordinary section are therefore called on to pay an increased levy of 3d. a week, making 9d., and trade section members an increase of 1d. a week, making 3d., in order to place the society in a proper financial position. Three thousand are on the out-of-work fund. The beneficent work of the society is evidenced by the fact that the average number of members who draw sick-pay exceeds 1,500, and that there are nearly 2,000 members in receipt of an old-age pension.

Architects and Contracts.—The hon. secretary of the Master-Builders' Association of Dublin, writes: "At a largely attended meeting of the members of this Association the following resolution were adopted unanimously: 'That although conditions of building contract have been under consideration for many years, we now regret to learn from the public press that the members of the Royal Institute of Architects of Ireland have at a recent meeting adopted without discussion a set of conditions without any

consultation with the Builders' Association as to their views on a matter so vitally important to their interests, contrary to the custom and practice adopted in England and Scotland, where this matter was the subject of many conferences between the architects and builders prior to its mutual adoption. While willing and anxious at all times to carefully consider any proposals whereby equitable terms on contract might be agreed on, we respectfully decline to be forced to accept or sign conditions which are, in our opinion, inequitable and unfair, and which differ materially from any accepted conditions at present in use in the United Kingdom. The members of the Association will continue to accept and sign the conditions of contract at present in use in our city, and also those agreed on between the Royal Institute of British Architects and the Association of Master-Builders of Great Britain and Ireland."

THE LABOUR MARKET.

Board of Trade Returns for May.

THE Board of Trade returns show that employment in the building trades was quiet generally, except with painters, who were well employed. It was better than a month ago and a year ago.

As regards London, returns received from forty-one London employers show that in the last week of May they paid wages to 9,682 workpeople of all classes, compared with 9,951 in April and 11,979 in May, 1905. Employment generally remained very quiet, except with painters,

who continued busy. Returns from trade unions in London show little change on the whole in the state of employment as compared with a month ago and a year ago. The percentage of unemployed trade-union carpenters in London at the end of May was 8.2, compared with 6.5 in April and 8.3 in May, 1905. With plumbers the percentages unemployed for the three periods were 13.7 for May, 1906; 13.5 for April, 1906, and 14.2 for May, 1905. In the case of both carpenters and plumbers, the percentage unemployed in May, 1906, was higher in London than in any other district of the kingdom. Bricklayers and plasterers reported a slight improvement in employment; masons and painters reported a decline.

As regards the Provinces,

seventy-four returns were received from employers' associations in towns outside of London. On the whole employment in these towns was quiet.

The following information is based on returns from trade-unions and local correspondents:—

Bricklayers.

With bricklayers employment remained dull generally, but was better on the whole than a month ago, especially in Lancashire and Cheshire, Yorkshire and the Midland Counties. Compared with a year ago, little general change was shown.

Stonemasons.

Employment with stonemasons was dull generally, but slightly better than in April. It was much the same generally as a year ago, but worse at Aberdeen. At Plymouth, Nottingham and Dundee it was worse than a month ago.

Carpenters and Joiners.

With carpenters and joiners employment showed no general change compared with a month ago, but was better than in May, 1905. The percentage of trade union members unemployed at the end of May was 5.4, the same percentage as in April. In May, 1905, the percentage was 6.8. The improvement, compared with a year ago, was shared by most districts; some decline however, was shown in the southern and south-western counties and Wales.

Slaters and Tilers.

Employment with slaters and tilers showed an improvement compared with last month.

Plumbers.

With plumbers employment, though quiet, was better than a month ago, and considerably better than a year ago. The percentage of trade-union members unemployed at the end of May was 7.9, compared with 9.0 in April and 10.9 in May, 1905. The improvement was general.

Plasterers.

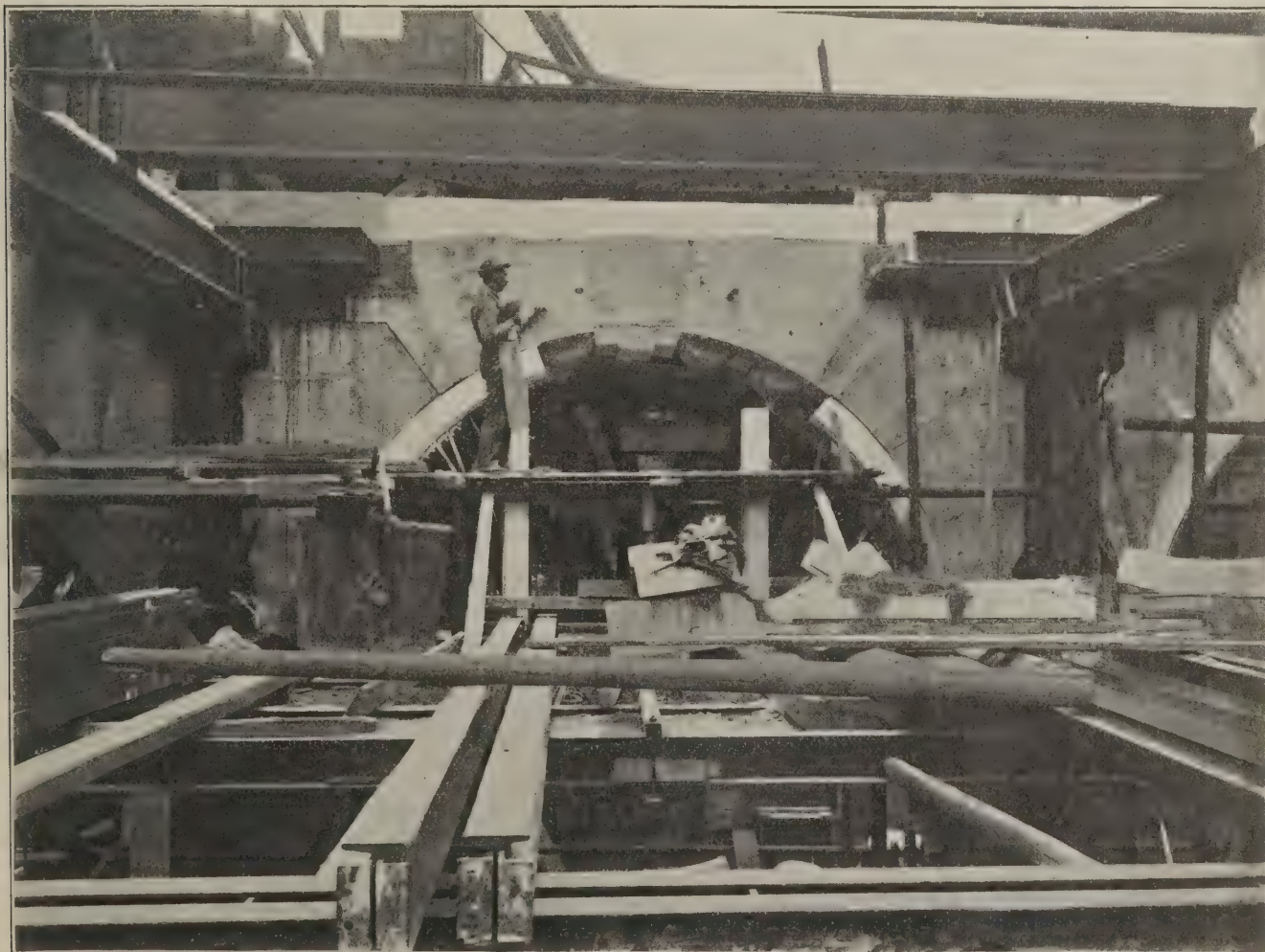
Employment with plasterers was dull. It showed a slight improvement on the whole as compared with April, but in Scotland it was worse. Three hundred plasterers are reported to have left Glasgow this season for the United States and Canada.

Painters.

Painters continued well employed, and reported an improvement compared with April and also compared with May, 1905. Overtime was worked in many cases.

Labourers.

With labourers employment remained quiet, and showed little change as compared with April.



ARCH OF PICCADILLY HOTEL ON THE FRONT TO REGENT STREET QUADRANT.

The above photograph shows one of the arches over the shop fronts of the Piccadilly Hotel, now in course of erection. Several views of the general excavation have been given in former issues of this supplement. Mr. William Woodward and Mr. Walter Enden are the architects of the building, but for the frontages Mr. Norman Shaw is responsible. It will be seen that the steelwork carries the weight of the floors, while the stonework is built outside it, and will apparently sustain the front walls. It is therefore not exactly American frame construction, but conforms to ordinary English practice.

Current Rates of Wages in Large Centres.

Towns.	Masons.	Bricklayers.	Carpenters and Joiners.	Plasterers.	Slaters.	Plumbers.	Painters.	Labourers.
Aberdeen -	d. 8	d. 8	d. 8	d. 8	d. 8	d. 8	d. 8	d. 4½-5½
Accrington -	9	9	8½	9	7½	8½	8½	5-5½
Ashton - under-Lyne -	9½	10	9	10	8½	9	8½	5½-6½
Barnsley -	9	9	8½	9	8½	8	8	6½
Barrow-in-Furness -	9	9	8½	9	9	8½	8½	6-6½
Bath -	7½	7½	7½	7½	7½	8½	8½	5-5½
Belfast -	8½	8½	8½	8½	8	8	8	19s. wk
Birkenhead -	9½	9½	9½	9½	9	9½	8½	5-6½
Birmingham -	10-10½	9½	9	10	9	9½	8½	6½-7
Blackburn -	9½	10	9	9	9	9	8	5½-6½
Blackpool -	9½	10	9½	9½	8½	9	8½	5½-6
Bolton -	9½	10	9½	9½	8½	9	8½	6½-7
Bournemouth -	8½	8	8½	8½	8	8	8	7½
Bradford -	9	9	8½	8½	8	9	8	6-6½
Brighton -	9	9	8½	8½	8	9	8	7
Bristol -	9	9	8½	8½	9	9	8½	6-6½
Burnley -	8½	8½	8½	8½	8	8	8	5½-6
Burton-on-Trent -	9½	9½	9½	9½	9	9	8½	5½-6
Bury -	9½	9½	9½	9½	8½	8½	8½	5-5½
Cambridge -	9	9	9	9	9	9	8½	5-5½
Cardiff -	8½	8½	8½	8½	8	8	8	5½
Carlisle -	9	9	8½	8½	9	10	8½	5-5½
Chatham -	8-8½	8	8	7½	8	8	7½	5
Cheltenham -	9	9	8½	8½	9	9	8½	5-5½
Chester -	9	9	8½	8½	9	9	8½	5-5½
Coatbridge and Airdie -	9½	9½	9	9½	8	9	8	6
Colchester -	8	8	8	8	8	8	8	5-5½
Cork -	7½	7½	7½	7½	7½	8	8	5-5½
Covey -	9	9	8½	8½	8	8	7	5
Crewe -	8½	8	8	8	8	8	7	5
Darlington -	9	9	8½	8½	9	9	8½	6
Darwen -	9½	9½	9	9	9	9	8½	6
Derby -	9	9	8½	8½	8	9	8½	5½-6
Dublin -	8-8½	8½	8½	8	8	8	7½	4½-4½
Dudley -	8½	8	8	8	8	8	7	5
Dumfries -	8-8½	10	9	8½	8½	8½	8	5½-5½
Eastbourne -	8½	8	8	8	pce.	8	7½	5½
Edinburgh -	8½	9½	9	9	9	9	7½	5
Exeter -	8	8	7½	7½	7½	7½	6½	5
Glasgow -	—	9½	9½	9½	9	9	9	5½-6
Glocester -	7½	8	8	7½	7½	8	7½	5
Greenock -	9½	10	9	9½	9	9	9	5½
Grimsby -	—	9	8	8	pce.	9	7½	6-7
Halifax -	9	9	8½	8½	8½	8½	7½	6
Hartlepool -	9½	10	9½	9½	—	—	—	7-7½
Hastings and St. Leonards -	8	8	8	8	—	8	7	5½-6
Huddersfield -	9	9	11	8½	9	7½	8	6
Hull -	9½	9	9	9	9	9	8	6½
Ipswich -	8	8	8	8	9	8	7½	5-5½
Keighley -	8½	8½	8	7½	7½	7½	6	5
Lancaster -	9½	10	8½	9	9	8	8½	5½-6
Leeds -	9½	9½	9	9½	9	9	8	6½-7
Leicester -	9	9	9	10	9	9	8	6-6½
Leigh -	9½	9½	9½	9	8½	9	8	6-6½
Lincoln -	8½	8	8	8	8	8	7½	5-6
Liverpool -	9½	9½	9½	9½	9½	9½	8½	5-6
London -	10½	10½	10½	11	—	11	—	—
Londonderry -	7	7	7	7	6½	7	7½	15s. wk.
Macclesfield -	8	8	8	7½	7½	7½	7½	5
Manchester -	9½	10	9½	10	9	9½	8½	5½-7
Merthyr Tydfil -	8½	8½	8	8½	8	8	7½	5½
Middlesbrough -	9	9½	9½	9½	9	9	8	6½-6½
Newcastle -	9½	9½	9½	9½	9	9	8½	6
Newport (Mon.) -	8½	8½	8½	8½	8	8	7½-8	5½
Northampton -	8½	8½	8½	8½	—	8½	7½-8	5½
North Shields -	10	10	10	10½	9	9	8½	6½-7
Norwich -	8	8	8	8	7½	8	6½	5
Nottingham -	9½	9	9	10	9	9	8	6½-7
Oldham -	9½	10	9½	9	8½	9	8½	5½-7
Oxford -	8½	8	8	8	8	8	7	5½
Paisley -	9	9½	9	9	9	9½	9	6
Perth -	8	8	8	8	8	8	7½	5½-6
Plymouth -	8	8	8	8	8	8	7	5
Portsmouth -	8½	8½	8	8½	pce.	7½	6½-7	6
Preston -	9½	10	9	9½	8½	8½	8	5½-6
Rochdale -	9½	10	9	9	8½	8½	8	5½-6½
Rotherham -	9½	9½	8½	8½	8	8	7½	6
Scarborough -	8½	8½	8	8	33s.	8	7½	6
St. Helens -	9	9	9	9	9	8½	8½	5½-6
Sheffield -	9½	9½	9	9	9	9	7½	5½-6½
Southampton -	7½	8	8	8	pce.	8	7	5
Southport -	9	9	8½	9	9	9	8½	6
South Shields -	9½	—	9½	—	9	8½	9	6
Stockport -	9½	9½	9	10	8½	8½	8	4½-7
Stockton-on-Tees -	9	9½	9½	9½	9	9	8	6½-6½
Sunderland -	9½	10	9½	10	10	8½	9	6½-7
Swansea -	8½	—	8½	8½	8	8	7½	5½
Torquay -	7	7	7½	7	7	7	7	4½-5
Wakefield -	9	8½	8	8	8	8	7½	6
Walsall -	9	8½	8½	8½	8	8	7	5½-6½
Warrington -	8½	9½	9½	9½	8½	8½	8	5½-6½
West Bromwich -	9½	9	8½	9	pce.	8½	7	6-6½
Wigan -	9½	10	9	9	8½	9	8	5½-7
Wolverhampton -	9	9	8½	8½	8	8	7½	6-6½
Worcester -	8½	8½	8½	8	8	8	7	5½
Yarmouth -	7	7½	7½	7½	7½	7½	7	4-4½

A. Done by bricklayer.

Current Market Prices

				FORAGE.							
					£	s.	d.		£	s.	d.
Beans	...	...	per qr.	1	15	0			1	16	0
Clover, best	...	...	per load	4	0	0			4	7	6
Hay, good	...	...	do.	12	6	0			12	6	0
Sainfoin mixture	...	...	do.	12	1	0			4	0	0
Straw	...	...	do.	1	8	0			1	14	0
MISCELLANEOUS.											
Bricks Stocks, d/d to job	per 1,000	1	15	0							
Do. Flettons on rail	do.	1	5	0							
Do. Pressed Wire Cuts, d/d to job	do.	1	17	0							
Do. Blue brindled wire cuts	do.	1	2	0							
Do. do. wire cuts	do.	1	6	0							
Do. do. pressed facings	do.	1	17	6							
Coke Breeze, into carts at gasworks	per load	0	2	0							
Do. d/d to job	do.	0	4	0							
Sand	per yard	0	7	6							
Ballast	do.	0	6	6							
Granite Chippings	do.	0	10	6							
Do. do.	do.	0	11	6							
Granite Broken, 1½ in.	do.	0	15	6							
Do. do. 2 in.	do.	0	15	0							
Do. do. 2½ in.	do.	0	14	6							
Do. Kerb, Norwegian, 6x12 and 12x6 in river	per foot	0	1	2							
Do. do. do. circular	do.	0	1	5							
Do. do. do. 12x8 in river	do.	0	1	5							
Do. do. do. circular	do.	0	1	8							
Do. do. Guernsey, 6x12 in river	do.	0	1	4							
Do. do. do. circular	do.	0	1	6							
Do. do. do. 12x6 do.	do.	0	1	6							
Do. do. do. do.	do.	0	1	8							
Do. do. do. 18x8 do.	do.	0	1	8							
Do. do. do. do.	do.	0	1	10							
Do. Pitchings, Norwegian, 3x6	per ton	1	8	0							
Do. do. do. 3x7	do.	1	10	0							
Do. do. do. 3x5	do.	1	9	0							
Do. do. do. 4x5	do.	1	8	0							
Do. do. do. 4x4	do.	1	13	0							
Do. do. do. 4x6	do.	1	5	0							
Do. do. do. 5x6	do.	1	4	0							
Do. do. do. 5x7	do.	1	4	0							
Do. do. do. Special, 4x6	do.	1	11	0							
Do. do. do. 5x7	do.	1	18	0							
Do. do. Guernsey, 3x6	do.	1	10	0							
Do. do. do. 3x7 & 3x5	do.	1	8	6							
Do. do. do. 3x5	do.	1	13	0							
Do. do. do. 4x5	do.	1	10	0							
Do. do. do. 4x4	do.	1	13	0							
Do. do. do. 4x6	do.	1	9	0							
Do. do. do. 4x7	do.	1	6	6							
Do. do. do. 5x6	do.	1	6	0							
Do. do. do. 5x7	do.	1	5	0							
Do. do. Specials add.	do.	0	6	0							
Glass, English Sheet, in crates of stock sizes, 15 oz., 2nds	per sq. ft.	0	0	3½							
Do. do. do. 3rds	do.	0	0	2½							
Do. do. do. 21 oz.	do.	0	0	5							
Do. do. do. 2nds	do.	0	0	5							
Do. do. do. 3rds	do.	0	0	3½							
Do. do. do. 25 oz.	do.	0	0	6							
Do. do. do. 3rds	do.	0	0	4½							
Do. do. do. 32 oz.	do.	0	0	8							
Do. do. do. 2nds	do.	0	0	8							
Do. do. do. 3rds	do.	0	0	6							
Do. English patent plain rolled plate in stock crates	do.	0	0	2							
Do. do. do.	do.	0	0	2½							
Do. do. do.	do.	0	0	2½							
Cement	per ton	1	12	0							
Lime	do.	1	4	0							
Castor Oil, French	per cwt.	1	10	0					1	2	0
Colza Oil, English	do.	1	6	3							
Copperas	per ton	2	0	0							
Lard Oil	per cwt.	2	15	0					2	17	0
Lead, white, ground, carbonate	per ton	16	0	0							
Do. red	do.	15	0	0					0	19	0
Linseed Oil, barrels	per cwt.	1	0	3							
Petroleum, American	per gal.	0	0	68					0	0	6½
Do. Russian	do.	0	0	58					0	0	6
Pitch	per barrel	0	8	0							
Shellac, orange	per cwt.	9	19	0					10	0	0
Soda, crystals	per ton	3	2	6							
Tallow, Town	per cwt.	1	7	6					1	8	3
Tar, Stockholm	per barrel	1	5	0							
Turpentine	per cwt.	2	6	0							
METALS.											
Standard Copper	per ton	84	0	0					84	10	0
Do. Strong sheets	do.	96	0	0					97	0	0
Lead, Soft Foreign	do.	16	10	0					16	15	0
Do. English	do.	17	0	0					17	5	0
Do. pipes	do.	19	15	0					19	17	6
Do. sheets	do.	19	5	0					19	10	0
Galvanised Corrugated sheets	do.	12	12	6					12	15	0
Spelter G.M.	do.	27	10	0					27	15	0
Angles, Scotland	do.	6	15	0					7	0	0
Bars do.	do.	7	17	6					7	19	0
Marked bars, Staffs	do.	9	0	0							
Common bars do.	do.	6	10	0					6	12	6
Angles, M'boro.	do.	6	10	0					6	12	6
Joists do.	do.	6	2	6					6	5	0
Angles, Midlands	do.	6	10	0					6	15	0
Joists do.	do.	6	15	0					7	0	0
Girdler plates, Midlands	do.	7	10	0					7	12	6

The Month's Trade.

(Reports by our Special Correspondents.)

THE STONE, GRANITE AND MARBLE TRADES.

These trades show practically no change for the better; what little improvement there is is due more to the season than to any improvement in trade generally. The holidays interfered with trade at the beginning of the month, but towards the end of May it improved somewhat.

The Board of Trade reports for May are as follows:—

Employment in limestone quarries in South Durham was fairly good, the same as a month and a year ago. In Weardale it continued good. It was quiet in the Plymouth district, and was not so good as usual at Buxton, but in both districts it improved towards the end of the month.

As regards other stone employment was fairly good at Sheffield, and there was full employment at Rotherham and Normanton. At Gateshead employment was fair. It continued moderate in the Cleve Hill road material quarries. In the Rowsley and district grindstone and building stone quarries employment continued moderate, but was a little better than a year ago. In Forfarshire it continued bad, short time being worked in many quarries.

Employment in the granite quarries in Aberdeenshire was fair, about the same as a month ago, but rather worse than a year ago. Employment was also fair in Leicestershire, where an improvement on a month ago was shown. In Devonshire and Cornwall it continued bad, with much short time.

Employment with settmakers was good at Edinburgh and in Aberdeenshire, and fair at Airdrie. At Stoney Stanton it was good and better than a month ago, and it was fair generally in North Wales. It continued moderate in the Cleve Hill district.

The returns for imports of stones, slabs and marble, rough, hewn and manufactured, for the month of May, 1906, as compared with the same month in 1904 and 1905, are as follows:—

Tons.			Value.		
1904.	1905.	1906.	1904.	1905.	1906.
130,736	108,409	129,494	£142,443	108,837	134,615

Part I. of the General Report on Mines and Quarries for 1905 contains statistics of the number of persons employed, the output of minerals, and of accidents at mines and quarries in the United Kingdom arranged according to the inspection districts. The total output (in tons) of the under-mentioned minerals in the United Kingdom in 1905 as compared with 1904 was as follows:—

	1904.	1905.
Clays and shale	15,948,915	15,134,754
Limestone (other than chalk)	12,041,135	12,501,780
Igneous rocks	5,988,821	5,936,900
Sandstone	5,305,363	5,639,566
Chalk	4,438,728	4,535,584

THE CLAYWORKING INDUSTRY.

Notwithstanding the prevailing depression, the brick and tile trades managed to improve slightly last month. Employment was moderate, and better than a month ago. We can only hope that the improvement will continue. These trades need it badly enough. The Board of Trade labour returns for May state that employment on the whole was moderate, but was good in the Oldham district, and in Norfolk and Cambridgeshire; and fair in the Tees, Bradford and Plymouth districts. In South Staffordshire it was bad.

The British Vice-Consul at Tangier states that the increased activity in the building trade at the port has created a considerable demand for bricks and tiles.

THE SLATE AND TILE TRADES.

Slate Trade.

The slate trade has shown a slight improvement lately. Enquiries are more numerous, but the superficial areas given for schedules are generally small, consequently a reduction in stocks will hardly be appreciable. There is a much brisker demand for special classes such as Westmorland, Precelly, Colleyweston, Welsh Green and Delabole. In certain parts of the country (especially in large agricultural districts) there is a considerable revival in building, and the demand for material for estate purposes shows a decided improvement on that of last year.

In London trade is generally very quiet, one reason for this being that the area of slating now used on buildings such as warehouses and factories has been curtailed owing to the substitution of glazed lights or patent glazing; consequently most of such roofs facing north are now glazed. This is also very largely the case in the public buildings now under construction, and undoubtedly accounts for a large falling-off in the quantity of material usually taken by London merchants from the Welsh quarries. Speculative building has also been in a stagnant condition, and has not yet recovered. Cheap money has a great influence in this branch of the building trade, and there is now apparently a prospect of things being better.

In Wales trade continues to be in a somewhat depressed condition, a few quarries are busy, but generally there is little difficulty in obtaining any reasonable quantity at short notice. So far as can be ascertained the present prices will rule to the end of the year.

The Westmorland district reports a very substantial improvement all round, and the prospects of the green slate trade have improved by over 30 per cent. during the present year. These remarks will also apply to the quarries in the Coniston district.

The demand for Precelly slates continues to be general from all parts of the kingdom, and from the number of contracts coming out where these slates are specified the quarry will undoubtedly be kept busy to the end of the year.

The Colleyweston slate trade continues good; in fact, the demand is greater than the supply. Amongst the largest jobs recently completed are Crathorne Hall, Yorkshire, and Burrough Court, Leicestershire. Among the principal buildings now in hand are New Grammar School, Lincoln; Merton College, Corpus College and New Library, Lincoln College, at Oxford, and Christ's College, Trinity College and Pembroke College, Cambridge.

We understand there has recently been a large demand for the Vronheulog Welsh green slates, and their colour and durability have much to recommend them.

From the Delabole district we understand that trade, though not brisk, is showing an improvement, this slate being now freely specified. Special attention might be directed to the "specially stout best slate," averaging about $\frac{1}{4}$ in. in thickness. This quarry have recently shipped a considerable quantity of slates to Belgium.

The Board of Trade reports that employment in the quarries in North Wales continued slack, and was worse than a year ago. Full time was worked in the Festiniog district, but there was a large number of men unemployed. Employment was quiet in Argyllshire, but a slight improvement was shown as compared with a month ago.

Tiling.

There is a very considerable improvement in the prospects of the tile trade, enquiries being rather more numerous than for slated roofs; this is mainly accounted for by the fact that tiles are apparently the favourite covering for scholastic buildings. Reports from the makers state that among the most satisfactory orders received of late are those for school buildings, though they complain of a lack of improvement in the trade generally.

There has been an increasing demand of late for old roofing tiles. This is fully appreciated by the fortunate possessors of these articles, who generally demand a very high figure, and in most cases prefer not to sell at all, as the tiles are most valuable to country builders for repairs. Consequently the cost of tiling with old tiles is very nearly double that of new.

"Old" Roof Tiles.

The desire to give a general effect of an old roof, which was formerly sufficiently limited to be met by the available supplies of genuine old tiles, has indeed now increased so much that tile makers have found it desirable to make an imitation old tile to meet this demand, the supply of genuine old tiles being entirely insufficient. We have seen a good example of these "new old" tiles, which appears to us to more nearly approximate the genuine article than any we have come across. It is somewhat dark in colour, and twisted sufficiently to give the old effect, without being so much so as to endanger the water-tightness of the roof when laid. We understand that the sole agents for the United Kingdom for these tiles, Messrs. Roberts, Adlard & Co., of Bermondsey, have arranged to keep a stock of them in London, and that the price is about the same as for ordinary Broseley tiling. Ridge tiles are also made in similar material to give a finished effect, these ridge tiles being also very suitable for use on green-slatted roofs.

Wall-tiling.

Of late there have been one or two enquiries for wall tiles which will be welcome to the trade generally, in so far as our experience tells us. The orders in this particular industry have been very scarce; and most of the works are prepared to supply considerable quantities on demand.

THE PORTLAND CEMENT TRADE.

The market for Portland cement continues to show great activity, and it seems probable that before long buyers may have some difficulty in procuring their supplies with that promptitude which was so characteristic of the position during the past years of depression. Already many manufacturers are denuded of stocks which had accumulated during the winter and spring months, and as there are no signs of any abatement in the demand, it can only be a matter of a very short time before the position thus created is reflected in the price which already is above the figures quoted a few weeks back. A point of interest to both buyer and seller is, that the position on the Continent is very much the same as it is in this country, and reports go to show that it is almost impossible to obtain a good reliable brand of artificial cement for early shipment. Prices of natural cement have followed in the wake of the better qualities. In the present condition of things it is additionally important for the consumer to take every precaution against being supplied with Belgian natural cement—the English wording "Portland cement" on the bag is unfortunately no safeguard, for this material is allowed to enter the country so marked without any qualifying words

denoting its foreign origin which would give some indication of its quality. A guarantee should always be insisted upon that the cement supplied is genuine artificial—preferably of British manufacture, otherwise with the inducement before him of snatching an unduly high profit the unscrupulous merchant will be at an advantage in his dealings with the consumer who does not buy on a specification. Certain manufacturers appear to be somewhat concerned at the report from Washington that the American Government will only buy the constructional materials required for the Panama Canal, including cement, from American manufacturers, and opinion is somewhat divided as to what effect this will have upon our own industry. It must affect to some extent those manufacturers who are engaged in the export cask trade, but as a set-off against this the enormous advance made in this country with the ferro-concrete method of construction must result in a very substantial increase in the demand for cement.

The statistical position for the month of May was again in favour of this country, as exports show a large increase, and there is a noticeable falling off in the imports.

The returns for imports and exports of cement for May, 1906, as compared with the same month in 1904 and 1905 are as follows:—

		IMPORTS.		
		1904.	1905.	1906.
Tons	-	25,625	24,372	19,040
Value	-	£37,358	32,312	24,380
		EXPORTS.		
		1904.	1905.	1906.
Tons	-	39,770	48,945	56,345
Value	-	£66,452	79,373	83,550

In his report on the trade, &c., of the States of Oregon, Washington and Idaho for the year 1905, H.M. Consul at Portland writes: "The demand for cement increased as the year progressed and stocks held at the beginning of the year were rapidly depleted. The supplies in sight are not nearly sufficient. This trade, however, does not appear to be cultivated by the British maker, as not one cask was received from the United Kingdom during the year. Prices have advanced, and the article is being used much more in buildings, streets, &c., and there is an extraordinary demand for railway purposes and irrigation works throughout the district. At this time there is practically none in the market, with prospects of a scarcity for some time to come. Prices have temporarily advanced to 13s. per cask. Market prices during

the year ranged from 8s. 4d. to 10s. Receipts from California were about 35,000 bags; the quality of this is reported irregular and the capacity of factories is not equal to the demand. Japanese cement will be received more largely in future. There seems to be some probability of cement works being started at Bellingham on Puget Sound, where very satisfactory working tests have been made of raw material found there."

Our Vice-Consul at Tangier reports that the activity in the building trade at that port has created a large and increasing demand for cement.

Russia claims to be the third most important Portland cement manufacturing country in the world, based on the shakiest foundation. That industry in Russia is being formed into a somewhat aggressive syndicate, and the official "Commercial and Industrial Gazette" says that while the production of cement in Russia up till the eighties was of the most modest dimensions, from that time the industry grew so that it soon became the third largest cement manufacturing country in the world. Reliable statistics are not available for a period later than the year 1900. In that year Germany produced 30,000,000 barrels of 10 poods each, England 9,000,000 barrels, and then came Russia with 4,000,000 barrels. Then follow France, with a similar but slightly inferior quantity, and Belgium and Austria-Hungary with about 1,000,000 each. But why not later than 1900, and where is America!

THE TIMBER TRADE.

The Board of Trade reports that during May employment with mill-sawyers and woodcutting machinists was about the same as a month ago, but better than a year ago. Trade unions with a membership of 4,607 reported 197 (or 4·3 per cent.) as unemployed at the end of May, compared with 4·2 per cent. at the end of April, 1906, and 5·9 per cent. at the end of May, 1905. Employment was good at Nottingham and Coventry; fair or moderate at Burnley, Oldham, Preston and Bristol; improving at Birmingham and Leeds; and bad at Liverpool, Hull, Wolverhampton and Leicester.

The Liverpool Market.

Timber for building purposes has been selling at Liverpool fairly freely. The spot trade has not been very active, but much timber of the lighter sorts has been passed

on inland after coming to hand, apparently to replenish dealers' stocks, as these have been drawn upon pretty freely of late for local requirements. The building of new places for manufacturing purposes, within easy reach of Liverpool, shows no sign of abating, for though some of the larger structures are now well advanced, new work of the kind, chiefly additions to existing mills and premises used for industrial purposes, is being carried out. It seems, indeed, as if the prosperity of the cotton trade and of branches of the woollen trade had prompted directors and principals to make contemplated extensions and additions to their mills and works at the present time. There is still accordingly a good demand for joists and floorings, while joiners are busy on woodwork for internal fittings.

Values of timber generally have been well maintained. At times there have been slight easings of prices, but there have been recoveries, and quotations at date are, as a rule, high.

Canadian Pine Deals

have come to hand to a moderate extent, and have been received chiefly by two large importing firms, Robert Cox & Co. and Watson & Todd. Sales of this timber have been fair, so that stocks have not yet increased, and are materially lighter than they were a year ago. Prices have lately shown a hardening tendency.

Canadian Spruce.

Quebec spruce has been received in small quantities, and the stock is slightly reduced, though still in excess of that held twelve months ago.

Spruce and pine deals from New Brunswick and Nova Scotia have arrived in larger quantities, but deliveries have been in excess of the importation. Stocks have been further reduced, the total at date being less than last month and than a year ago. Prices remain practically unchanged.

Norwegian Flooring Boards

have come to hand in ample supply, though not quite so freely as a few weeks ago. The demand has, however, slackened, and the total of stocks is appreciably greater than a month ago. Recent prices are well maintained.

Baltic Red Deals and Boards

have been received in small quantities. The stock is now less than a month ago, but apparently quite ample for the consumption.

In Square Pine

Quebec has been in good demand, though the deliveries have been less than last month. The stock is small compared with the recent rate of consumption. Prices are well maintained.

Red Pine

has been neglected and the stock remains substantially as last month.

Oregon Timber

in logs and planks has met with good enquiry, and fairly large deliveries have been made. The stock is still extensive and fully adequate for the consumption. Prices continue very firm.

Pitch-pine

has received considerable attention, and good business, on the whole, has been done in this branch of the trade. Hewn has arrived in fair quantity, and deliveries have been heavier. Sawn has come to hand in larger quantities, and the consumption has also been on an increased scale. Prices have been a little easier. Planks have been received much more freely. The stock is in excess of last month's, though less than half of what was held a year ago. Prices are well maintained.

Oak

from the United States has arrived in larger quantity and the consumption has been on a fair scale. The stock is comparatively light, though ample for the present scale of consumption. Logs are dearer. Planks have come to

THE GLASS TRADE.

The glass trade continues fair. The Board of Trade reports that employment with sheet-glass makers and flatteners during May was good at St. Helens, and fair with pressed-glass makers on the Tyne and Wear, with glass blowers in London, and with flint-glass makers and plate-glass bevellers at Birmingham.

The returns for imports and exports of glass for the month of May, 1906, as compared with the same month in 1904 and 1905, are as follows:—

		IMPORTS.					
		1904.	Cwts.	1905.	1904.	Value.	1905.
Window and German sheet, including shades and cylinders		117,791	83,035	126,200	£66,586	50,908	70,692
Plate		47,995	34,829	39,498	59,399	42,839	38,701
		EXPORTS.					
		1904.	Cwts.	1905.	1904.	Value.	1905.
Plate		9,631	11,568	14,504	13,544	15,009	19,242

THE PAINT TRADES.

The paint trades are fair. As regards materials, the returns for imports and exports for May, 1906, as compared with the same month in 1904 and 1905, are as follows:—

		IMPORTS.					
		1904.	Cwts.	1905.	1904.	Value.	1905.
White lead	-	26,888	25,334	25,068	£20,588	21,396	22,491
Zinc oxide	-	138,659	25,273	23,211	108,142	20,888	26,144
Other colours and pigments	-	19,986	131,276	131,855	36,657	84,840	81,081
Turpentine	-	9,191	21,841	12,830	36,657	40,980	20,622
Lac-dye, seedlac, shellac and sticklac	-		6,526	9,805	82,974	46,518	50,855
Linseed oil	-		Tons.				
		112	1,032	1,411	2,169	19,689	30,323
		EXPORTS.					
		1904.	Cwts.	1905.	1904.	Value.	1905.
White lead	-	25,909	35,000	38,277	26,115	33,824	40,559
Zinc oxide	-	127,639	4,009	7,153	147,777	5,764	7,953
Other colours and pigments	-		132,489	143,282		167,618	178,724
Linseed oil	-	3,553	Tons.				
			3,155	2,136	64,156	58,926	46,747

hand steadily and in fair quantity, and have found a ready market. Full prices continue to be obtained.

Birch

logs have arrived in moderately large quantities. The consumption has been on a fair scale, though not so great as the importation. Birch planks have also arrived in large supply. The prices of this wood have also eased.

Teak

has been less active. Planks have arrived in larger supply, but the consumption has been lighter. Values have been maintained.

Mahogany,

to judge by the stocks now in hand, and the readiness with which attractive wood found purchasers at the last sales, has still a good market.

THE IRONMONGERY TRADE.

The Board of Trade returns for May show that employment at Wolverhampton in the lock and latch trades continued bad, with short time. With makers of hollow-ware and of iron fences and hurdles it was good. Employment with hollow-ware makers continued slack at Sheffield, and was moderate at Birmingham and West Bromwich.

Employment in the stoves, grates, &c., trades continued good at Bolton and Bury, and was quiet in the Sheffield district and at Leeds. At Glasgow and Falkirk it was fair.

With nut and bolt makers employment was good at Winstan and fair in South Wales; at Darlaston it continued to improve, and was good. With nail and rivet makers it was fair at Birmingham and Smethwick. At Black Heath it continued fair with nail makers and quiet with rivet makers.

Employment in the wire trade was good generally, particularly in Halifax, Manchester, and Sheffield, where overtime was worked, and at Warrington and Norwich. In almost all the important centres it was better than a year ago.

In his report on the trade of Tangier, the British Vice-Consul at that port draws attention to the large and increasing demand for hardware, due to the great stimulus experienced in the building trade. "The import of British hardware fell 13 per cent. during the year, the British percentage being absorbed by Belgium and France, from which two countries steel and iron girders and ironmongery of all descriptions were imported in large quantities."

The return for imports and exports for May, 1906, as compared with the same month in 1904 and 1905, are as follows:—

	IMPORTS.			Exports.		
	1904.	1905.	1906.	1904.	1905.	1906.
Wire nails	-	-	-	-	-	-
Nails (other than wire nails), screws and rivets	2,766	2,890	4,131	£28,362	28,697	40,835
Bolts and nuts	1,125	1,036	865	18,570	17,320	13,903
	401	335	337	7,357	5,337	5,191
Nails, screws and rivets	1,820	2,227	2,465	35,384	42,299	44,931
Bolts and nuts	1,110	1,473	1,810	19,802	25,162	34,140

THE IRON AND STEEL TRADES.

Recent Progress.

We have never in these columns echoed the bootless theory that an earthquake on the Pacific Coast would shake our phlegmatic trade into a state of unprecedented vigour. But two months ago we ventured to suggest that there was a tendency to unseemly haste in writing dirges about a departing boom. We were inclined rather to believe that we were passing through a period of calm that would soon give way to a good trade wind of increasing vitality. That a time of solid prosperity is in store for us we are far from despairing of, but we want to see it germinate a little more rapidly.

However, if our home trade is not all that it might be, there are certainly some grains

of comfort to be gleaned from the figures of our export trade. In the recently issued statements of the Board of Trade some very encouraging advances in exports are shown both for the month of May and in the totals for the five months of 1906. The following are a few figures for the past month as compared with May, 1905:—

IRON AND STEEL EXPORTS, MAY.

	1905.	1906.
Pig iron	88,060	148,640
Wrought-iron bars	13,430	14,200
Galvanized sheets	35,418	34,630
Steel bars	14,900	18,700
Cast-iron goods	2,912	3,641
Wrought-iron goods	3,600	4,350
Steel girders	6,780	8,871

Pig iron has shown the most spirited advance, Germany, the Netherlands, Belgium and France having been the largest buyers. The total quantity exported to those countries during May is recorded at 78,800 tons.

The descriptions enumerated above are equally pleasing in their aggregates for the five months. The figures are as follows:—

IRON AND STEEL EXPORTS, JANUARY-MAY.

	1905.	1906.
Pig iron	354,700	548,681
Wrought-iron bars	54,830	59,200
Galvanized sheets	168,010	184,630
Steel bars	54,910	76,320
Cast-iron goods	16,640	17,490
Wrought-iron goods	17,160	20,160
Steel girders	26,215	40,260

The holidays interfered somewhat with the progress of trade at the beginning of the month, and all over matters opened out rather quietly. Prices, however, remained pretty firm in spite of general slackness and the prevailing sparseness of fresh business.

In the Cleveland district, whilst pig iron commenced the month with considerable vigour, there were but few new orders for general iron and steel manufactures. Shipbuilding was distinctly dull, and it was feared that this would soon have a depressing effect on the manufactured iron and steel trades. Makers, however, had sufficient current orders in hand to keep them well employed for the time being, and signs have not been lacking that new business would come along before the disposal of their contracts.

In the Midlands the prevailing dulness of the preceding few weeks was more than ever emphasized at the commencement of the present month. Here, also, prices maintained a surprising degree of firmness. "Marked" bars were selling at £9 per ton, and "common" bars at £6 15s. to £6 17s. 6d. Galvanized sheets were in the happy position of having justified their enhanced figures, and prices ranged from £12 10s. to £12 17s. 6d. Angles averaged from £7 to £7 5s., and

channels and joists averaged from £6 15s. to £6 17s. 6d.

In Scotland the position was very much the same, although perhaps the volume of orders against current contracts was larger than in the centres on this side of the border. New business was sparse. The Scotsman, however, takes his holidays very seriously, and conscientiously disallows any considerations as to the state of trade to interfere with them. Consequently the output of manufactured material made but an indifferent tonnage.

Those interminable negotiations respecting an adjustment of prices for angles, as in the North-east of England and in Scotland respectively, were reported to be still "in progress."

The Present Position.

As the month advanced, affairs in the Cleveland district appeared to brighten up with the weather.

Pig iron, though solid enough in the fact, is a doubtful thing in the abstract to build up hopes upon, but the increased production and the high export figures which we have already presented have been so consistent and irrefutable that they may well be regarded as signs of the times.

Except in rails, however, new orders for manufactured steel have not come forward with anything like alacrity. Still, makers appear to have plenty of business on their books to be going on with, and there is a continued firmness about prices.

The following is a general comparison of present prices in various districts with those of 1905:—

IRON AND STEEL PRICES (per ton).

	1905.	1906.
Staffordshire marked bars	£9 0 0	£8 0 0
" common bars	6 17 6	6 0 0
Steel rails, Middlesbrough	6 7 6	5 7 6
" Lancashire	6 7 6	5 5 0
Steel angles, Middlesbrough	6 15 6	5 15 0
" Scotland	7 0 0	5 7 6
Steel plates, Middlesbrough	7 0 0	5 17 6
" Scotland	7 7 6	5 17 6

The position in Scotland has not changed materially, although many rumours are afloat respecting large shipbuilding orders which may come at any moment. When these assume a more definite shape, an all-round improvement may be looked for. Meanwhile specifications continue to come forward against running contracts, and prices are comparatively firm.

At a recent meeting of the Scotch steel-makers to consider the position of the trade it was decided to make no alteration in the existing quotations. It is not expected that anything will now be done until after the July holidays, and much may happen in the meanwhile to modify the ideas which at present obtain. The South American States, for instance, may prove to be friends in need if they close with the offers which have been made from the Clyde for the construction of six or seven large cruisers. Such orders as these would give great stimulus to the steel trade, and will effect a considerable change in the present state of the market.

In Sheffield trade has assumed a very vigorous tone. In practically all lines of manufactured steel, large and small, good business is being done, and orders for forward delivery are reported to be plentiful.

In the Midlands makers have pulled round considerably since the beginning of the month. Prices are steady and a very satisfactory quantity of new business is reported in various lines.

The following represent in round figures the prices prevailing in various classes of iron and steel manufactures in the Midlands:—

MIDLAND PRICES (per ton)

	£	s.	d.
Marked bars	-	-	0 0
Do. special	-	-	0 12 6
Common bars	-	-	0 12 6
North Staff. bars	-	-	7 5 0
Gas strip	-	-	6 15 0
Hoops	-	-	7 15 0
Black sheets	-	-	7 12 6
Girder plates	-	-	7 12 6
Joists	-	-	7 0 0
Angles	-	-	6 15 0
Mild steel bars	-	-	7 12 6
Galvanized sheets	-	-	12 15 0

In structural steel the improvement was most marked, and corrugated sheets showed an almost equal degree of vitality.

The state of affairs on the Continent is still one of abounding activity. All the Belgian and German works appear to be well supplied with orders for some time to come, chiefly for the home trade, and consequently they look with some indifference upon the markets on this side. Prices have not only been well maintained during the past few weeks, but appreciable advances have been recorded, at any rate for export

orders. Prices for delivery on this side in ordinary materials are all in the region of £1 per ton in advance of those quoted this time last year, and present conditions do not point to any falling off for the next few months. Rolled steel joists are quoted in London at the imposing figure of £6 3s. 6d. per ton or thereabouts for delivery in the Thames or equal East coast ports. Channels are about 5s. higher. Angles range from £6 10s. to £6 12s. 6d. and Tees £6 12s. 6d. to £6 15s. Steel bars are selling at £6 10s., and the same figures applies to heavy steel rails; half-round bars are quoted at £7, and fencing standards about 5s. below this figure, all c.i.f. Thames or equal. None of these figures point to heavy buying in this country, and the trade in Continental material generally will be tolerably flat until the prevailing activity on the other side shows signs of subsiding.

Other Metals.

The tin market still pursues its wild and erratic career. This remark was not original ten years ago, and we have no doubt it will still be a popular platitude ten years hence. Last month's record figure of £215 has, however, not been attained, or even approached since, and the strongest movements have really been in the reverse direction. Quotations have fluctuated during the past few weeks between £170 and £190, the figures in the region of £180 having been the most representative. During the latter part of May and early in June heavy shipments were made from the Straits, followed by an increase in the stocks on this side. It is hoped that this and other considerations will create a narrower limit to the fluctuations in prices, but this hope has been so frequently expressed and so frequently disappointed that we can only speak of the future with all reserve. Current prices are quoted in the region of £180, and recent movements have been comparatively mild.

Lead has displayed considerable steadiness recently, and prices continue good. Soft foreign ranges from £16 15s. to £17s., these figures being very similar to those quoted a month ago. Fresh arrivals have only totalled a small tonnage, and these quotations are not likely to be disturbed to any great extent. English lead is quoted at £17 2s. 6d.; pipes at £19 17s. 6d., and sheets at £19 10s. The imports of lead during May were 18,700 tons, this figure being about 1,000 tons below that for April.

Copper has not displayed any great degree of briskness latterly, and although prices have been constantly varying, they have not covered a very wide field. Quotations have ranged between £83 10s. and £86, and buying has not been heavy. Standard copper is now quoted at about £84, electrolytic at £87, and strong sheets at £99.

Good trade has been done in spelter, partly as a result of the activity in the galvanizing trade. Good ordinary is quoted at £27 15s. and special brands at about 5s. higher.

In galvanized sheets the briskness which characterized the commencement of the month has been well maintained. Prices have kept up a steady and consistent advance, and there appears to be no doubt that the present figures of £12 10s. to £12 15s. are pretty secure from any danger of slackening. Comparing prices with those of even so recently as six weeks ago, makers have certainly no cause for complaint as regards their present position.

THE WALLPAPER TRADE.

The wallpaper trade continues stagnant. It is only very slightly better than last year. Our exports last month were better than a month ago, and better than a year and two years ago, as the following return of paper-hangings for May will show:—

		IMPORTS.		
		1904.	1905.	1906.
Cwts.	-	-	4,733	6,637
Value	-	-	£13,003	17,389
		EXPORTS.		
		1904.	1905.	1906.
Cwts.	-	7,062	7,109	7,839
Value	-	£17,152	16,607	18,456

NEW LONDON BUILDINGS.

AT yesterday's meeting of the London County Council the Building Act Committee reported the following applications under the London Building Act, 1894, their recommendations as to consent or refusal being appended in *italics*:—

Retention of a building on the south side of Dalgarno Gardens and western side of Bracewell Road, Hammersmith, on the application of Bull & Bull, on behalf of P. Tinckham. (*Consent.*)

Iron and glass shelter in front of the Hyde Park Hotel, Knightsbridge, on the application of the Crittall Manufacturing Co., Ltd., on behalf of the Hyde Park Hotel, Ltd. (*Consent.*)

Retention of a motor-carshed on the forecourt of No. 117, Finchley Road, Hampstead, on the application of J. D. Hunter. (*Consent.*)

Oriel windows and balconies to a building proposed to be erected at Nos. 208 and 210, Great Portland Street, St. Marylebone, to abut also upon Bolsover Street, on the application of Lanchester & Rickards. (*Consent.*)

One-storey porch at St. Paul's Church, Kingsdown Road, Holloway, on the application of the Rev. C. E. Welson. (*Consent.*)

Oriel window and balconies in front of a proposed extension of the Berkeley Hotel, Berkeley Street, Piccadilly, on the further application of R. Griggs, on behalf of the Berkeley Hotel Co., Ltd. (*Consent.*)

Projecting balconies at No. 28, Grosvenor Street, St. George, Hanover Square, to abut upon Grosvenor Street and Davies Street, and a projecting chimney shaft to abut upon Davies Street, on the application of C. W. Stephens, on behalf of Lord Edward Spencer Churchill. (*Consent.*)

Oriel window at the first-floor level of the Portland Club, St. James's Square, to abut upon York Street, on the application of Hesketh & Stokes. (*Consent.*)

Forecourt fence in front of a house on the eastern side of Garrad's Road, Tooting Bec Common, northward of Prentis Road, at less than the prescribed distance from the centre of Garrad's Road, on the application of H. Shepherd, on behalf of G. R. Higgins. (*Consent.*)

Iron and glass shelter in front of the hotel "Maison Jules," Jermyn Street, Strand, on the application of G. D. Martin. (*Consent.*)

Addition at the rear of No. 4, Chelsea Embankment, on the application of H. T. A. Chidgey, on behalf of Sir W. Evans-Gordon, M.P. (*Consent.*)

Building to be used as a stable and coach-house at the rear of No. 42, Rushey Green, Lewisham, to abut upon Bradgate Road, on the application of H. Roberts, on behalf of C. Child. (*Refusal.*)

Extension of the period within which the erection of a workshop building on the northern side of Richmond Terrace, Clapham Road Kennington, westward of No. 90, Clapham Road, was required to be commenced, on the application of Sandom, Kersey and Knight. (*Consent.*)

Erection of a working-class dwelling on the site of No. 73, Bishop's Road and No. 1, Lark Row, Bethnal Green, on the application of Merrett & Mould on behalf of M. H. Pope. (*Refusal.*)

Erection of an addition at the rear of Nos. 417 and 419, Battersea Park Road, Battersea, to abut upon Carlton Grove, on the application of H. E. Rossiter, on behalf of F. Mühlenkamp. (*Refusal.*)

Modification of the provisions of that section with regard to open spaces about buildings, so far as relates to the proposed erection of buildings on the site of No. 11, Philpot Street, Stepney, to abut upon Nelson Street, with an irregular open space at the rear, on the application of E. H. Abbott, on behalf of C. Martin. (*Consent.*)

Deviation from the plans approved on July 4th, 1905, for the erection of a one-storey projection on part of the forecourt of No. 124, Victoria Street, Westminster so far as relates to the construction of a skylight in the roof of such projection, on the application of Griffin & Woollard, on behalf of J. B. Martin. (*Consent.*)

Two iron and glass shelters in front of the Waldorf Theatre, Aldwych and Catherine Street, on the further application of Gullow & Co. (*Consent.*)

One-storey shop on the southern side of Gordon House Road, Highgate Road, St. Pancras, westward of the Catholic Apostolic Church, on the application of Tubbs & Messer, on behalf of S. E. Spencer. (*Refusal.*)

Retention of a building at the rear of "Selborne," Leigham Court Road, Wandsworth, at less than the prescribed distance from the centre of the roadway of Leigham Avenue, on the application of W. Lawrance, on behalf of J. Hill. (*Consent.*)

Modification of the provisions of that section with regard to open spaces about buildings, so far as relates to the proposed erection of a building on the north-western side of Bosworth Road, Kensington, between Nos. 10 and 12, with an irregular open space at the rear, on the application of J. W. Chapman, on behalf of the Bosworth Temperance Club, Ltd. (*Consent.*)

Uniting of No. 117, Piccadilly, with the upper floors of a proposed new building to abut upon Down Street, on the application of J. P. Crosby, on behalf of A. McCandlish. (*Consent.*)

Erection of two cooling towers on the south-western side of Burnard Place, Islington, on the application of A. Gay, on behalf of the Islington Metropolitan Borough Council. (*Consent.*)

Construction of a screening and intake chamber, supply and discharge pipes between the River Lea, and the condensers in the generating station, and a discharge chamber at the generating station, Millfields Road, Hackney, on the application of R. Hammond & Son, on behalf of the Hackney Borough Council. (*Consent.*)

Construction of a temporary addition to the generating station, Millbank Street, Westminster, on the application of C. S. Peach, on behalf of the Westminster Electric Supply Corporation. (*Consent.*)

Deviations from the plans approved on 19th December, 1904, for the formation or laying out of new streets for foot traffic only on a site on the west side of Backchurch Lane and east side of Gowers Walk, Whitechapel, so far as relates to an increase in the number of stalls with stores over, the provision of general store rooms for stall holders, the erection of a poultry-killing house with store over, and an extension eastward of the covered entrance from Gower's Walk, on the application of Crickmay & Heath. (*Consent.*)

Deviation from the plans approved on 20th February 1905, for the formation or laying out of a new street for carriage traffic to lead from Trinity Road to Norwood Road, Lambeth, so far as relates to an alteration in the cross section of the proposed street, on the application of C. Deane. (*Consent.*)

New street for foot traffic to lead from Southampton Row, Holborn, to Vernon Place, on the application of R. J. Worley. (*Consent.*)

Extension of Vicarage Gate, Kensington, and in connection therewith the erection of a new parish hall, on the application of Rev. Canon Pennefather. (*Consent.*)

New streets for carriage traffic to lead out of the eastern side of Upper Tulse Hill, Norwood, on the application of Shaw & Lee, on behalf of Messrs. Stringer Brothers. (*Refusal.*)

Retention of two wooden sheds of a temporary character at the premises of the Cheap Wood Co., No. 66, Deptford Green, Greenwich, on the application of the Cheap Wood Co. (*Consent.*)

Wood and glass timekeeper's box in front of the "Myddelton Arms" public-house, Canonbury Road, Islington, as shown, on the application of R. T. Kingham, on behalf of the London General Omnibus Co., Ltd. (*Refusal.*)

New street for carriage traffic in continuation northward of Willow Vale, Uxbridge Road, Hammersmith, on the application of J. H. Richardson, on behalf of Williams & Wallington. (*Consent.*)

New streets for carriage traffic upon the Streatham Lodge estate, Streatham Common south, Wandsworth, on the application of F. Newman & Blunt, on behalf of C. H. Copley Du Cane. (*Consent.*)

New street for foot traffic only, to lead northward out of Godfrey Street and Lower Pelipar Road, Woolwich, and in connection therewith the erection of a Sunday school upon a site approached by such street, on the application of H. Bussbridge, on behalf of the building committee of the Pelipar Road Sunday school. (*Consent.*)

Building on the land at rear of No. 43, Springbank Road, Hither Green, Lewisham, on the application of P. Roche. (*Consent.*)

Extension of the time within which the formation or laying out of new streets for carriage traffic on the Streatham Lodge estate, Streatham High Road, Streatham, approved by the Council on 29th April, 1902, was required to have been completed, on the application of F. Newman. (*Consent.*)

New street for carriage traffic of a street to lead out of the southern side of a proposed continuation of Chartfield Avenue, Putney, on the application of J. C. Radford, on behalf of Lord Westbury. (*Refusal.*)

Modification of the provisions of that section with regard to open spaces about buildings, so far as relates to the proposed erection of four shops and dwelling-houses on a site on the western side of Mare Street, Hackney, between the "Dolphin" public-house and No. 175, with irregular open spaces at the rear, on the application of D. Morris. (*Consent.*)

Deviations from the plan certified by the district surveyor, so far as relates to the proposed rebuilding of Nos. 22 & 23, Grosvenor Square, on the application of Read & Macdonald, on behalf of Holloway Brothers. (*Consent.*)

Addition at the rear of Nos. 7 & 8, Rupert Street, Strand, on the application of R. H. Kerr, on behalf of C. Manzel. (*Consent.*)

Building at Whitcher Place, Rochester Mews, Camden Town, to exceed in extent 250,000 cub. ft. but not 450,000 cub. ft., and to be used only for the purposes of a motor garage, on the application of Idris & Co., Ltd., on behalf of the Associated Omnibus Co., Ltd. (*Refusal.*)

Buildings on the site of Nos. 42, 43 and 44, Hyde Park Gate, Kensington Road, Kensington, to abut also upon Hyde Park Gate, on the application of Weatherall & Green, on behalf of the trustees of the Campden Charity. (*Consent.*)

Deviation from the plan approved on October 4th, 1904, for the erection of buildings on a site on the south side of Kensington Road, Kensington, to abut also upon Palace Gate, so far as relates to an alteration in the frontage line at the north-eastern angle of the buildings, on the application of Millard & Pryce, on behalf of the Royal Exchange Assurance Co. (*Consent.*)

Buildings upon a site at the junction of Horney Rise and Upper Horney Rise, Hornsey, on the application of E. Bates, on behalf of G. W. Cook and E. R. Smith. (*Consent.*)

Buildings on the south-eastern side of Fulham Road, Chelsea, to abut also upon College Street and Kimbolton Row, on the further application of Elms & Jupp, on behalf of E. Bingham and T. Crapper & Co., Ltd. (*Consent.*)

Open wooden porch at "The Limes," Dulwich Wood Park, Dulwich, on the application of W. Griffiths, on behalf of J. Bowyer & Co. (*Consent.*)

Tenders.

Addressed postcards on which lists of tenders may be stated will be sent free on application to the Manager, BUILDERS' JOURNAL, Great New Street, Fetter Lane, E.C. Information from accredited sources should be sent to "The Editor" at latest by noon on Monday if intended for publication in the following Wednesday's issue. Results of Tenders cannot be accepted unless they contain the name of the Architect or Surveyor for the work.

Ashby.—For the erection of a new Wesleyan church at Ashby, near Frodingham. Mr. W. H. Buttrick, architect, 23, Wells Street, Scunthorpe:—
A. & H. Woods, Gainsborough ... £4,095 0 0
Good & Son, Hull ... 3,992 8 3
Scarborough, Lincoln ... 3,890 0 0
S. R. & T. Kelsey, Goole ... 3,793 0 0

Barnard Castle.—For shop fronts, for the Co-operative Society. Mr. T. Farrow, architect, 7, Market Place, Barnard Castle:—

In teak.
Parnell & Sons, Bristol ... £371 12 0
J. Curtis & Sons, Leeds ... 322 10 0
J. & W. Gibson, Bishop Auckland ... 242 10 0
Co-operative Wholesale Society,*
Newcastle-on-Tyne ... 230 6 6

* Accepted subject to several items being arranged to architect's satisfaction.

Broadstone.—For alterations and additions to the golf pavilion, Broadstone, for Lord Wimborne. Mr. W. Andrew, architect, Parkstone:—

W. E. Jones & Son, Bournemouth ... £1,917 0 0
Baker & Pearcey, Parkstone ... 1,788 0 0
Burt & Vick, Poole ... 1,638 10 0
W. J. Cross, Parkstone ... 1,615 0 0
A. & F. Wilson, Parkstone ... 1,595 0 0
Poole Construction Co., Poole ... 1,530 0 0
J. Smith,* Wimborne ... 1,478 0 0

* Accepted.

Bushey.—For the erection and completion of a new elementary school and cookery centre at London Road, Bushey, for the Hertfordshire County Council. Mr. Urban A. Smith, county surveyor, Hatfield:—

J. Willmott & Sons, Hitchin ... £13,483 9 8
Wilkinson Brothers, Finsbury Park ... 13,300 0 0
W. Bailey & Sons, Watford ... 12,396 1 1
L. & W. H. Patman, Enfield ... 12,285 0 0
Mattock & Parsons, London, W.C. ... 12,272 0 0
A. W. Nash, Dunstable ... 12,171 9 9
W. S. Shepherd & Co., London, S.W. ... 11,745 0 0
W. H. Hyde, Norwood Junction ... 11,679 0 0
C. Miskin & Sons, St. Albans ... 11,583 0 0
G. & F. Waterman, Watford ... 11,544 0 0
Coulson & Lofts, Cambridge ... 11,475 0 0
C. Brightman, Watford ... 11,449 3 8
J. & M. Patrick, Wandsworth ... 11,332 0 0
F. & G. Foster, Norwood Junction ... 11,027 0 0
H. Flint, High Wycombe ... 11,026 0 0
Oak Building Co., Cambridge ... 10,899 0 0
Co-operative Builders, Kettering ... 10,467 1 1
T. Cuthbert, Nottingham ... 10,419 3 6
C. Henson & Son,* Midland Road, Wellingborough ... 10,348 11 1
Hooper, Neary & Co., Greenwich ... 9,939 3 11

* Accepted.

Colchester.—For the erection of the East Ward Council School, Greenstead Road, for the Education Committee. Messrs. Goddey & Cressall, architects, Victoria Chambers, Colchester:—

Spencer, Santo & Co. ... £10,400 0 0
Coulson & Lofts ... 10,180 0 0
Oak Building Co. ... 9,973 0 0
J. McKay ... 9,479 0 0
W. Chambers ... 9,439 0 0
H. W. Gladwell ... 9,374 0 0
H. E. Ambrose ... 9,296 0 0
Young & Son ... 9,267 0 0
R. Beaumont ... 9,134 17 0
Everett & Son ... 8,998 0 0
C. Roper ... 8,700 0 0
Dobson & Son ... 8,679 0 0
T. J. Ward,* Colchester ... 8,603 0 0
Clark & Sons ... 8,297 0 0

* Accepted.

East Barnet.—For carrying out additions and alterations to the Margaret Road County Council School, East Barnet, for the Hertfordshire County Council. Mr. Urban A. Smith, county surveyor, Hatfield:—

Coulson & Lofts, Cambridge ... £2,186 0 0
W. M. Butcher, New Barnet ... 2,123 3 4
Patman & Fotheringham, London, W.C. ... 2,073 0 0
J. & M. Patrick, Wandsworth ... 2,055 0 0
J. Willmott & Sons, Hitchin ... 2,042 17 11
A. Fairhead & Sons, Enfield ... 2,029 0 0
L. & W. H. Patman, Enfield ... 1,990 0 0
Mattock & Parsons, London, W.C. ... 1,971 0 0
J. Stewart, London, N. ... 1,958 0 0
J. Thomas, Enfield ... 1,932 0 0
W. H. Hyde, Norwood Junction ... 1,945 10 0
F. W. Harris & Co., Barnsbury ... 1,877 0 0
F. & G. Foster, Norwood Junction ... 1,842 0 0
Wilkinson Brothers, Finsbury Park ... 1,841 0 0
H. Flint, High Wycombe ... 1,833 0 0
Co-operative Builders,* Kettering ... 1,714 11 2

* Accepted.

Evasham.—For the erection of a jam factory, for Messrs. T. W. Beach & Sons. Mr. F. Foster, architect, Masonic Buildings, Coventry:—

C. H. Haywood ... £9,181 0 0
A. J. Bloxham ... 9,130 0 0
A. J. Colborne ... 8,999 9 0
E. R. Dyke ... 8,912 0 0
T. Broad, Ltd. ... 8,891 0 0
G. Huins & Son ... 8,792 0 0
W. Jones ... 8,745 0 0
T. Bailey ... 8,700 0 0
J. Parnell & Son ... 8,690 0 0
J. E. White ... 8,475 0 0
R. Bowen ... 8,399 0 0
J. Darse ... 8,350 0 0

Cliff & Co. ... £8,378 0 0
Esply & Co. ... 8,200 0 0
W. Lissaman & Co. ... 8,100 0 0
R. P. Gathercole ... 7,900 0 0
W. H. Gibbs ... 7,878 0 0
E. Harris,* Coventry ... 7,852 0 0

* Accepted.

Exeter.—For the erection of a new hostel in Castle Street, for students at the Royal Albert Memorial College. Mr. James Jarman, architect:—

Stephens ... £5,149
Bunclark & Stephens ... 5,023
Westcott, Martin & White ... 4,974
Brealy ... 4,889
Herbert ... 4,875
Smale ... 4,850
Luscombe ... 4,830
Ham & Passmore ... 4,819
Mudge ... 4,682
Sutter* ... 4,662
Coles, Alington ... 4,650

* Recommended for acceptance.

Grimsby.—Accepted for the erection of a new hall, Garibaldi Street, for the Ancient Order of Foresters. Mr. H. Heap, architect, Osborne Chambers, Grimsby:—
W. Kuson ... £1,123

Lincoln.—For the erection of bridge, Scorer Street. Messrs. T. Tropp & Harding, engineers:—

J. Bradley ... £1,430 11 0
Halkes Brothers ... 1,228 0 0
H. S. & W. Close ... 1,195 0 0
C. Taylor ... 1,124 0 0
W. Wright & Son ... 1,039 0 0
S. & R. Horton* ... 1,038 13 2

* Accepted.

London.—For the re-painting of Westminster, Battersea and Hammersmith bridges, for the London County Council:—

Westminster Bridge.
J. Scott-Fenn, Woolwich ... £983 15 1
E. Proctor & Sons, Plumstead ... 804 0 0
J. Kirkaldy & Son, London, E. ... 526 15 2
W. Dudley, New Southgate ... 482 10 6
A. H. Inns,* London, E.C. ... 457 0 0

[Estimate comparable with the tenders, 643 18 0.]

Battersea Bridge.
J. Scott-Fenn, Woolwich ... 1,996 14 4
E. Proctor & Son, Plumstead ... 1,097 0 0
W. Dudley, New Southgate ... 932 7 5
A. H. Inns,* London, E.C. ... 939 0 0

[Estimate comparable with the tenders, 1,031 5 3.]

Hammersmith Bridge.
J. Scott-Fenn, Woolwich ... 2,297 2 9
E. Proctor & Son, Plumstead ... 1,376 0 0
A. H. Inns, London, E.C. ... 1,132 0 0
W. Dudley,* New Southgate ... 1,034 12 0

[Estimate comparable with the tenders, 1,474 18 4.]

* Accepted.

London, N.—For the erection of a residence, Westfield, in Hendon Avenue, Finchley, N., for Mr. J. B. West. Messrs. Bennett & Richardson, architects, 2, The Broadway, Finchley, N. Quantities by the architects:—

W. Tout ... £2,262
Nicholls & Son ... 2,250
Ford & Walton ... 2,235
Godson & Son ... 2,233
Mattock Brothers ... 2,193
C. W. Scott ... 2,166
F. Gough & Co. ... 2,164
Patman & Fotheringham ... 2,153
Sheffield Brothers ... 2,045
W. Lawrence & Son* ... 1,997

* Accepted.

London, S.E.—For the erection of four cottages at Ordnance Road, East Greenwich, for Mrs. S. R. Colwall. Mr. Alfred Roberts, architect, Greenwich, S.E.:—

Thomas & Edge ... £1,587
F. & T. Twome ... 1,457
T. D. Leng ... 1,360
W. Martin ... 1,216
W. J. Howie ... 1,194
H. Groves,* Stockwell Street, Greenwich ... 1,150

* Accepted.

Morrison.—For the erection of Libanus new school-room, Morrison:—

J. & D. Jones ... £1,310 0 0
T. Richards ... 1,280 0 0
D. Jenkins's Exors. ... 1,258 10 0
Bennett Brothers ... 1,250 0 0
Lloyd Brothers ... 1,243 10 0
J. & F. Weaver ... 1,245 0 0
Williams & Mort, Landore ... 1,220 0 0
G. Davies ... 1,217 10 6
Walters & Johns, Morrison ... 1,211 9 0
T. D. Jones ... 1,177 11 0
J. Walters, Langyfelach ... 1,160 0 0
Thomas & Jones,* Morrison ... 1,082 0 0

* Accepted. [Rest of Swansea.]

Norwich.—For the erection of the new County Council offices, and additions to the Shirehouse, for the Norfolk County Council. Mr. Edwin J. Tench, A.R.I.B.A., architect, Royal Insurance Buildings, Norwich. Quantities by Mr. W. Harker Bousfield, Norwich:—

J. Thompson & Co., Peterborough ... £14,055 0 0
Stephens, Bastow & Co., Bristol ... 13,998 0 0
R. W. Riches, Postwick ... 13,533 0 0
Coulson & Lofts, Cambridge ... 13,524 0 0
W. Sindall, Cambridge ... 13,449 0 0
H. J. Linnell, Newmarket ... 13,440 0 0
Patman & Fotheringham, London ... 13,950 0 0
J. Hurn, Norwich ... 12,914 0 0
J. S. Smith, Norwich ... 12,888 0 0
Bell & Sons, Cambridge ... 12,880 0 0
J. Downing & Son, Norwich ... 12,823 0 0
R. Daws & Son, Norwich ... 12,814 0 0
T. Parkington & Son, Ipswich ... 12,890 0 0
Scarles Brothers, Norwich ... 12,666 0 0
The Oak Building Co., Cambridge ... 12,640 0 0
G. E. Hawes, Norwich ... 12,580 0 0
Kerridge & Shaw, Cambridge ... 12,559 0 0
J. Youngs, Norwich ... 12,498 0 0
T. H. Yelf, Norwich ... 12,497 10 0

T. Gill,* Norwich ... £12,240 0 0
[Architect's estimate, £12,105.]
* Provisionally accepted.

Oxford.—For making additions and alterations to Cherwell Hall College, and for rebuilding Milham Ford School, Oxford, for the Church Education Corporation, Ltd. Mr. W. Andrew, architect, Parkstone:—

Milham Ford. Cherwell Hall.
Brucker Brothers, Oxford ... £4,842 0 0
Baker & Pearcey, Parkstone ... 4,055 5 0
Bloxham, Banbury ... 3,937 0 0
W. H. Siarey, Wallingford ... 3,924 0 0
Knowles & Son, Oxford ... 3,923 0 0
Organ Brothers, Oxford ... 3,893 0 0
C. Curtis, Oxford ... 3,845 0 0
Simm & Son, Oxford ... 3,794 0 0
J. Woodbridge, Oxford ... 3,787 0 0
Wyatt & Son, Oxford ... 3,760 0 0
Parnell & Sons, Rugby ... 3,617 0 0
Hutchins & Son, Oxford ... 3,585 0 0
A. J. Colborne, Swindon ... 3,461 13 0
Kingerlee & Son,* Oxford ... 3,366 0 0

* Accepted.

St. Albans.—For carrying out additions and alterations to the Garden Fields County Council School, St. Albans, for the Hertfordshire County Council. Mr. Urban A. Smith, county surveyor, Hatfield:—

W. Payne, Leavesden, Watford ... £2,497 8 4
F. J. Bailey, Ashwell ... 2,495 0 0
F. W. Stanley ... 2,481 0 6
Gibson & Co., Hendon ... 2,354 0 0
W. Irwin, Islington ... 2,297 0 0
H. A. Williamson ... 2,234 13 5
Miskin & Sons, Romeland ... 2,190 0 0
F. & G. Foster, Norwood Junction ... 2,187 0 0
J. T. Bushell ... 2,175 0 0
C. W. Dumbleton ... 2,162 0 0
W. H. Hyde,* Clifford Road, Norwood Junction, S.E. ... 2,038 0 0

* Accepted. [Rest of St. Albans.]

St. Albans.—For carrying out additions and alterations to the Priory Park County Council School, St. Albans, for the Hertfordshire County Council. Mr. Urban A. Smith, county surveyor:—

Bailey & Sons, Watford ... £1,533 8 11
G. E. Wallis & Sons, Maidstone ... 1,499 0 0
E. Dunham, St. Albans ... 1,428 6 6
J. Willmott & Sons, Hitchin ... 1,404 11 10
C. Miskin & Sons, St. Albans ... 1,383 0 0
H. Flint, High Wycombe ... 1,366 0 0
J. & W. Drake, London, W. ... 1,349 0 0
E. Brown & Son, Wellingborough ... 1,330 0 0
F. & G. Foster, Norwood Junction ... 1,296 0 0
W. H. Hyde, Norwood Junction ... 1,274 0 0
Co-operative Builders, Kettering ... 1,256 9 0
T. Cuthbert,* Hyson Green, Nottingham ... 1,242 5 0

* Accepted.

Swindon.—For the erection of laundry buildings and disinfectant house, for the Guardians of Swindon and High-worth Union. Mr. R. J. Bird, M.S.A., architect, 10, Victoria Road, Swindon:—

P. Chick, Highworth ... £1,703 0 0
R. J. Leighfield ... 1,562 0 0
Norman ... 1,473 0 0
A. J. Colborne ... 1,449 15 6
Tydenam Brothers ... 1,400 0 0
Spackman Brothers,* Hunt Street ... 1,347 10 0

* Accepted. [Rest of Swindon.]

Westerhope.—Accepted for the erection of a new County Council school at Westerhope, near Newcastle-on-Tyne, for the Northumberland County Council Education Committee. Mr. G. Topham Forrest, architect to the Education Committee. Quantities by Messrs. J. P. Allen & Partners, Newcastle-on-Tyne:—
S. Eastew, Ltd., Newcastle-on-Tyne ... £4,100

Bankruptcies.

[Abbreviations: R.O.—receiving order; P.E.—public examination; C.C.—county court; O.R.—official receiver; Adj.—Adjudication.]

DURING THE WEEK ending June 22nd twenty-six failures in the building and timber trades in England and Wales were gazetted.

H. LEWIS, builder, Hurst. Adj. June 13th.
T. C. LEWIS, builder, Portland. R.O. June 11th.
H. G. LANE, builder, Orpington. R.O. June 12th.
W. DRAKE, builder, Poulton. Gross liabilities £1,932.
S. LEONARD, builder, Bexhill. Liabilities £423.
H. BURKE & Co., steel contractors, Manchester. P.E., Manchester C.C., June 26th, at 3.
LUCIUS & WORSLEY, builders, Waterhead, near Oldham. R.O. June 14th.
C. W. MATTOCK, builder and contractor, Leicester. P.E., The Castle, Leicester, June 29th, at 10.
G. S. WILLIAMS, builder and contractor, Wolverhampton. P.E., Dudley C.C., July 3rd, at 11.
P. E. MILLER, builder, Balham and Tooting Graveney. Adj. June 11th.
C. W. MATTOCK, builder and contractor, Leicester. Gross liabilities £3,075; assets, 428.
A. H. ATKINSON, builder and contractor, Hull. Gross liabilities £97,883; assets estimated at £2,272.
C. H. DODD, builder and decorator, Halsead. Gross liabilities £744; assets £183.
FUGE & ROSSER, builders and contractors, Swansea. R.O. June 13th.
C. COTCHING, builder, Epping and Walthamstow. Adj. June 13th.
H. COLES, builder, Portsmouth. First meeting, O.R.'s, Portsmouth, June 28th, at 3. P.E., Portsmouth C.C., July 30th, at 11.
J. H. DIXON, contractor, South Luffenham. First meeting, O.R.'s, Leicester, June 27th, at 2.30. P.E., The Castle, Leicester, June 29th, at 10.
BRADLEY, KRISCHKE & Co., plasterers and concreters, Bradford. First meeting, O.R.'s, Bradford, June 28th, at 3. P.E., Bradford C.C., July 18th, at 10.

Builders' Current Price List of Specialities.

This list is not intended to promote undercutting, and prices are subject to discounts for a quantity and for cash. Readers are advised to write for these discounts. Where prices for goods are standardised and fluctuation takes place in trade discounts, our prices have the discounts deducted. In some cases it is difficult for firms to quote prices, and we have stated where they will be pleased to send catalogues and quotations immediately on receipt of applications.

Goods.	Description.	Merchants or Manufacturers.	Address.	Size.	Weight.	Quantity.	Price		
							On Rail.	Divrd. at London Termini.	Divrd. to Buyer.
Baths:									
Iron	Rolled edge, white vitreous enamelled.	Doulton & Co., Ltd.	Lambeth, London	5ft. 6in. inside.	—	each	£4 7s. 6d.	—	—
Bathroom Suites	Complete as advertised	Standard Sanitary Manufacturing Co.	22, Holborn Viaduct, London.	—	—	—	—	—	£18 18s.
Blinds:									
"Japa"	Sanitary	Japa Blinds, Ltd.	55, Barbican, London, E.C.	All sizes	72 long 36 wide.	—	—	From 2s. 6d. to 16s. doz.	Free.
Boilers:									
Saville	Wrought-iron for hot-water heating and supply.	Hartley & Sugden, Ltd.	Halifax	30 x 13 to 72 x 30.	3 cwt. to 17 cwt.	each	£9 5s. to £52.	Free in Great Britain.	—
Bricks:									
Blue	Staffordshire pressed	Hathern Station Brick and Terra Cotta Co., Ltd.	Loughborough	9 x 4½ x 2½	3'5 tons	1000	£2 15s.	£3 13s.	—
Facing	Blue and brindled	G. Woolliscroft & Sons, Ltd.	Hanley, Staffs.	9 x 4½ x 3	3'75 tons	1000	35s. to 37s. 6d.	£4 3s. to £3 5s. 6d.	—
Facing	Red terra-cotta	G. Woolliscroft & Sons, Ltd.	Hanley, Staffs.	9 x 4½ x 3	3'75 tons	1000	£2 10s.	£3 18s.	—
Stocks	Sand stocks	Gibbs Brothers	Loughborough	9 x 4½ x 2½	2'12 tons	1000	£2	£2 15s.	—
Casements and Sashes:									
Metal Casements	Iron, steel, and bronze	George Wragge, Ltd.	London and Manchester	Registered sections.	—	each	From 15s.	16s.	—
Metal Sashes	Ditto	Ditto	Ditto	Ditto	—	ft. super.	From 6d.	—	—
Castings:									
Iron	Plain and ornamental	Walter Macfarlane & Co.	Saracen Foundry, Glasgow	—	—	—	Prices on application.		
Cement, Lime, &c.:									
Cement	Portland	Associated Portland Cement Manufacturers (1900), Ltd.	Dixon House, 72, Fenchurch Street, E.C.	—	—	—	Prices on application.		
Lime	—	Associated Portland Cement Manufacturers (1900), Ltd.	Dixon House, 72, Fenchurch Street, E.C.	—	—	—	Prices on application.		
Chimney-Pieces:									
Marble	—	J. & H. Patteson	7, Bayley Street, Bedford Sq., London, and Oxford St., Manchester.	—	—	—	Prices on application.		
Chimney Pots	"Notlor" patent self-flanching and weathering.	Notley & Taylor	Finsbury Pavement House, E.C.	9 x 9 and 14 x 9 flues.	—	—	—	From 3s. 6d.	—
Closets:									
Cisterns, Seats, &c.	For houses	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	set, with fittings.	£2 to £10	—	—
Latrines	For schools and workmen	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	stall each	30s. to 70s.	—	—
"Simplicitas"	—	Doulton & Co., Ltd.	Lambeth, London	—	—	—	£1 15s.	—	—
Columns	Cast-iron	Measures Bros., Ltd.	53B, Southwark Street, London, S.E.	stock patterns. 4ft. x 8 to 18ft. x 8in. and 1in.	—	ton	£7	£7	—
Compoboard	Swedish	Messers, Ltd.	79½, Gracechurch Street, E.C.	—	1 ton	2,000ft. super.	Prices on application.		
Concrete:									
Armoured	Floors and roofs	Trussed Concrete Steel Co.	Caxton House, Westminster.	—	—	sq. yard	—	—	8s.*
Conduits:									
"Simplex" steel	Screwed wireduc.	Simplex Steel Conduit Co., Ltd.	Garrison Lane, Birmingham.	½ to 2 diam.	20lbs. to 140lbs.	100ft.	—	—	12s. 8d. to £3 3s.
Door Furniture:									
Door Springs	With silent check	Robert Adams (patentee)	3 & 5, Emerald Street, London, W.C.	For medium doors.	—	each	D.A. 46s. S.A. 42s.	D.A. 46s. S.A. 42s.	—
Sliding Door Fittings	Top and bottom rollers and guide rails.	John Bousfield	Bar Ironworks, York	various	—	each	—	rollers from 6s. 6d.	—
Drain:									
Testing Apparatus	For smoke or air test: No. 358	Burn Brothers	Rotunda Works, 3, Blackfriars Rd., London, S.E.	—	About 30lbs.	each	£4 4s.	—	—
Elevators:									
"Otis"	Electric and hydraulic	Otis Elevator Co., Ltd.	4, Queen Victoria Street, London.	—	—	—	Prices on application.		
Enamels:									
"Sanaline"	Pure white or colours	Aspinall's Enamel, Ltd.	New Cross, London	—	—	gallon	—	—	18s.
Faience:									
White and coloured	For elevations	Alfred Whitehead	Prudential Build'gs, Leeds	—	—	sq. yard	74s. 6d.	79s.	—
Fans:									
Fans, Blowers, and Motors.	Belt, electric or steam driven.	Matthews & Yates, Ltd.	Cyclone Works, Swinton, Manchester.	all sizes	—	—	Prices on application.		
Felt:									
Ruberoid Sacking Felt	High-grade inodorous felt	Robert W. Blackwell & Co., Ltd.	59, City Road, London, E.C.	36 x 72	44lbs.	roll, 24sq. yds.	—	—	13s. 6d.
Fencing:									
Iron	"Greenhill" patent automatic railing.	Hill & Smith	Brierley Hill Iron Works, Staffs.	3ft. high ½ verticals.	40lbs. yd.	yard	4s. 5d.	4s. 9d.	—
Fireproofing (See also Partitions):									
Terrawode Brickwood	Fireproof floors	Jabez Thompson & Sons	Northwich, Cheshire	4ins. thick	—	sq. yd.	6s.	7s.	—
Columbian	Reinforced concrete floors and roofs.	Columbian Fireproofing Co.	37, King William Street, London.	—	—	—	Prices on application.		
Steel Sheeting	For partitions, reinforced concrete, damp-course, &c.	The Fireproof Co., Ltd.	10, York Buildings, Adelphi, W.C.	all sizes	all weights.	sq. yard	from 1s. 3d.	from 1s. 3d.	plus rail charge
Expanded Steel	Reinforcement for every description of concrete work.	New Expanded Metal Co.	York Mansion, York Street, Westminster, S.W.	up to 16ft. x 8ft.	2lbs. to 30lbs.	sq. yard	5d. to 4s. 9d.	Price list on application.	
Floors and Roofs	Steel concrete	Homan & Rodgers	17, Gracechurch Street	—	—	sq. yd.	—	—	7s.*
Floors and Roofs	Reinforced concrete	Trussed Concrete Steel Co.	Caxton House, Westminster.	—	—	sq. yd.	—	—	8s.*
Floors and Roofs	Reinforced concrete	Potter & Co., Ltd.	66, Victoria Street, London, S.W.	—	—	sq. yard	—	—	From 6s.*
Floors:									
Columbian	Concrete fireproof floors and roofs.	Columbian Fireproofing Co.	37, King William Street, London.	—	—	—	Prices on application.		
Euboelolith	Patent flooring	Euboelolith Patent Flooring	3, Victoria Street, Westminster.	—	—	yard sup.	5s. to 6s.	—	—

* Erected.

This List is not intended to promote undercutting. Readers should write for discounts for quantity and for cash.

Builders' Current Price List of Specialities—(continued).

Goods.	Description.	Merchants or Manufacturers.	Address.	Size.	Weight.	Quantity. per	Price		
							On Rail.	Divrd. at London Termini.	Divrd to Buyer.
Galvanised Iron:									
Sheets - - -	Corrugated - - -	Baldwins, Ltd. - - -	5, Fenchurch St., London, E.C.	5ft. to 6ft. x 2ft. x 22 or 24 G.	—	ton	—	£14 10s.	—
Sheets - - -	Flat - - -	Baldwins, Ltd. - - -	5, Fenchurch St., London, E.C.	72 x 24 to 36 x 20 or 24 G.	—	ton	—	£15	—
Buildings - - -	Of every description - - -	Baldwins, Ltd. - - -	5, Fenchurch St., London, E.C.	—	—	—	Prices on application.		
Gas Generators:									
Acetylene - - -	Five-light portable - - -	Strode & Co. - - -	48, Osnaburgh Street, London.	15ins. diameter, 24ins. high.	—	each	—	£3	—
Glass:									
Stained and Embossed - - -	Leaded lights, embossed and brilliant cutglass.	Young & Martin, Ltd.	Stratford, E.	—	—	—	Prices on application.		
Stained - - -	Memorial and other windows	E. E. Oldacre & Co. - - -	Stirling Place, Hove	—	—	ft. super.	Prices on application.		
Guards, Wire:									
Straight Lattice - - -	Half mesh - - -	Richard Johnson, Clapham & Morris, Ltd.	Manchester - - -	6ft. x 3ft.	14lbs.	sq. ft.	5d.	5½d.	5¾d.
Hooks:									
Hat and Coat - - -	"Schola" pattern for schools, &c.	Brookes & Co., Ltd. - - -	4, Cateaton Street, Manchester.	—	—	—	Prices on application.		
Joinery:									
Panelling - - -	High class 1-in. Austrian oak panelling.	Elliott's Moulding & Joinery Co., Ltd.	Newbury - - -	3ft. to 7ft. high.	ft. super.	2s.	2s. 1d.	—	—
Joists:									
Steel - - -	Broad flange beams - - -	H. J. Skelton & Co. - - -	71, Finsbury Pavement, London, E.C.	—	—	ton	—	£6 10s.	—
Steel - - -	English and foreign - - -	Columbian Fireproofing Co.	37, King William Street, London.	—	—	—	Prices on application.		
Steel - - -	Belgian and German - - -	Measures Bros., Ltd. - - -	53B, Southwark Street, London, S.E.	7 3 to 20 deep.	—	ton	£6 10s. basis sections.	£6 10s. basis sections.	—
Laundry Machinery:									
Ironing Machines - - -	High-class "Decondin" - - -	W. Summerscales & Sons, Ltd.	Keighley, Yorks - - -	54ins. to 120ins.	—	each	£50 to £180	£52 to £188 10s.	—
Lavatories:									
Glazed Ware - - -	For schools, workmen, and private houses.	Adamsez, Ltd. - - -	Scotswood-on-Tyne - - -	—	—	set, with fittings.	£1 10s. to £4.	—	—
Leaded Lights - - -	All descriptions - - -	E. E. Oldacre & Co. - - -	Stirling Place, Hove	—	—	ft. super.	Prices on application.		
Lifts:									
Electric - - -	All other types - - -	A. Smith & Stevens - - -	Battersea, London	All sizes.	All weights.	—	Prices on application.		
Hand-power - - -	All kinds, for all purposes - - -	George Johnson - - -	227, St. John's Hill, London, S.W.	—	—	—	Prices on application.		
"The Premier" - - -	Dinner and service lift to raise ½ cwt.	The Lift and Hoist Co. - - -	Premier Iron Works, Prince Street, Deptford, S.E.	Cage inside 2ft. wide, 1ft. 6 deep, 2ft. 6 high.	—	—	—	£9 10s.	—
Lighting and Heating:									
Electric light and gasfittings, &c.	—	Young & Martin, Ltd.	Stratford, E.	—	—	—	Prices on application.		
Lightning Conductors	Copper tape - - -	Joseph Lewis - - -	5 & 6, Great Winchester Street, London, E.C.	¾ x ¾ and upwards.	—	foot run	from 1s.	—	—
Locks:									
Coin Collecting - - -	Bright brass or bronzed - - -	New Century Co. - - -	235, High Holborn, London, W.C.	14ins. x 4½ins. x 1½ins.	—	each	—	—	35s.
Kaye's Patent - - -	Four lever mortice, iron and brass.	Joseph Kaye & Sons, Ltd. - - -	93, High Holborn, London, W.C.	—	—	each	—	—	7s. 6d. 10s. 6d.
"C. and B." - - -	Registered mortise Nos. 1, 2, and 3.	Colledge & Bridgen - - -	Midland Works, Wolverhampton.	6 inch	—	dozen	—	—	£3 6s. £2 5s. £1 10s.
Mantelpieces:									
White Wood - - -	With overmantel - - -	The Hardware Trading Co.	12, New Oxford Street, London, W.C.	Opening 38 x 38.	72ins.	each	£2	—	—
Marble, Mosaic, and Stone Work:									
Glass Mosaic - - -	Coloured art - - -	The Cloisonné Glass Co. - - -	40, Berners Street, W.	—	—	sq. ft.	—	From 3s. upwards.	—
—	Plain or to design - - -	J. & H. Patteson - - -	7, Bayley Street, Bedford Square, London, and Oxford Street, Manchester.	—	—	—	Prices on application.		
Motor Wagons - - -	Steam - - -	St. Pancras Ironworks Co., Ltd.	171, St. Pancras Road, London, N.W.	—	4 tons 19 cwt.	each	—	From £530.	—
Paint:									
"Japonika," Enamel - - -	Elastic, impervious, covers goyds. sup. per gal.	John Line & Sons, Ltd. - - -	Alfred Place, Tottenham Court Rd., London, W.C.	—	—	gallon	18s.	—	—
Anti-corrosive, &c. - - -	"Bitumastic" solution and enamel.	Wales, Dove & Co., Ltd. - - -	Newcastle-on-Tyne, London, Liverpool, Cardiff, Birmingham, and Glasgow.	—	—	—	Prices on application.		
Partitions:									
Dovetail Corrugated Steel Sheeting.	For partitions, reinforced concrete, &c.	The Fireproof Co., Ltd. - - -	10, York Buildings, Adelphi, W.C.	All sizes	All weights.	sq. yard	From 1s. 3d.	From 1s. 3d.	1s. 3d. plus rail.
Partitions - - -	"Kulm" slabs - - -	H. W. Cullum & Co. - - -	Craven House, Kingsway, London, S.W.	—	—	sq. yard	Prices on application.		
Patent Plaster - - -	Hollow interlocking blocks - - -	Havelock Patent Plaster Partition Co.	63, Finsbury Pavement, E.C.	29 x 17	70lbs. super. yard.	super. yard.	3s. 6d.	4s. 6d.	6s.*
Plaster - - -	Partition slabs - - -	Jabez Thompson & Sons - - -	Northwich, Cheshire	12 x 12 x 2	—	sq. yard	3s. 6d.	4s.	—
Porous Brick - - -	Porous terra-cotta blocks - - -	Hempstead Patent Brick Co.	Hemel Hempstead	9 x 12 x 1½	—	sq. yard	2s.	2s. 4d.	—
Terravode Brickwood School - - -	Partition bricks - - -	Jabez Thompson & Sons - - -	Northwich, Cheshire	9 x 4½ x 3	2 tons	1000 sq. ft.	£3 5s.	£4 9s.	—
—	—	John Stones - - -	"Rosside," Ulverston	—	—	—	Prices on application.		
Pavement Lights	Prismatic - - -	St. Pancras Ironworks Co., Ltd.	171, St. Pancras Road, London, N.W.	—	—	per ft. super.	—	From 4s. 6d.	—
Photo Prints, Copies, &c.:									
"True to scale" - - -	(Dorel system) - - -	W. F. Stanley & Co., Ltd. - - -	13, Railway Approach, London Bridge, S.E.	Imperial	—	2 copies	—	—	2s. 3d. p.free.
True scale - - -	Dorel and photo-litho methods.	Vincent, Brooks, Day & Son, Ltd.	48, Parker Street, Kingsway, London, W.C.	—	—	—	Prices on application.		
All Kinds - - -	On any material - - -	London Drawing and Tracing Office.	98, Gray's Inn Road	—	—	—	Prices on application.		

* Executed.

This List is not intended to promote undercutting. Readers should write for discounts and for quantity for cash.

Builders' Current Price List of Specialities—(continued).

Goods.	Description.	Merchants or Manufacturers.	Address.	Size.	Weight.	Quantity per	Price		
							On Rail	Divrd. at London Termini	Divrd. to Buyer.
Pipes:									
Columbian	Armoured cement for water and sewage conveyance.	Columbian Fireproofing Co.	37, King William Street, London.	—	—	—	Prices on application.		
Drain (iron)	Immense assortment of fittings stocked.	Burn Bros.	Rotunda Works, 3, Blackfriars Rd., London, S.E.	2 to 6	L.C.C. weights.	—	Prices on application.		
Pipe joint paste	"Wisconsin" Graphite	G. F. Hopkins & Co.	112, Westminster Bridge Road, London, S.E.	—	—	1 lb. to 60 lbs.	1s. 1d. to 6d.	—	—
Plaster:									
Fibrous, &c.	For relief decoration	G. and A. Brown, Ltd.	167, Hammersmith Road, W.	—	—	—	Prices on application.		
Keene's & Parian	—	Associated Portland Cement Manufacturers (1900), Ltd.	Dixon House, 72, Fenchurch Street, E.C.	—	—	—	Prices on application.		
"Pytho"	For interior plastering	Plaster, Brick, and Stone Co., Ltd.	Wall Grange, near Leek, Staffs.	—	1 ton	—	37s. 6d.	42s. 2d.	—
Rainwater Heads and Pipes:									
Rainwater Heads	Cast lead and iron	George Wragge, Ltd.	London and Manchester	stock designs.	—	each	From 16s. 6d.	17s. 6d.	—
Roofs:									
Rubberoid Roofing	High-grade prepared roofing	Robert W. Blackwell & Co., Ltd.	59, City Road, London, E.C.	36 x 72	40lbs. to 100lbs.	216 sq. ft.	—	1 ply, 17s. 4d.; 2 ply, 16s. 6d.; From 6d. upwds.*	1 ply, 20s. 6d.; 3 ply, 34s. 6d.
Steel	Principals and corrugated iron	E. F. Blakeley & Co.	Vauxhall Ironworks, Liverpool.	—	—	ft. super.	—	—	—
Sanitary:									
Engineers' Appliances	Baths, lavatories, closets, pipes, cisterns, pumps, &c.	Young & Marten, Ltd.	Stratford, E.	—	—	—	Prices on application.		
Syphons and Tanks	Automatic flushing	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	each	£1 to £3	—	—
Waste Preventors	"Paisley," painted	Doulton & Co., Ltd.	Lambeth, London	2 gallon	—	each	£1 3s. 6d.	—	—
Waste Preventors	"Well," painted	Doulton & Co., Ltd.	Lambeth, London	2 gallon	—	each	16s.	—	—
Scaffolding:									
Putlogs	Hewn birch	Vigers Bros.	67-68, King William Street, E.C.	—	—	dozen	5s. 3d. in docks.	—	—
Shutters:									
Revolving	No. 7 convex wood lath	Clark, Bunnett & Co., Ltd.	New Cross Road, London, S.E.	—	—	ft. super.	1s. 6d.	—	—
Signs	Anything and Everything	H. B. Torode	22, Henrietta Street, Strand	L.C.C. regulation size	—	—	Prices on application.		
Sinks:									
Glazed Ware	"Krator," "Helios" "Bel-fast" and "Edinburgh."	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	each	10s. to £5.	—	—
Slates and Slating:									
"Arfon" Slates	Unfading green	Pearson Bros. & Campbell	18, Water Street, Liverpool	—	—	—	Prices on application.		
Buttermere or Cumberland and Westmoreland Green Slates	Light sea green, olive, and dark.	Buttermere Green Slate and Stone Works.	Keswick	30 to 12 long.	—	ton	£4 5s.	£5	—
Slating and Tiling	All kinds—green slating speciality.	Roberts, Adlard & Co.	London, Faversham, Brighton, &c.	as required	—	1,000	Prices on application.		
Slates and Slating	Portmadoc, French and American.	Young & Marten, Ltd.	Stratford, E.	—	—	—	Prices on application.		
Sound-Proofing:									
Deafening Quilt	Cabots' double ply	Arthur L. Gibson & Co.	19/21, Tower Street, Upper St. Martin's Lane, London, W.C.	—	120 lbs.	bale, 500sq. ft.	36s. 6d.	—	—
Spring:									
Door Checks	"Blount"	Charles Winn & Co.	Birmingham	—	—	—	Prices on application.		
Stone:									
Bramley Fall	Sandstone, light and grey	B. Whitaker & Sons, Ltd.	Horsforth, near Leeds	any sizes	14ft. to 1 ton.	cube ft.	10d.	1s. 9d.	—
Granite	Architectural and monumental.	Kirkpatrick Brothers	Trafford Park, Manchester	—	—	—	Prices on application.		
Dark-Bed Hopton Wood	Hard limestone, colour grey	J. Hodson & Son, Ltd.	Nottingham	random blocks.	—	foot cube	1s. 2d.	2s.	—
Yorkshire	Sandstone, various colours	J. Hodson & Son, Ltd.	Nottingham	random slabs.	14ft. cube to ton.	foot cube	From 2s.	From 2s. 10d.	From 3s.
Staircases:									
Spiral	—	St. Pancras Ironworks Co., Ltd.	171, St. Pancras Road, London, N.W.	From 3ft. 6ins. in diameter.	—	per ft. rise.	—	—	—
Terra-cotta:									
Window Heads	Buff or red	Walwyn T. Chapman	Cleethorpes	3 x 9 4 1/2 x 10.	1 cwt.	each	5s.	—	—
Tiles:									
Coloured Enamelled	Best quality in brown, blue, green, &c.	Carter & Co.	Encaustic Tile Works, Poole.	usual sizes	1 ton	55yds. per yd.	10s. 6d. sup.	11s. per yd. sup.	11s. 2d. per yd.
Tessellated	Best quality any plain pattern	Carter & Co.	Encaustic Tile Works, Poole.	usual sizes	2 tons	80yds. sup. per yd.	5s. per yd. sup.	5s. 4d. per yd.	5s. 6d. per yd.
Decorative	Floor	Craven, Dunnill & Co., Ltd.	Jackfield, R.S.O., Shropshire.	every size	50lbs.	sq. yard	from 3s. 6d.	4s. 6d.	4s. 6d.
	Wall	Ditto	Ditto	—	40lbs.	—	from 5s. 6d.	6s. 4d.	6s. 4d.
	Mosaic	Ditto	Ditto	—	48lbs.	—	from 13s. 9d.	15s.	15s.
	Faience	Ditto	Ditto	—	170lbs.	—	from £1 3s.	£1 5s.	£1 5s.
"Opalite"	Opal glass, with Sheldermine backing.	Wm. Griffiths	126, Hamilton Ho., Bishopsgate, St. Without, E.C.	9 x 3 and 6 x 6	—	sq. yard	—	—	10s. 6d.†
Wall	Patent undercut back	T. & R. Boote, Ltd.	Burslem	6 x 6	50 lbs.	sq. yard	6s.	6s. 6d.	6s. 9d.‡
"Durolite"	Glass tiles, with patent fire-proof backing to prevent surface cracking.	Durolite, Ltd.	36, Camomile Street, London, E.C., and St. Helens, Lancashire.	white and tinted 6 x 6 and 9 x 3 marbles 12 x 6	—	sq. yd.	—	—	whiter 10s. 0d. tinted 11s. 6d. marbles 12s. 6d. 19s.
Tracing Cloth:									
"Ivoryine"	Pure white	Norton & Gregory, Ltd.	Castle Lane, Westminster	30ins. x 24yds.	—	roll	Prices on application.		
"Koh-i-noor"	—	L. & C. Hardmuth	12, Golden Lane, London, E.C.	30, 36, 40, 42, 30ins. x 20yds.	—	roll of 24yds. roll	—	—	11s.
"Triumph" Brand	Blue	Norton & Gregory, Ltd.	Castle Lane, Westminster	—	—	—	—	—	—
Urinals:									
Glazed Ware	Circular slab and T-backs	Adamsez, Ltd.	Scotswood-on-Tyne	—	—	stall, with fittings.	£3 to £15	—	—
Ventilators:									
"Acme" and Spherical	Exhausts and intakes	Acme Ventilating & Heating Co.	35, Tarleton Street, Liverpool.	6ins. to 24 diam. tube	—	each	—	—	17s. 6d. to £15.
Boyle's Patent	Latest "air-pump" ventilators (design No. 175).	Robert Boyle & Son	London and Glasgow	2ins. to 54ins. diam.	—	—	—	—	25s. to £18 18s
Vices:									
"Lightning"	Instantaneous action	C. Nurse & Co.	181-183, Walworth Road, London, S.E.	jaws 9 ins. opening 12	50 lbs.	each	17s.	—	—

* Erected.

† Approximate price fixed, complete, in London.

‡ Executed.

This List is not intended to promote undercutting. Readers should write for discounts for quantity and for cash.

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